



July 2021

### Review for North Twin Hydroelectric Development Certification by the Low Impact Hydropower Institute's (LIHI) (Part of the Penobscot Mills Hydroelectric Project)

Prepared by Gary M. Franc July 27, 2021

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### I. INTRODUCTION

The Penobscot Mills Hydroelectric Project (PMHP) consists of four hydroelectric developments and a storage dam located between river mile (RM) 2.0 and RM 15.0 on the west branch of the Penobscot River<sup>1</sup> near Millinocket and East Millinocket, Maine. The PMHP is licensed with the Federal Energy Regulatory Commission (FERC) as Project No. 2458. From upstream to downstream these hydropower developments are the Millinocket Lake, North Twin, Millinocket, Dolby, and East Millinocket.

Two of these developments, Millinocket and Dolby, are currently certified by LIHI as Project #167 with a certification period that began on September 6, 2019 and which will terminate on September 5, 2024. The review for LIHI certification in this report only pertains to the North Twin Development.

These hydropower developments were originally constructed to meet the mechanical demands of the Millinocket paper mill, constructed in 1900, and the East Millinocket Mill Dam, constructed in 1906. Millinocket Lake contains a pumping station, located on the opposite end of the lake from the dam. Water can be pumped up approximately 12 feet from Millinocket Lake to Ambajejus Lake, which is part of the North Twin impoundment. The North Twin Dam is positioned approximately 14.9 river miles above the confluence of the East and West Branches of the Penobscot River and approximately 2.6 miles upstream of Quakish Lake.

A Section 401 Water Quality Certificate (WQC) was issued by the Maine Department of Environmental Protection (MDEP) on April 22, 1993 and amended by MDEP on July 18, 2012<sup>2</sup>. FERC's Environmental Impact Statement (FEIS) was issued on October 1, 1996<sup>3</sup>. The FERC issued a 30-year major license for the PMHP to Great Northern Paper, Inc. (GNP) on October 22, 1996, effective October 1, 1996, which expires on October 1, 2026<sup>4</sup>. On August 26, 2002, GNP changed its name to Great Lakes Hydro America, LLC (GLHA)<sup>5</sup> which is a wholly owned subsidiary of Brookfield Renewable Partners (BRP).<sup>6</sup> On August 18, 2016, the FERC amended the license to remove about 2.5 acres from the Project boundary<sup>7</sup>. On June 11, 2021<sup>8</sup>, GLHA filed a Pre-Application Document (PAD) and a notice of intent to relicense the Project using an Integrated Licensing Process (ILP).

The North Twin Development, which began operation in 1935, has an authorized total installed capacity of 9.84 megawatts (MW) that produced an average annual generation (AAG) of 51,541 megawatt-hours (MWh) for calendar years 2010 through 2019, which corresponds to an annual plant factor of 59.8%.

GLHA submitted an application for LIHI certification on February 16, 2021. The reason for applying for LIHI certification is to participate in the Massachusetts Renewable Portfolio Standard (RPS) program. On April 6, 2021, LIHI notified GLHA that the application intake review was complete. The intake review found that a revised application was not needed but additional information was required.

<sup>&</sup>lt;sup>1</sup> River miles at measured above the confluence of the east and west branches of the Penobscot River.

<sup>&</sup>lt;sup>2</sup> Amended WQC <u>https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13030012</u>

<sup>&</sup>lt;sup>3</sup> FEIS <u>https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=8243822</u>

<sup>&</sup>lt;sup>4</sup> FERC License - https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=3058862

<sup>&</sup>lt;sup>5</sup> https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=10698324

<sup>&</sup>lt;sup>6</sup> Kelly Maloney, Compliance Manager, Northeast Region, Brookfield Renewable, 150 Main Street, Lewiston, Maine 04240, (207) 755-5606, <u>Kelly.Maloney@brookfieldrenewable.com</u>

<sup>&</sup>lt;sup>7</sup> https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14333803

<sup>&</sup>lt;sup>8</sup> Notice of intent - <u>https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15811972</u>



### II. PROJECT GEOGRAPHIC LOCATION

The Penobscot River is 264 miles long, making it the longest river system in Maine (See Figure 1). The river drains nearly one-third of the State of Maine with a watershed area of 8,670 square miles (SQMI). The basin has a low human population density, is largely forested, and contains many large lakes and multiple tributaries.

Drainage of the Penobscot is wholly within the state, and its tributaries are as follows: the East Branch Penobscot River - 1,150 SQMI, the West Branch Penobscot River - 2,140 SQMI, the Mattawamkeag River - 1,520 SQMI, the Piscataquis River - 1,470 SQMI and the Penobscot River - 2,400 SQMI. The river is tidal for the first 25 miles up to the former Veazie dam, which was removed in 2013.



Figure 1 - Penobscot Drainage Basin



Figure 2 is a blowup of the Penobscot Mills Project area in Figure 1. Releases from North Twin Dam (latitude 45° 38' 5.16"N, longitude 68° 46' 50.88"W) enter the Millinocket development impoundment, comprised of Quakish Lake and Ferguson Pond.



Figure 2 - Project Area Blowup

Figure 3 is an aerial side view looking to the west showing the Millinocket development in the foreground and the North Twin development in the background. Water within the Millinocket impoundment can be



Figure 3 - Aerial Side View of Millinocket Development with North Twin Development



released downstream through Stone Dam on Quakish Lake into a 4.5-mile-long bypass reach of the west branch of the Penobscot River known as the "Back Channel", or through the powerhouse from Ferguson Pond which empties into the Millinocket Stream. The Millinocket Stream and the Back Channel converge at Shad Pond about 1.5 miles downstream of the Millinocket tailrace.

There are a number<sup>9</sup> of dams both upstream and downstream of the Penobscot Mills Project developments. A listing of the dams from upstream to downstream include:

- The Ripogenus Project, owned by GLHA and licensed as FERC Project 2572. Releases from the project enter the North Twin impoundment. The project has no upstream or downstream fish passage.
- The PMHP's Millinocket Lake development at RM 19 on the West Branch Penobscot River, owned by GLHA and licensed as part of FERC Project 2458. The development can pump water into the North Twin impoundment. The development has no upstream or downstream fish passage.
- The PMHP's North Twin development at RM 15 on the West Branch Penobscot River, owned by GLHA and licensed as part of FERC Project 2458. The development has an upstream fishway for resident fish species with no downstream fish passage.
- The PMHP's Millinocket development (LIHI #167) at RM 12.3 on the West Branch Penobscot River, owned by GLHA and licensed as part of FERC Project 2458. The development has no upstream or downstream fish passage.
- The PMHP's Dolby development (LIHI #167) at RM 4.2 on the West Branch Penobscot River, owned by GLHA and licensed as part of FERC Project 2458. The development has no upstream or downstream fish passage.
- The PMHP's East Millinocket development at RM 2.5 on the West Branch Penobscot River, owned by GLHA and licensed as part of FERC Project 2458. The development has no upstream or downstream fish passage.
- The Medway Project at RM 0.7 on the West Branch Penobscot River, owned by Black Bear Hydro Partners (BBHP) a subsidiary of Brookfield Renewable, and licensed as FERC Project 2666 (LIHI #65). The project has upstream and downstream eel passage.

There are two US Geological Survey (USGS) gages located upstream of the Project's developments:

- 1. USGS gage 01027240, located immediately below Canada Falls Lake. This gage has a contributing drainage area of 182 SQMI and only started recording streamflow on October 6, 2016;
- 2. USGS gage 01027200, located near Pittston Farm, Maine. This gage has a contributing drainage area of 232 SQMI and started recording streamflow on September 6, 2001.

Flows from both gages combine prior to flowing into Seboomook Lake, then continue downstream into Moose Pond, Chesunook Lake, Caribou and Ripogenus Lake, and finally Ambajejus Lake. Additionally, flow into Millinocket Lake is solely from local drainage.

The first USGS gage (01028000) downstream of the PMHP developments is located on the West Branch of the Penobscot River near Medway, Maine. This gage stopped recording streamflow in November of 1939. Accordingly, the next USGS gage available is the Penobscot River at West Enfield, Maine (01034500) with a drainage area of 6,422 SQMI.

<sup>&</sup>lt;sup>9</sup> The Project developments in this list are italicized.





Due to this situation, mass balance equations are used by GLHA to calculate inflows at the PMHP Project. Real-time inflows for each development are back-calculated based on changes in impoundment elevation, turbine data, tailwater data and gate curves using Brookfield's Supervisory Control and Data Acquisition (SCADA) system. Real-time outflows are estimated based on net head, wicket gate settings, and gate positions.

However, from a historical perspective, inflows into the PMHP Project can be estimated by initially subtracting flows from USGS gages that contribute to the flow at the USGS gage at West Enfield and then prorating the remaining flow to North Twin. These USGS gages are from upstream to downstream:

- 1. The USGS gage on the east branch of the Penobscot River at Grindstone, Maine (01029500) with a drainage area of 837 SQMI. When prorated to its confluence with the West Branch of the Penobscot River its drainage area is 1,150 SQMI;
- 2. The USGS gage on the Mattawamkeag River near Mattawamkeag, Maine (01030500) with a drainage area of 1,418 SQMI. When prorated to its confluence with the Penobscot River its drainage area is 1,520 SQMI;
- 3. The USGS gage on the Piscataquis River at Medford, Maine (01034000) with a drainage area of 1,162 SQMI. When prorated to its confluence with the Penobscot River its drainage area is 1,470 SQMI.

By subtracting flows from these three gages from the flows at the USGS gage at West Enfield, flows on the West Branch of the Penobscot River just prior to its confluence with the east branch of the Penobscot River (WBPR) can be determined. This location has a contributing drainage area of 2,282 SQMI and contains period of record (POR) daily flows from October 1, 1934 to May 21, 2021. Inflows can be estimated by prorating daily flows at WBPR using a ratio of the contributing drainage area, which is (1,877/2,282) or 0.823.

Based on flow duration analyses of estimated flows, the minimum daily flow of 20 CFS occurred on September 26, 1981. The maximum daily flow of 32,980 CFS occurred on April 30, 1973. A daily flow of 1,799 CFS is exceeded about 90% of the time annually. A daily flow of 2,830 CFS is exceeded about 50% of the time annually. A daily flow of 5,794 CFS is exceeded about 10% of the time annually. The 1% exceedance annual daily flow is 12,743 CFS. Based on a frequency analysis, the 10-year daily flow is about 20,990 CFS and the 100-year daily flow is 31,600 CFS.

The POR average annual inflow is 3,433 CFS, about 1.83 CFS per SQMI. POR average monthly flows for January through December are estimated at 3,035, 2,818, 3,452, 6,286, 5,385, 3,140, 2,498, 2,355, 2,455, 2,836, 3,390, and 3,472.

### **III. PROJECT SITE CHARACTERISTICS**

The North Twin Development is located in Penobscot and Piscataquis Counties to the west of Millinocket, Maine, approximately 14.9 RM above the confluence of the East and West Branches of the Penobscot River and 2.6 miles upstream of the Quakish Lake (a.k.a. Stone) Dam (See Figure 4).

The North Twin dam (45° 38' 5.16" N, 68° 46' 50.88" W) is a concrete and earth-filled structure located at the outlet of the impoundment, known as Elbow Lake. The powerhouse and concrete sections of the dam are located between a 500-foot-long southern dike and a 286-foot-long northern dike.



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Figure 4 - Aerial View of North Twin Development Looking Downstream

The Development consists of:

- An impoundment having a normal high water surface elevation of 491.92 feet above mean sea level (FTMSL), comprised of five separate basins Elbow, South Twin, North Twin, Pemadumcook and Ambajejus lakes (collectively referred to as the Pemadumcook Chain of Lakes). The impoundment measures approximately 11.8 miles in length (river course) and has a surface area of approximately 17,790 acres at the full pond elevation of 491.92 FTMSL. The gross storage capacity is 346,000 acre-feet (ACFT) with a mean depth of about 27.7 feet. Usable storage is approximately 344,355 ACFT, with a drawdown of 22 feet;
- A dam measuring approximately 1,051 feet in length, which includes:
  - A 117-foot-long Tainter gate section comprised of two steel Tainter gates and associated piers. Each gate is approximately 50 feet wide and 27.3 feet high. The maximum discharge capacity near the top of the dam (elevation 497.6 FTMSL) through both gates is 72,000 CFS;
  - A 34-foot-wide concrete section, containing a weir fishway and two gated log sluice sections, is located on the opposite end of the powerhouse from the southern earthen dike. Three gates located upstream of the fishway control the flow of water into the chambers of the fishway. Each of the gates measures 1 feet 3 inches wide by 2 feet high. The gates are located at different depths so the fishway can remain operable at various impoundment elevations. The chambers of the fishway extend downstream of the gate approximately 98 feet along the northeastern side of the powerhouse. There is an 8-inch-diameter gravity pipe which provides attraction flows. The pipe extends from an area near the log sluices to the fishway entrances. The pipe intake has a slide gate control with an upstream removable basket trashrack. The pipe bifurcates at its discharge into a "Y" pattern to attract fish to both fishway entrances;



- A 114-foot-wide intake structure measuring 37 feet by 114 feet with nine gate openings. Each gate is 8 feet wide by 13 feet high containing trashracks. Each trashrack is constructed of 3/8-inch bar steel with a 2-5/8-inch clear opening between the bars, and;
- A powerhouse containing three generating units. Units 1 and 2 are vertical Francis turbine/generators with a maximum hydraulic capacity of 1,350 CFS and an installed capacity of 3.2 MW (See Figure 5 and Figure 6). Unit 3 is a vertical Kaplan turbine/generator with a maximum hydraulic capacity of 1,800 CFS and an installed capacity of 3.44 MW (See Figure 7). Water exits the powerhouse through six tailrace bays, each of which are approximately 14 feet wide. A concrete retaining wall extends approximately 28 feet downstream of the powerhouse and protects the downstream side of the southeastern earthen dike. The tailrace is approximately 104 feet wide and conveys the water from the powerhouse back to the river. A tailwater elevation of 460.7 FTMSL results when operating at maximum powerhouse hydraulic capacity of 4,500 CFS at a head of about 30 feet (See Figure 8);
- Six earthen dikes having a combined length of 2,530 feet, located upstream of the dam. Five dikes, with a combined length of 1,850 feet, are located along the eastern shore of the impoundment near the dam. All of the dikes have a crest elevation between 497.6 feet and 498.1 feet and a minimum top width of 10 feet. The dikes are earth fill structures with sheet pile located within the fill. A sixth earthen dike, measuring approximately 680 feet in length, is located approximately 11 RMs upstream of the dam between the North Twin impoundment (at Ambajejus Lake) and Millinocket Lake;
- An outdoor substation containing six transformers located on the northeast side of the powerhouse. Each transformer has a rated capacity of 2,500/2,800 kilovolt amp (kVA), and;
- A transmission line approximately 4.2 miles in length that extends to GLHA's Millinocket substation. The 34.5 kV, transmission line has a capacity of 194 amps.





Figure 6 - Generator 1

Figure 5 - Generator 2



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Figure 7 - Generator 3



Figure 8 - Tailrace Reach



### IV. ZONES OF EFFECT (ZOEs)

There are two ZOEs defined from upstream to downstream. An overview of ZOEs is shown in Figure 5. The three ZOEs are:

- ZOE 1, the impoundment, from the dam upstream to Elbow, South Twin, North Twin, Pemadumcook, and Ambajejus lakes (RM 14.9 to RM 19.0) (See orange shading in Figure 2 above), and;
- ZOE 2, the tailrace extending approximately 0.8 mile below the dam (RM 14.90 down to RM 14.11) (See Figure 9).

The alternative standards selected to satisfy the LIHI certification criteria in each of these ZOEs are identified in Table 1. As part of my review process, I checked and agreed with their selections as identified in Table 1.



Figure 9 - ZOE2



#### **Table 1: Zones of Effect**

CRITERION and STANDARD SELECTED										
	Α	В	С	D	Ε	F	G	Н		
Zone Number and Zone Name	Ecological Flows	Water Quality	Upstream Fish Passage	Downstrea m Fish Passage	Shoreline and Watershed Protection	Threatened and Endangered Species	Cultural and Historic Resources	Recreational Resources		
1. Impoundment	2	2	1	1	2	2	2	2		
2. Tailrace Reach	2	2	1	1	2	2	1	2		

### V. REGULATORY AND COMPLIANCE STATUS

A WQC was issued by the MDEP on April 22, 1993. FERC's Environmental Impact Statement (FEIS) was issued on October 1, 1996<sup>10</sup>. The FERC issued a 30-year major license for the PMHP to GNP on October 22, 1996, effective October 1, 1996, which expires on October 1, 2026<sup>11</sup>.

On August 26, 2002, GNP changed its name to GLHA<sup>12</sup>, a subsidiary of BRP.<sup>13</sup> The MDEP amended the WQC on July 18, 2012<sup>14</sup>. On August 18, 2016, the FERC amended the license to remove about 2.5 acres from the PMHP Project boundary<sup>15</sup>. On June 11, 2021<sup>16</sup>, GLHA file a Pre-Application Document (PAD) and a notice of intent to relicense the PMHP Project using an Integrated Licensing Process (ILP).

#### A. Licensing Requirements

The existing FERC license includes a number of requirements intended to restore, protect, and enhance natural resources and improve public access and recreation. The FERC license contains seventeen license articles pertaining to the one or more of the PMHP developments:

- Article 402 Millinocket Lake will be maintained between elevations 470.0 FTMSL and 480.0 FTMSL while providing water via pumping to maintain impoundment levels;
- Article 404 Develop a plan for complying with all instream flow requirements at the Penobscot Mills developments;
- Article 405 Participate in studies conducted by the United States Environmental Protection Agency (USEPA) and the MDEP to determine the inter-relationship and impacts of atmospheric deposition and water level fluctuations on concentrations of mercury, cadmium, lead, and other toxic metals on aquatic life. Annual reports describing the nature of its activities and cooperation with the two agencies is required;

<sup>&</sup>lt;sup>10</sup> FEIS <u>https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=8243822</u>

<sup>&</sup>lt;sup>11</sup> FERC License - https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=3058862

<sup>&</sup>lt;sup>12</sup> <u>https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=10698324</u>

<sup>&</sup>lt;sup>13</sup> Kelly Maloney, Compliance Manager, Northeast Region, Brookfield Renewable, 150 Main Street, Lewiston, Maine 04240, (207) 755-5606, <u>Kelly.Maloney@brookfieldrenewable.com</u>

<sup>&</sup>lt;sup>14</sup> Amended WQC <u>https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13030012</u>

<sup>&</sup>lt;sup>15</sup> https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14333803

<sup>&</sup>lt;sup>16</sup> Notice of intent - <u>https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15811972</u>



- Article 406 Make appropriate repairs and/or modifications to the existing North Twin fishway. A plan developed in consultation with resource agencies was required within 12 months.
- Article 407 Authority is reserved by the FERC to require the construction, operation, and maintenance of fishways, as may be prescribed by the United States Department of the Interior (USDOI).
- Article 408 The water level in the North Twin impoundment will be maintained at or above the lake trout spawning/incubation level from October 15 through May 1 and will be maintained at a relatively stable level from May 1 through August 22 while maintaining a minimum flow of 2,000 CFS at Millinocket. From August 22 to October 15, higher minimum flows are provided for fisheries, so long as the impoundment has sufficient storage. A Water Use Plan (WUP) must be developed to accomplish these requirements. Exceptions may be temporarily approved for maintenance activities or due to operating emergencies beyond the licensee's control;
- Article 409 Develop a Lake Trout Monitoring Plan (LTMP) within the impoundment for FERC approval within 12 months of license issuance;
- Article 410 Develop a plan to enhance wetlands at the Deep Cove East and Deep Cove West sites on the North Twin impoundment, to benefit existing wetlands affected by operations for FERC approval;
- Article 411 Develop a plan for the design and implementation of artificial nesting structures for common loon and other aquatic birds for FERC approval;
- Article 414 Remove boulders and other obstructions at the shoreline and provide six additional gravel vehicle spaces to the parking area at the Green Bridge boat access site above Quakish Lake;
- Article 415 After consultation with the U.S. Fish and Wildlife Service (USFWS), U.S. National Park Service (USNPS), Maine Department of Inland Fisheries and Wildlife (MDIFW), Maine Department of Conservation (MDOC), and Maine Bureau of Parks and Recreation (MBPR), recreation use monitoring will determine whether existing recreation facilities are meeting recreation needs. Monitoring must begin within six years after license issuance. At a minimum, annual recreation use data will be collected. Every six years during the term of the license, a report of results will be filed with the FERC;
- Article 416 Develop a plan for establishing and collecting fees for use of recreational facilities;
- Article 417 Implement the provisions of the Programmatic Agreement (PA) negotiated between the FERC, the Advisory Council on Historic Preservation, and the Maine State Historic Preservation Officer (SHPO) for managing historic properties that may be affected by operations;
- Article 418 Develop a Shoreline Management Plan (SMP) for FERC approval;
- Article 419 Land conveyance rights. No later than January 31 of each year, a report briefly describing any conveyances made must be filed with FERC;
- Article 420 Consult with Maine Department of Agriculture, Conservation and Forestry (MDACF) regarding the need for a study to mark and remove submerged hazards to recreational navigation in the Millinocket Lake and North Twin impoundment;
- Article 502 Headwater benefits. If the PMHP Project benefits by the construction work of another development of a storage reservoir or other headwater improvement during the term of the license, and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater improvement, the licensee shall reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed.



#### **B.** Compliance Issues

A review of the FERC docket from 2010 to the present indicates GLHA consistently reports minimum flow excursion/deviations to resource agencies and FERC as required. From 2010 to present, numerous deviation reports were filed but most were not related to operations of the North Twin Development. Most deviations across all Project developments were due to factors beyond operator control (e.g., transmission trip, lightning, icing, equipment failure) or were planned drawdowns with prior agency notification. Only one event on August 10, 2015 at North Twin was the result of operator miscommunication about target flows needing to be released from North Twin to ensure minimum flows at the downstream Millinocket development, resulting in an approximate 2-hour deviation at Millinocket. GLHA implemented corrective actions and revised its communication procedures, and FERC determined the event was not a license violation<sup>17</sup>.

### VI. LIHI PUBLIC COMMENTS

GLHA submitted an application package for LIHI certification on March 18, 2021. On April 6, 2021, LIHI notified GLHA that the application intake review was complete. The intake review found that a revised application was not needed but additional information was required. GLHA supplied supplemental documentation on May 20, 2021 and LIHI posted the application for public comment on May 28, 2021. The 60-day public comment period ended on July 27, 2021.

#### A. Comment Letters

On May 28, 2021, LIHI filed notice on their email list that the public comment period for the application has been opened. The notice states, *"LIHI is seeking comment on this application. Comments that are directly tied to specific LIHI criteria (flows, water quality, fish passage, etc.) will be most helpful, but all comments will be considered. Comments may be submitted to the Institute by e-mail at <u>comments@lowimpacthydro.org</u> with <i>"North Twin Comments" in the subject line, or by mail addressed to the Low Impact Hydropower Institute, 1167 Massachusetts Avenue, Office 407, Arlington, MA 02476. Comments must be received at the Institute on or before 5 pm Eastern time on July 27, 2021 to be considered. All comments will be posted to the web site and the applicant will have an opportunity to respond. Any response will also be posted. The project description and complete application can be found HERE<sup>18</sup>."* 

No comments were received.

#### **B. Agency Correspondence**

On May 28, 2021, LIHI<sup>19</sup> emailed contacts<sup>20</sup> listed in the application as knowledgeable about the North Twin Development stating, *"You may have already received this notice if you are on the Low Impact Hydropower Institute (<u>www.lowimpacthydro.org</u>) email list. However, you were also identified as an agency contact on the* 

19 Maryalice Fischer – LIHI Certification Program Director - <u>mfischer@lowimpacthydro.org</u> - 603-664-5097 office - 603-931-9119 cell 20 <u>Nick.Livesay@maine.gov;</u> Jeff.Murphy@noaa.gov; Kathy.Howatt@maine.gov; <u>Kevin.Dunham@maine.gov;</u> Kathleen.Leyden@maine.gov; Gail.Wippelhauser@maine.gov; Kirk.Mohney@maine.gov; <u>kevin\_mendik@NPS.gov;</u> <u>Dan.Kusnierz@penobscotnation.org;</u> mark.chavaree@penobscotnation.org.

<sup>&</sup>lt;sup>17</sup> https://elibrary.ferc.gov/eLibrary/filedownload?fileid=14000647

<sup>18</sup> https://lowimpacthydro.org/north-twin-project-maine/



LIHI recertification application recently submitted by Great Lakes Hydro America for the North Twin Hydroelectric Project located on the West Branch of the Penobscot River. The application reviewer, Gary Franc (copied here), may be in contact with you if he has questions about these projects or wishes to clarify any aspects of the LIHI applications. You may also provide comments directly to LIHI as indicated below. More information about the projects and their application can be found in the link below. If you would like to receive additional notices about these projects or other hydroelectric projects in your region applying for LIHI certification, please sign up for our mailing list at <u>https://lowimpacthydro.org/join-our-list/</u>."

No responses were received. Throughout my review, I found no reasons to contact any agencies or individuals.

### VII. DETAILED CRITERIA REVIEW

This section contains my review of the North Twin Development with regard to the LIHI Certification criteria. As part of my review, I conducted a FERC e-library search to verify claims in the recertification application. My review concentrated on the period since GHLA acquired a new thirty-year license for the PMHP Project on October 22, 1996.

#### A. Ecological Flows

The goal of this criterion is to support habitat and other conditions that are suitable for healthy fish and wildlife resources in riverine reaches that are affected by the facility's operation. The Applicant states the North Twin Development satisfies the LIHI flows criterion in both ZOEs by meeting alternative standard A-2.

The North Twin impoundment is operated according to a Water Use Plan (WUP) designed to provide flood control, maintain tailrace fishery opportunities, enhance summer water levels, and manage flows for the other PMHP's downstream developments' generation. North Twin is one of two storage impoundments of the Penobscot Mills Project operated on an annual storage cycle, together with storage dams located further upstream in the basin, in accordance with a system rule curve to provide controlled flows downstream (See Figure 10).

Spring runoff is typically used to replenish storage in these impoundments. Water is withdrawn at a controlled rate from the storage impoundments during the entire year to meet the requirements of the WUP, to provide maximum sustained base load energy in accordance with the rule curve, and to provide storage capacity (flood control) for the next spring, all within the constraints of the WUP.

The North Twin impoundment is lowered to a target elevation of 479.92 FTMSL (12.0 feet below full pond) in anticipation of spring runoff and to provide the required minimum flows at the Millinocket Development throughout the winter. In reality, the level to which the impoundment is drawn down is determined by the actual precipitation occurring and the water content of the snow cover. A normal spring runoff will replenish storage in the impoundment.



The annual cycle of operating these storage impoundments provides:

- Flood control during high flow periods by storing most of the runoff. Even when the impoundments are filled to capacity and water must be spilled, the maximum discharge is greatly reduced in magnitude and delayed in time until peak flows from the unregulated rivers have subsided. While elevation 491.92 FTMSL is the normal high water level of the impoundment, GLHA has flowage rights to elevation 492.12 FTMSL;
- Providing a more even distribution of water flow in the entire West Branch and the downstream main stem of the Penobscot River throughout the year. From May 1 to August 22, impoundment elevations are maintained relatively stable. From August 22 to October 15, higher minimum flows are provided for fisheries, so long as the impoundment has sufficient storage. During times of low regulated inflow, water is withdrawn from system storage to supplement inflow in order to maintain generation and minimum flow requirements.

Water can be pumped from Millinocket Lake to the North Twin impoundment to supplement regulated inflow being received into that impoundment from the upstream storage impoundments and natural inflows. Pumping water from Millinocket Lake to the North Twin impoundment also provides flood control benefits for the town of Millinocket, which is located downstream on Millinocket Stream.

Under normal conditions, the daily outflow from Millinocket development approximately equals that of the North Twin development, with an average daily flow variation of about 130 CFS between the two outflows due to tributary inflows. North Twin releases no spillage during periods of high inflows unless its impoundment elevation approaches its normal high water level of 492.12 FTMSL.

The system storage as of April 19, 2021, indicates a total system storage of 38.96 billion cubic feet (BCF)<sup>21</sup>. Typically, a system storage of about 43.0 BCF is preferred (Figure 10 black line). The 38.96 BCF was comprised of 11.31 BCF within the impoundment (dark blue line), 20.13 BCF in Ripogenus Lake (green line) and 7.52 BCF in remaining upstream lakes (cyan line).

<sup>&</sup>lt;sup>21</sup> There are 22,956.84 acre feet in 1 billion cubic feet.



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Figure 10 - West Branch Penobscot River Storage Curve

Highlights of the WUP are:

- GLHA maintains a 2,000 CFS minimum flow in the West Branch at Millinocket and a minimum flow into Millinocket Stream, as long as water remains in upstream storage (North Twin, Millinocket Lake). A minimum flow of 60 CFS into Millinocket Stream regardless of inflow is required from May 1 to October 15 and the remainder of the year, the minimum flow is 60 CFS or inflow if less;
- GLHA maintains relatively stable water levels in the North Twin impoundment from May 1 through August 22, unless GLHA is unable to maintain the 2,000 CFS minimum flow at Millinocket,
- GLHA maintains a 3,000 CFS flow minimum flow from the North Twin Dam from August 22 to October 15, so long as the impoundment water level exceeds 488.42 FTMSL in elevation.
- GLHA maintains a minimum target level of 488.42 FTMSL (3.5-foot drawdown) for the period August 22 through October 15 unless GLHA is unable to maintain the 2,000 CFS minimum flow at Millinocket,
- GLHA operates the Millinocket Lake Development to provide water to maintain North Twin impoundment levels and the Millinocket Stream's 60 CFS minimum flow requirements, while providing flood control benefits to the town of Millinocket.

The WUP was developed during the last licensing in consultation with resource agencies and stakeholders. IFIM and flows modeling studies were conducted to determine the feasibility of providing original agency recommended flows within the context of the multiple projects' flow availability and competing management goals. The WUP incorporated agency and stakeholder requests for minimum flows, impoundment elevations for landlocked Atlantic salmon and trout spawning and incubation periods, and for recreation – all to enhance conditions for wildlife, wetlands, recreation, and aesthetics. The 60 CFS



minimum flow is greater than the reported summer aquatic base flow of 37 CFS, and the 2,000 CFS below the Millinocket powerhouse was based on state law allocating water proportions between the Stillwater Branch and mainstem Penobscot River as well as agency requests for fish habitat, water quality, and recreation.

BRP's National System Control Center (NSCC) monitors impoundment elevations, turbine discharges and back calculated inflows. As mentioned previously, GLHA consistently reports minimum flow impoundment level excursion/deviations to FERC. The typical causes are due to equipment failures, power outages and highly unusual weather conditions. None of these occurrences have been noticed as violating FERC license articles.

My review indicates that GLHA has historically operated the North Twin Development in accordance with its current license requirements pertaining to reservoir levels and minimum flows and appears to satisfy the Ecological Flows criterion as defined in the current license, however, it is my recommendation that if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### **B.** Water Quality

The goal of this criterion is to ensure water quality is protected in water bodies directly affected by facility operations, including downstream reaches, bypassed reaches, and impoundments above dams and diversions. The Applicant states the North Twin Development satisfies the LIHI water quality criterion in both ZOEs by meeting alternative standard B-2.

A WQC was issued for the PMHP Project on April 22, 1993 and amended by MDEP on July 18, 2012<sup>22</sup> less than 10 years old. The amendment was based on GLHA's request to alter the fall impoundment drawdown to eliminate water management for lake trout since this management has not been successful on the North Twin impoundment. The USFWS had no objection to the change in water management at the North Twin impoundment. The MDEP stated approval of the change through modification of the WQC. The change allowed GLHA to lower the impoundment levels more slowly from mid-August to mid-October. The prior impoundment levels were required to stay above the lake trout spawning elevation from October 15 to November 5 for spawning and from November 6 – May 1 for incubation. These elevations had resulted in adverse summertime effects to shorefront property owner docks being out of water and private wells that could go dry in late summer and early fall. MDEP reported that they no longer had a management goal of a self-sustaining lake trout population in the impoundment, and the change was "a minor change and will not significantly affect any issues identified during previous Department reviews of the project site".

The designated operations specific to aquatic habitat were deemed to be met by maintaining a minimum flow of 2,000 CFS in the West Branch of the Penobscot River at Millinocket, as provided primarily through outflows from the North Twin Development.

The impoundment is classified as Great Pond A (GPA) water which is defined as *"any inland bodies of water which in a natural state have a surface area in excess of 10 acres and any inland bodies of water artificially formed or increased which have a surface area in excess of 30 acres."* Class GPA waters:

<sup>&</sup>lt;sup>22</sup> Amended WQC <u>https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13030012</u>



- Must be of such quality that they are suitable for the designated uses of drinking water after disinfection, recreation in and on the water, fishing, agriculture, industrial process and cooling water supply, hydroelectric power generation, navigation, and as habitat for fish and other aquatic life. The habitat must be characterized as natural;
- Must be described by their trophic state based on measures of chlorophyll a content, Secchi disk transparency, total phosphorus content, and other appropriate criteria;
- Must have a stable or decreasing trophic state, subject only to natural fluctuations, and must be free of culturally induced algal blooms that impair their use and enjoyment;
- There may be no new direct discharge of pollutants into the water body. Discharges into these waters prior to January 1, 1986 are allowed to continue only until practical alternatives exist;
- Materials may not be placed on or removed from the shores or banks of the water body in such a manner that materials may fall or be washed into the water or that contaminated drainage may flow or leach those waters, except as permitted;
- A change of land use in the water body may not, by itself or in combination with other activities, cause water quality degradation that impairs the characteristics and designated uses of downstream GPA waters or causes an increase in the trophic state of those GPA waters.

In addition, Maine water quality standards provide provisions for hydropower impoundments. All hydropower projects with impoundments in existence on June 30, 1992 that remain classified as GPA water and that do not attain desired habitat and aquatic life criteria, must, at a minimum, satisfy the aquatic life criteria contained in Class C water.

The West Branch of the Penobscot River, from the outlet of Elbow Lake, at North Twin Dam, downstream to the outlet of Ferguson Pond and Quakish Lakes, is Class B water. Standards for Class B are as follows:

- The dissolved oxygen (DO) content equals or exceeds 7 parts per million (PPM) or 75% of saturation, whichever is higher. However, from October 1 to May 14, to ensure spawning and egg incubation of indigenous fish species, a more stringent requirement is that the seven-day mean DO must be 9.5 PPM or greater and the one-day minimum DO must be 8.0 PPM or greater in some identified fish spawning areas. Additionally, from April 15 to October 31, the number of E. coli bacteria must not exceed a geometric mean of 64 CFU<sup>23</sup> per 100 milliliters over a 90 day interval or 236 CFU per 100 milliliters in more than 10% of the samples in any 90 day interval;
- Discharges to Class B waters may not cause adverse impacts to aquatic life in that the receiving waters must be of sufficient quality to support all aquatic species indigenous to the receiving water without detrimental changes in the resident biological community;
- Waters shall be of such quality that they are suitable for the designated uses of drinking water supply after treatment, fishing, recreation in and on the water, industrial process and cooling water supply and hydroelectric power generation.

More information on water classification can be found here.24

This section of the West Branch of the Penobscot River near the North Twin Development is not identified as impaired in MDEP's 2016 Maine Integrated Water Quality Monitoring and Assessment Report (MIWQAR). As found on page 32 in the 2016 MIWQAR<sup>25</sup>, the West Branch of the Penobscot River from the

<sup>&</sup>lt;sup>23</sup> CFU - A colony-forming unit is used in microbiology to estimate the number of viable bacteria or fungal cells in a sample.

<sup>&</sup>lt;sup>24</sup> https://www.maine.gov/dep/water/monitoring/lake/index.html

<sup>&</sup>lt;sup>25</sup> https://www.maine.gov/dep/water/monitoring/305b/2016/28-Feb-2018\_2016-ME-IntegratedRptLIST.pdf



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outlet of Elbow Lake to the outlet of Ferguson and Quakish Lakes is listed as Category 2 – Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses. Additional MIWQARs can be found here.  $^{26}$ 

A comprehensive water quality sampling program was conducted in 1986-1987, supplemented with a less extensive water quality sampling program in 1988, as part of PMHP Project relicensing. The water quality sampling programs were conducted in accordance with the MDEP's "Lake Trophic State Sampling Protocol". The results of the 1986-1988 sampling were compared to results of a 1981-1985 sampling program, revealing no appreciable increase in trophic state.

Results did indicate concentrations of metals and mercury were present in higher concentrations in the PMHP impoundments than in those impoundments upstream. A study was conducted to determine the interrelationship and impacts of atmospheric deposition and water level fluctuations on concentrations of mercury, cadmium, lead, and other toxic metals on aquatic life in the Project's waters.

In summary, the reasons for the variable mercury contamination rates were inconclusive due to several confounding factors (size of the watershed, stratification effects, and thick layers of sawdust in the sediment). On October 4, 2000, FERC approved the final mercury contamination report, filed on June 11, 1999, and supplemented on October 6, 1999, agreeing that, due to the confounding factors, the study did not indicate that impoundment operations had any impact on the mercury levels.

Article 405 of the license requires GLHA to file annual reports describing its activities and cooperation with the USEPA and the MDEP on impacts of atmospheric deposition and water level fluctuations on concentrations of mercury, cadmium, lead, and other toxic metals on aquatic life in Project waters. The most recent report<sup>27</sup> was filed on March 15, 2021. In the report GLHA stated it was not asked to participate in any new USEPA or MDEP monitoring studies of toxic metals in Project waters in 2020.

It is my recommendation that the North Twin Development satisfies the LIHI water quality criterion, however, if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### C. Upstream Fish Passage

The goal of this criterion is to ensure safe, timely and effective upstream passage of migratory fish so that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the Project's facilities. The Applicant states the North Twin Development satisfies the LIHI upstream fish passage criterion in both ZOEs by meeting alternative standard C-1.

There are currently no anadromous fish species present in the West Branch of the Penobscot River. The West Branch is within historical habitat for Atlantic salmon, but it is not designated as critical habitat, and thus is not managed for Atlantic salmon. Likewise, the West Branch is not managed for alosines (river herring; American shad). However, license article 407 reserves authority by the FERC to require the construction, operation, and maintenance of upstream fishways, as prescribed by the USDOI.

<sup>&</sup>lt;sup>26</sup> <u>https://www.maine.gov/dep/water/monitoring/305b/index.html</u>

<sup>&</sup>lt;sup>27</sup> https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15736292



The upstream fishway at the dam serves resident fish species only. The fishway was incorporated into the dam in 1934, was repaired in 1984, and was modified in 1998 to address dewatering of the fishway exit at low impoundment elevations, excessive turbulence within the pools, and to increase attraction water. Landlocked salmon are the principal species of concern at the dam. The upstream fishway is primarily in place to allow salmon that have passed downstream over the dam to move back upstream into the impoundment.

The fishway consists of a pool and weir design with 1 foot 9 inch slots. The conveyance flow for the fishway is 7 CFS, with approximately 2 CFS through the orifices and 5 CFS over the weirs. A supplemental attraction flow of 3.5 CFS is provided through an 8 inch diameter gravity pipe (See Figure 11).

American eels are present in the West Branch of the Penobscot River, including PMHP Project waters. However, there are no eel passage facilities at the downstream Penobscot Mills developments, and no requirement for eel passage at North Twin. Only the Medway Project has eel passage, which is located downstream of the East Millinocket development. Specifically, eels were observed passing Medway in 4 out of 12 years of monitoring (2004 – 2015), with an average of only 7 eels observed per year.



Figure 11- Upstream Fishway



My review indicates no issues pertaining to upstream fish passage have arisen since license issuance. It is my recommendation that the North Twin Development satisfies the upstream fish passage criterion, however, if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual statement to LIHI and LIHI will re-evaluate compliance with this criterion when appropriate.

#### D. Downstream Fish Passage

The goal of this criterion is to ensure safe, timely and effective downstream passage of migratory fish and for riverine fish such that the facility minimizes loss of fish from reservoirs and upstream river reaches affected by facility operations. Migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility. The Applicant states the North Twin Development satisfies the LIHI downstream fish passage criterion in both ZOEs by meeting alternative standard D-1.

There are no anadromous fish species in the West Branch of the Penobscot River. The PMHP Project is not required to have downstream fish passage facilities for migratory species. However, license article 407 reserves authority by the FERC to require the construction, operation, and maintenance of downstream fishways, as prescribed by the USDOI.

The West Branch of the Penobscot River is within historical habitat for Atlantic salmon, but it is not designated as critical habitat. Eels are present in low numbers in the lower portion of the West Branch of the Penobscot River. Resident species include brook trout, smallmouth bass, various species of suckers, shiners and sunfish, fallfish, eastern blacknose dace, creek chub, slimy sculpin, burbot, and landlocked salmon.

My review of the FERC docket indicates no issues pertaining to downstream fish passage have arisen since license issuance. The North Twin Development satisfies the downstream passage and protection criterion as defined in the current license; however, it is my recommendation that if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### E. Shoreline and Watershed Protection

The shoreline and watershed protection criterion is designed to ensure that sufficient action has been taken to protect, mitigate or enhance environmental conditions of soils, vegetation, and ecosystem functions on shoreline and watershed lands associated with the facility. The Applicant states the shoreline and watershed protection criterion in both ZOEs are satisfied by meeting alternative standard E-2.

Article 418 requires a Shoreline Management Plan (SMP) for lands around the impoundment. The SMP was initially submitted to FERC on October 17, 1997<sup>28</sup>. As the result of field surveys conducted to support the conveyance of the Penobscot Mills license and assets to a new owner, the SMP was updated and resubmitted to FERC on September 25, 2001. On February 12, 2002, FERC approved the revised SMP<sup>29</sup>.

The SMP controls the uses allowed along shoreline areas within the PMHP Project boundary, which was

<sup>&</sup>lt;sup>28</sup> https://elibrary.ferc.gov/eLibrary/filedownload?fileid=8172944

<sup>&</sup>lt;sup>29</sup> https://elibrary.ferc.gov/eLibrary/filedownload?fileid=3250000





expanded to include areas within 200 feet of the normal full pond elevation on the impoundments but excluding existing camp lots and shoreline areas reserved for future development. Since it is part of the PMHP, the Project boundary was also expanded along the riverine reach downstream of North Twin Dam and upstream of the Millinocket impoundment (Quakish Lake).

The SMP incorporates license requirements for a 200-foot building setback restriction and a 100-foot vegetative buffer restriction, and it provides for appropriate public access to the impoundments for recreation. It also describes how lands are managed to provide for the continued effective management of the renewable forest and water resources on associated lands while recognizing and protecting the recreational and other natural resource values on those lands. Lands surrounding the North Twin are mostly forested with some agricultural uses.

The 2002 SMP expanded the riverine reach downstream of North Twin Dam and upstream of the Millinocket impoundment to include shoreline areas within 200 feet of the river. Although there are no camp lots excluded from the Project boundary downstream of the dam, this section of river does include a Maine Department of Transportation (MDOT) highway bridge crossing (Route 11), a railroad bridge crossing, and a recreational trail bridge crossing for snowmobiles and ATVs. This area also includes GLHA's Green Bridge concrete boat launch, which provides boating access upstream to North Twin Dam and downstream to the Millinocket impoundment.

My review of the FERC docket indicates no issues pertaining to shoreline and watershed protection have arisen since license issuance. The North Twin Development satisfies the LIHI shoreline and watershed protection criterion; however, it is my recommendation that if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### F. Threatened and Endangered Species Protection

The threatened and endangered species protection criterion is designed to ensure that the facility does not negatively impact state or federally-listed threatened or endangered species. The Applicant states the LIHI threatened and endangered species criterion is satisfied in both ZOEs by meeting alternative standard F-2.

An IPaC report and USFWS Official Species List were developed for the North Twin Development and were provided in Section 7.0 of the LIHI application.

The following federally-listed endangered or threatened species may be present in the vicinity: Canada lynx (threatened; for which critical habitat in the vicinity has been identified) and Northern long-eared bat (threatened; for which a Final Section 4(d) rule has been published for activities that may affect the species for streamlined consultation).

Routine operations are not anticipated to affect terrestrial species such as bats and Canada lynx. There may be periodic vegetation clearing for dam safety, access, and other purposes, but these would be conducted in accordance with the Section 4(d) rule for the bat using the USFWS streamlined consultation process and would be limited given vegetative buffer restrictions contained in the SMP. As such, no negative effects are anticipated by this periodic activity.

Atlantic salmon, federally-listed as endangered and historically documented as occupying the West Branch



of the Penobscot River, are not in the PMHP Project area. This portion of the river is not managed for Atlantic salmon, as restoration efforts have focused on the main stem and the East Branch of the Penobscot River that provides 75 miles of free flowing river of high quality habitat (Class AA). As such, critical habitat for Atlantic salmon has not been designated on the West Branch of the Penobscot River, nor in the vicinity, and there are no anadromous fish passage facilities on the West Branch, including at the North Twin Dam.

In addition, the following state-listed endangered, threatened, and special concern species have been documented in the general vicinity of the Penobscot Mills Project Area: bigmouth pond snail (special concern); tidewater mucket (threatened); yellow lamp mussel (threatened); and wood turtle (special concern).

Bald eagles have also been documented in the area but were delisted on both the state and federal level. Eagles continue to be protected under the federal Bald Eagle and Golden Eagle Protection Act.

In addition, several bat species could occur within the area during migration and/or the breeding season: little brown bat (endangered); Northern long-eared bat (endangered); Eastern small-footed bat (threatened); big brown bat (special concern); red bat (special concern); hoary bat (special concern); silver-haired bat (special concern); and tri-colored bat (special concern).

My review indicates no issues pertaining to threatened and endangered species protection have arisen since license issuance. The North Twin Development satisfies the LIHI threatened and endangered species protection criterion; however, it is my recommendation that if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### G. Cultural and Historical Resource Protection

The cultural and historic resource protection criterion is designed to ensure that the facility does not unnecessarily impact cultural and historic resources associated with the facility's lands and waters, including resources important to local indigenous populations. The Applicant states the LIHI cultural and historic resources criterion in ZOE 1 is satisfied by meeting alternative standard G-2, and in ZOE 2 by meeting alternative standard G-1.

License article 417 implements the Programmatic Agreement (PA) for the PMHP Project which requires a Cultural Resource Management Plan (CRMP). The final CRMP was submitted to FERC on April 9, 1998 and was approved by FERC on June 11, 1998<sup>30</sup>. Periodic reports on activities related to the management of historic properties are submitted to FERC. The latest report<sup>31</sup> was submitted on October 20, 2016.

Based on the archaeological Phase I survey and the Phase II archaeological testing report, only one cultural or historical site covered by the CRMP is located in the North Twin impoundment. Site 121.59 is located in Pemadumcook Lake and contains multi-component deposits attributable to the Late Archaic period.

The site was initially deemed significant and eligible for listing in the National Register of Historic Places, based on an archaeological Phase I survey conducted in the late 1980s and a Phase II archaeological testing report completed circa 1990. A field reconnaissance conducted in 2004 resulted in the discovery of a few

<sup>&</sup>lt;sup>30</sup> https://elibrary.ferc.gov/eLibrary/filedownload?fileid=52320

<sup>&</sup>lt;sup>31</sup> <u>https://elibrary.ferc.gov/eLibrary/filedownload?fileid=14380427</u>



stone artifacts on the shore, but very little backshore area for archaeological testing. In 2007, this site was determined to not require a field study and the site was thus removed from further annual reporting.

My review indicates no issues pertaining to cultural and historic resource protection have arisen since license issuance. The North Twin Development satisfies the LIHI cultural and historic resource protection criterion; however, it is my recommendation that if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### H. Recreational Resources

The goal of this criterion is to ensure that recreation activities on lands and waters controlled by the facility are accommodated and that the facility provides recreational access to its associated land and waters without fee or charge. The Applicant states that the recreation criterion in both ZOEs is satisfied by meeting alternative standard H-2.

License article 414 defines requirements to construct, operate and maintain specified recreational facilities, including six parking spaces at the Green Bridge boat access site above Quakish Lake, which provides access to the North Twin tailrace. The boat launch provides public access to the North Twin tailrace reach and to the Quakish Lake portion of the Millinocket impoundment. The recreation facility improvement identified in Article 414 was completed before October 1998, and maintenance of this site has been completed as needed since 1998. These facilities are provided free of charge.

License article 415 requires monitoring recreational use. Specifically:

- Consultation with the USFWS, USNPS and MDIFW;
- Monitoring of recreation use to determine whether existing recreation facilities are meeting recreation needs every six years, and;
- Filing of a report that discusses the methodology, adequacy of the recreation facilities to meet recreation demand, and any updates to the recreation plan proposed to accommodate recreational demand.

Recreation Facility Monitoring Reports were filed in October 2002<sup>32</sup>, April 2009<sup>33</sup>, and April 2015<sup>34</sup>. The next Recreation Facility Monitoring Report is due March 31, 2022. Recreational use of the facility is monitored periodically. As reported in the 2015 recreational monitoring report, fishing, boating, picnicking, sightseeing, and camping activities were observed. GLHA continues to periodically monitor use, update facilities, and maintain and improve the existing sites as needed.

License article 420 required consultation with the MDACF to determine the need for a study to mark or remove submerged hazards to recreational boaters using Millinocket Lake and the North Twin impoundment. The study was concluded and maps of navigational hazards were developed (See Figure 12). These maps are periodically updated, made available to the public, and are posted at all public access sites of the North Twin and Millinocket Lake developments.

The PMHP Project is also subject to the requirements of FERC's Part 8 regulations, including safety signage.

<sup>&</sup>lt;sup>32</sup> <u>https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10658577</u>

<sup>&</sup>lt;sup>33</sup> https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11983088

<sup>&</sup>lt;sup>34</sup> https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13858681



Inspections of Part 8 signs are scheduled annually at the start of the recreation season, and signs are replaced, as necessary.

FERC's most recent Environmental Inspection report<sup>35</sup> was issued on December 28, 2016 for the inspection conducted on September 8, 2016. The inspection report identified the following requirements:

- Review the FERC Form 80 report to determine if the roadside picnic areas are PMHP Project facilities or not. The roadside picnic areas were determined to be MDOT Rest Areas that are not FERC approved sites;
- Review the fence on the south shore of Elbow Lake. The security fence was noted to not go all the way to the water, though FERC required no follow-up actions, and;
- Replace the Part 8 sign at the South Twin boat ramp. The Part 8 sign for the South Twin Boat Launch was documented as deteriorated to the point of being illegible.

GLHA responded on November 2, 2016 stating that the roadside picnic area at North Twin is not within the PMHP Project boundary, and although owned by GLHA it has been leased to the state since 1955. On November 29, 2016 GLHA reported that the Part 8 sign had been replaced.



Figure 12 - Map of Submerged Hazards

There are three public boat launches providing access to lands and waters at the North Twin impoundment:

- Ambajejus Boat Launch provides parking and a launch facility for motorized watercraft at the dike separating Ambajejus Lake and Millinocket Lake and provides access from the upstream extent of Ambajejus Lake;
- Partridge Cove Boat Launch provides parking and a launch facility for motorized watercraft at the Partridge Cove section of South Twin Lake. This site was improved in 2005 by expanding the parking area and adding signage, and;

<sup>&</sup>lt;sup>35</sup> <u>https://elibrary.ferc.gov/eLibrary/filedownload?fileid=14452927</u>



• Norcross Launch – provides hand-carry access for non-motorized watercraft and parking at Elbow Lake.

In addition, there are two private boating facilities on the impoundment:

- Five Lakes Lodge (formerly known as Barton's Marina) providing access at South Twin Lake;
- North Woods Trading Post Boat Dock on Ambajejus Lake, in proximity to the Ambajejus Lake boat launch.

Additional recreation sites at the impoundment include the Ambajejus Lake Beach and three campsites.

My review indicates no issues pertaining to LIHI recreational resources have arisen since license issuance. The North Twin Development satisfies the LIHI recreational resources criterion; however, it is my recommendation that if granted LIHI certification, GLHA will be required to provide updates on the relicensing process as part of its annual compliance statements and LIHI will re-evaluate compliance with this criterion when appropriate.

#### VIII. RECOMMENDATION

My review comprised a thorough assessment of the certification application and its supporting documentation, a search of the FERC docket and other publicly available information.

The relicensing process has just begun with filing of the NOI and PAD on June 11, 2021 and impacts may be better understood and operations could change when any required studies are complete and new agency recommendations are made. It is unlikely that a new license would be issued during the LIHI Certificate term since it expires in October 2026. Therefore, it is my recommendation that the North Twin Development be certified for a five (5) year term with the following condition:

• Condition 1: The facility Owner shall provide updates to LIHI in annual compliance statements on the ongoing status of FERC relicensing, including studies, FERC filings, resource agency consultation, prescriptions and recommendations, and agency comments on study results. LIHI reserves the right to modify the Certificate or conditions based on the outcome of the relicensing.

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