GREEN MOUNTAIN POWER
Generating Possibilities Together

October 24, 2023

Ms. Shannon Ames
Executive Director
Low Impact Hydropower Institute
329 Massachusetts Avenue, Suite 2
Lexington, MA 02420

Re: Low Impact Hydropower Institute Application for the Lower Great Falls Hydroelectric Project (FERC Project No. 4451).

Dear Ms. Ames:

Green Mountain Power Corporation (GMP), on behalf of itself and its co-licensee the City of Somersworth, NH (collectively the Licensee) submits the attached Application for the Lower Great Falls Hydroelectric Project located on the Salmon Falls River in New Hampshire and Maine. GMP is respectfully requesting certification of this facility.

The application includes the following required components.

- Introduction
- Project Description and Low Impact Hydropower Institute Table B-1.
- Zones of Effect descriptions and overview maps and images.
- Matrix of Alternative Standards for each Zone of Effect identified evaluating the Low Impact Hydropower Institute certification standards for each requisite criterion including water quality, fish passage and recreation.
- Facility Contacts Form.
- Attestation and Waiver Form.

Please contact me at (802) 655-8753, via email at John.Tedesco@greenmountainpower.com, or at the address below, if you have any questions or concerns related to this matter.

Sincerely,

John Tedesco

John Tedesco
Generation Project Coordinator
Green Mountain Power Corporation
163 Acorn Lane
Colchester, VT 05446

LOW IMPACT HYDROPOWER INSTITUTE CERTIFICATION APPLICATION

LOWER GREAT FALLS HYDROELECTRIC PROJECT

FERC PROJECT NO. 4451

GREEN MOUNTAIN POWER CORPORATION

GREEN MOUNTAIN POWER
Generating Possibilities Together

AND THE

CITY OF SOMERSWORTH, NH

October 2023

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APE	Area of Potential Effect
cfs	cubic feet per second
DOC	Department of Commerce
DOI	Department of the Interior
ESA	Endangered Species Act
FEMP	Fishway Effectiveness Monitoring Plan
FERC or Commission	Federal Energy Regulatory Commission
FOMP	Fishway Operations and Maintenance Plan
GMP	Green Mountain Power Corporation
HPMP	Historic Properties Management Plan
IPAC	Information for Planning and Consultation
kW	kilowatt
kWh	Kilowatt-hours
Licensee	Green Mountain Power Corporation and the City of Somersworth, NH
LIHI	Low Impact Hydropower Institute
MDEP	Maine Department of Environmental Protection
MDMR	Maine Department of Marine Resources
MDIFW	Maine Department of Inland Fisheries and Wildlife
MHPC	Maine Historic Preservation Commission
mi^2	Square miles
msl	Mean sea level
MW	Megawatt
MWh	Megawatt-hours
NHDES	New Hampshire Department of Environmental Services
NHDHR	New Hampshire Division of Historical Resources
NHFGD	New Hampshire Fish and Game Department
NHNHB	New Hampshire Natural Heritage Bureau
NLEB	Northern longed-eared bat
NLF	Nature-Like Fishway
NRHP	National Register of Historic Places
PLC	Programmable Logic Controller
Prescription	Department of Interior Modified Fishway Prescription
Project	Lower Great Falls Hydroelectric Project
RM	River mile
rpm	Revolutions per minute
SHPO	State Historic Preservation Officer
USFWS	United States Fish and Wildlife Service
WQC	Water Quality Certification
WQMEP	Water Quality Mitigation and Enhancement Plan
ZOE	Zone of Effect

1 PROJECT DESCRIPTION

1.1 Project Location

Green Mountain Power Corporation (GMP), and its co-licensee the City of Somersworth, NH (collectively the Licensee) own the 1.28-megawatt (MW) Lower Great Falls Hydroelectric Project (the Project), which is operated and managed by GMP. Project is located on the Salmon Falls River in the states of New Hampshire (NH) and Maine (ME). Most of the infrastructure associated with the Project, including the intake, penstock, and powerhouse, is located within the City of Somersworth, NH. The left abutment of the dam is in the Town of Berwick, ME. A Project location map is shown in Figure 1.1-1.

The Project dam is located at approximately river mile (RM) 3.1 and is the third dam on the mainstem of the Salmon Falls River. Its coordinates are 43°15'36" north and 70°51'36" west. At the Project dam, the total drainage area is approximately 220 square miles (mi^2), which is about 93.2% of the Salmon Falls drainage area (236 mi^2). Table 1.1-1 details the name, status, location, and attributes of all dams along the Salmon Falls River from downstream to upstream. The dam locations are shown in Figure 1.1-2.

The following sections describe the Project structures, features, and mode of operation. Project information is also summarized in Table 1.1-2.

1.2 Project Facilities

Key structures and features of the Project are shown in Figure 1.2-1. Photographs of the Project structures and features are included in Appendix A.

The Project dam (Figure A-1) has been in place since 1825 and has a total length of 297 feet, which consists of a 50-foot-long left abutment, a 176-foot-long spillway section, and a 71-foot-long right abutment. The dam is a stone masonry and concrete gravity dam that is approximately 32 feet high. The spillway has a crest elevation of 102.4 feet, NGVD 1929. The dam is topped with 4-foot-high flashboards, resulting in a normal pond elevation of 106.4 feet, NGVD 1929, at the crest of the flashboards.

The dam was rehabilitated in 1984 and the spillway was rehabilitated in 1991. The right abutment of the dam is in Somersworth, Strafford County, NH and the left abutment is in Berwick, York County, ME.

There is one low level outlet gate located in the left abutment which controls flow into a seven-foot-diameter, 40-foot-long bypass pipe. The gate is 8 feet wide by 8 feet high, with a sill elevation of 84.9 feet, NGVD 1929. A second inoperable outlet pipe that had previously been partially filled with concrete is present. In the Fall of 2022, GMP completed several FERC mandated dam safety repairs at the Project that included filling the remaining portion of the inoperable outlet pipe with concrete. The gate that is operable is opened when the impoundment level rises approximately 10 inches above the flashboards, attempting to avoid failure of the flashboards during high flow periods. The gate is operated manually by a hydraulic unit mounted to the gate structure that is run by a dedicated portable generator.

The Project dam also contains a small trash gate (Figure A-2) located adjacent to the intake structure with a manually operated screw stem operator. The gate is 5.25 feet wide by 4 feet high, with a sill elevation of 102.4 feet, NGVD 1929. The gate is typically used to sluice debris and is also opened when the impoundment level rises approximately 10 inches above the flashboards during high flow periods. The gate is inspected during flashboard repair activities but requires no routine maintenance other than regular lubrication of the gate operator mechanism.

The Project impoundment (Figure A-3) has a gross volume of 584 acre-feet with an approximate surface area of 40 acres at the normal pond elevation of 106.4 feet, NGVD 1929. Since the Project operates as a run-of-river facility, the useable storage volume is negligible.

The 40.5-foot-wide by 20-foot-high intake is a concrete structure with a wooden-deck that includes four (4) steel frame gates with a sloping steel trashrack at the upstream side of the wooden deck (Figure A-4). Two (2) pairs of gates control flow to each penstock. Each gate is 5-ft-wide by 10.5-ft-high and has a sill elevation of 92.0 feet.

The gates are hand operated with a chain hoist suspended from a monorail. These gates provide closure to two (2) 8.5-foot penstocks and in turn each penstock bifurcates into two penstocks that convey water to the powerhouse. All the penstocks are buried and extend approximately 200-225 feet from the intake structure to the powerhouse.

There are two 8.5-foot-diameter steel penstocks. The left penstock bifurcates approximately 120 feet downstream of the intake structure into a 5.3-foot-diameter penstock (Unit 4) and a 7.6-foot penstock (Unit 3), both with lengths of 85 feet. The right penstock bifurcates approximately 140 feet downstream of the intake structure into a 7-foot-diameter penstock (Unit 2) and a 7.6-foot-diameter penstock (Unit 1), both with lengths of 85 feet.

The powerhouse is located approximately 250 feet downstream of the Project dam. The powerhouse is a 30-foot by 46-foot concrete and brick building with a wood frame superstructure. The powerhouse includes the 4 turbine/generators, controls, and station switchgear. (Figure-A-5).

Power is delivered directly to a 4.16 kV distribution line via a 260-foot-long underground transmission line that stretches to an Eversource Energy pole-mounted air break.

The Project has one tailrace that is approximately 55 feet wide and 30 feet long (Figure-A-5). A 250-foot-long bypass reach extends between the Project dam and the tailrace. The bypass varies in width between approximately 90 feet at the downstream end and approximately 160 feet at the upstream end.

1.3 Project Operations

The Project is operated in a run-of-river mode using automatic pond level control. The Project impoundment is maintained at the flashboard crest elevation of 106.4 feet, NGVD 1929, under typical operating and flow conditions. The Project releases a minimum flow of 37 cfs or inflow, whichever is less, into the bypass channel below the Project dam.

The Project passes a portion (10 cfs) of the minimum flow via the two (12-inch and 4-inch diameter) pipes located at the base of the Project dam, while the remaining portion (27 cfs) is passed via a cut-out in the flashboards on the right side of the spillway. In addition, during flashboard repair, the Project passes the minimum flow through a combination of the two (12-inch and 4-inch diameter) pipes at the base of the dam (10 cfs) and the low-level gate (27 cfs).

The flashboards on the spillway crest are constructed of wood and held in place with steel pins. Flashboards are typically replaced as-needed after high-flow events. During installation/repair of the spillway flashboards, the Project impoundment is temporarily drawn down by increasing generation flows above inflow rates, during a time when streamflow conditions allow. The impoundment level is lowered just below the spillway crest to allow operations personnel to safely work on the spillway crest. Flashboards and pins are then repaired or replaced as needed. When restoring the elevation of the impoundment, most of the

inflow is passed through the Project turbines, allowing the impoundment to slowly rise and prevent dewatering of the river reach below the dam.

1.4 Regulatory and Other Requirements

The Federal Energy Regulatory Commission (FERC or Commission) issued a 40-year license for the Project on January 20, 2023, with an expiration date of December 31, 2062 (Appendix B). In addition, on April 4, 2022, the Licensee was granted a Water Quality Certification (WQC) from the New Hampshire Department of Environmental Services (NHDES) (Appendix C) and the Maine Department of Environmental Protection (MDEP) issued a WQC for the Project on April 6, 2022 (Appendix D). On April 6, 2021, pursuant to Rule 602 of the FERC Rules of Practice and Procedure, GMP, on behalf of itself and the City of Somersworth, NH, filed an Offer of Settlement in the Project relicensing (Appendix E). The Offer of Settlement consists of the Settlement Agreement for Prescription for Fishways for American Shad and River Herring (LGF Settlement Agreement) executed by and between the Co-Licensees and the U.S. Department of the Interior DOI) Fish and Wildlife Service (USFWS) and the Explanatory Statement. The purpose of the LGF Settlement Agreement is to memorialize and enact the agreements of the Parties concerning the appropriate terms of a prescription for fishways for American shad and river herring.

Both WQCs were incorporated into the FERC License and the Settlement Agreement's terms were reflected in the DOI Prescriptions and the FERC License.

- Article 401 requires the Licensee to file various plans, reports, schedules, and amendments for Commission approval that are required by the WQCs and the U.S. Department of the Interior's (DOI) section 18 fishway prescription. Article 401 also requires the Licensee to notify the Commission of any planned or unplanned deviations from the mandatory license conditions related to operation.
- Article 402 reserves authority to the Commission to require fishways at the Project that be prescribed by DOI or the Department of Commerce (DOC).
- Article 403 requires the Licensee to file within one year of license issuance, for Commission approval, a downstream eel and fish passage plan that provides for the installation of downstream eel and fish passage facilities at the Project for downstream migrating American eels and anadromous fish species. The downstream fish passage facilities must consist of a two-foot-high flume fixed to the crest of the spillway that would convey 35 cfs over the dam and drop fish approximately 19 feet to a 5.25-foot-deep plunge pool downstream of the dam. The downstream fish passage facilities must be operational by May 15 of the third year after license issuance and operate annuals from May 15 through November 15.
- Article 404 requires the Licensee to replace the existing trashrack having 2.0-inch clear bar spacing with a trashrack that has 0.75-inch clear bar spacing to protect downstream migrating fish from turbine entrainment and mortality.
- Article 405 requires a seasonal restriction on tree removal to protect the federally listed northern long-eared bat during its active season (April 1 to October 1). The Licensee must limit non-hazardous tree removal to the period of October 2 through March 31. Tree removal is defined as cutting down, harvesting, destroying, trimming, or manipulating in any other way the non-hazardous trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats (i.e., woody vegetation greater than or equal to 3 inches diameter at breast height).
- Article 406 requires the Licensee to employ a qualified botanist to conduct surveys for the small whorled pogonia, a federally listed plant species, prior to any ground-disturbing activities.
- Article 407 requires the Licensee implement the "*Programmatic Agreement Among the Federal Energy Regulatory Commission, the New Hampshire State Historic Preservation Office, and the*

Maine State Historic Preservation Office for Managing Historic Properties that May be Affected by Issuing a Subsequent License to Green Mountain Power Corporation and the City of Somersworth, New Hampshire for the Continued Operation of the Lower Great Falls Hydroelectric Project in Strafford County, New Hampshire and York County, Maine (FERC No. 4551-024)," executed on October 28, 2022, and including but not limited to the Historic Properties Management Plan (HPMP) for the Project. As part of the Programmatic Agreement, the Licensee must file, for Commission approval, a HPMP within one year of issuance. If the Programmatic Agreement is terminated prior to Commission approval of the HPMP, the Licensee must obtain approval from the Commission and the New Hampshire and Maine State Historic Preservation Officers, before engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the Project's areas of potential effects.

- Article 408 grant permission for certain types of use and occupancy of Project lands and waters and to convey certain interests in Project lands and waters for certain types of use and occupancy, without prior Commission approval.
- Article 409 requires the Licensee to notify the Commission if the City's Riverwalk Park or Greater Baxter Mills, LLC's private picnic area and car-top boat launch cease operation.

1.5 Zones of Effect

The Project is delineated into three Zones of Effect (ZOE): Impoundment, Bypass Reach and Downstream as shown in Figure 1.5-1 and discussed in greater detail below.

- ZOE 1 starts at the most upstream point of the Project boundary (RM 4.2) on the Salmon Falls River in the Project impoundment and ends at the Project dam (RM 3.1). The approximate length of the 40-acre impoundment is 1.1 RM. The normal pond elevation of 106.4 feet, msl.
- The Project dam discharges to Salmon Falls River, designated as ZOE 2 – Bypass Reach. The Project bypass reach is approximately 0.05 RM, in length.
- The Project bypass reach and powerhouse discharge to the Salmon Falls River in a reach designated as ZOE 3 – Downstream. This ZOE extends downstream of the Project powerhouse approximately 0.25 RM, in length, to the downstream end of Worster Island.

TABLE 1.1-1: CURRENT AND HISTORIC DAMS ON THE SALMON FALLS RIVER

Name	Status	Town	FERC No.	Owner	River Mile	Downstream Fish Passage Facility
Great East Lake Dam	Active	Wakefield	-	NHDES Water Division	35	No
Horn Pond Dam	Active	Wakefield	-	NHDES Water Division	33.5	No
Salmon Falls River XI Dam	Ruins	Milton	-	Mr. Carr Horn	31.6	NA
Salmon Falls River XII Dam	Ruins	Milton	-	Mr. L E Wiggin	31.2	NA
Rowe Dam	Active	Milton	-	NHDES Water Division	29.5	No
Salmon Falls River VIX Dam	Ruins	Milton	-	PSNH	29.2	NA
Salmon Falls River VIII Dam	Breached	Milton	-	PSNH	28.9	NA
Waumbek Dam	Active	Milton	5872	NHDES Water Division	28.8	No
Salmon Falls River VII	Active	Milton	-	Mr. David Aubert	28.6	Yes (eel)
Milton Three Ponds Dam	Active	Milton	-	NHDES Water Division	21.4	No
Salmon Falls River V Dam	Removed	Milton	-	PSNH	21.3	NA
Milton Leather Board Dam	Active	Milton	-	Milton Land Corp	21.1	No
Milton Leather Board Lower Dam	Removed	Milton	-	Mr. John Jamesom	21	NA
South Milton Dam	Active	Milton	3984	SFR Hydro Co.	20.8	No
Salmon Falls River I Dam	Ruins	Milton	-	Spaulding Fiber Company	20.1	NA
Spaulding Pond Dam	Active	Rochester	3985	Spaulding Ave Industrial Complex, LLC	18.8	No
Salmon Falls II Dam	Ruins	Rochester	-	Cocheco Woolen	13.8	NA
Boston Felt Dam	Active	Rochester	4542	Salmon Falls Power and Light Co	13.7	No
Mast Point Dam	Removed	Somersworth	-	General Electric Co.	7.2	
Stone Dam	Active	Somersworth	3820	Aclara Technologies, Inc.	4.4	No
Back Dam	Active	Somersworth	-	Aclara Technologies, Inc.	4.1	No
Lower Great Falls Dam	Active	Somersworth	4451	City of Somersworth & GMP	3.1	Expected (2026)
Rollinsford Dam	Active	Rollinsford	3777	Town of Rollinsford (operated by GMP)	0.9	Expected (2025)
South Berwick Dam	Active	Rollinsford	11163	Salmon Falls Hydro, LLC (GMP)	0	Yes

TABLE 1.1-2: FACILITY INFORMATION

Item	*Information Requested*	*Response (include references to further details)*
Name of the Facility	Facility name (use FERC project name or other legal name)	Lower Great Falls Hydroelectric Project
Reason for applying for LIHI Certification	To participate in state RPS program To participate in voluntary REC market (e.g., Green-e) To satisfy a direct energy buyer's purchasing requirement To satisfy the facility's own corporate sustainability goals For the facility's corporate marketing purposes Other (describe)	(select and describe only applicable reasons) 1. ☒ State Program: GMP is applying to participate in the NEPOOL State REC Program: NH Class IV, RI Existing, VT Tier I, CT CEO 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☒ describe: Sell into NH IV REC market to offset rates
	If applicable, amount of annual generation (MWh and % of total generation) for which RECs are currently received or are expected to be received upon LIHI Certification	Amount of MWh participating: ~ 3,917 MWh % of total MWh generated: 100%
Location	River name (USGS proper name)	Salmon Falls River
	Watershed name - Select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html	01060003
	Nearest town(s), county(ies), and state(s) to dam	City of Somersworth, Strafford County, NH and Town of Berwick, York County, ME
	River mile of dam above mouth	3.1
	Geographic latitude and longitude of dam	Lat: 43°15'36" north Long: 70°51'36" west
Facility Owner	Application contact names	John Tedesco
	Facility owner company and authorized owner representative name. **For recertifications: If ownership has changed since last certification, provide the effective date of the change.**	Green Mountain Power Corporation, City of Somersworth, NH.

Item	*Information Requested*	*Response (include references to further details)*
	FERC licensee company name (if different from owner)	NA
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	P-4451, date of issuance 1/20/2023, date of expiration 12/31/62
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Minor
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	WQC #L-16881-33-F-N, Issued April 6, 2022 by the Maine Department of Environmental Protection and WQC 2021-FERC-002, Issued April 4, 2022 by the New Hampshire Department of Environmental Services
	Hyperlinks to key electronic records on FERC e-Library website or other publicly accessible data repositories[1]	Hyperlinks are provided throughout various sections of this document as pertinent FERC Orders and other related regulatory documents are discussed.
Powerhouse	Date of initial operation (past or future for pre-operational applications) Total installed capacity (MW) **For recertifications: Indicate if installed capacity has changed since last certification**	Date of initial operation-1985, Installed capacity=1.28 MW
	Average annual generation (MWh) and period of record used **For recertifications: Indicate if average annual generation has changed since last certification**	3,917 MWh for the period 2005-2018.
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) **For recertifications: Indicate if mode of operation has changed since last certification**	Run-of-river

[1] For example, the FERC license or exemption, recent FERC Orders, Water Quality Certificates, Endangered Species Act documents, Special Use Permits from the U.S. Forest Service, 3rd-party agreements about water or land management, grants of right-of-way, U.S. Army Corps of Engineers permits, and other regulatory documents. If extensive, the list of hyperlinks can be provided separately in the application.

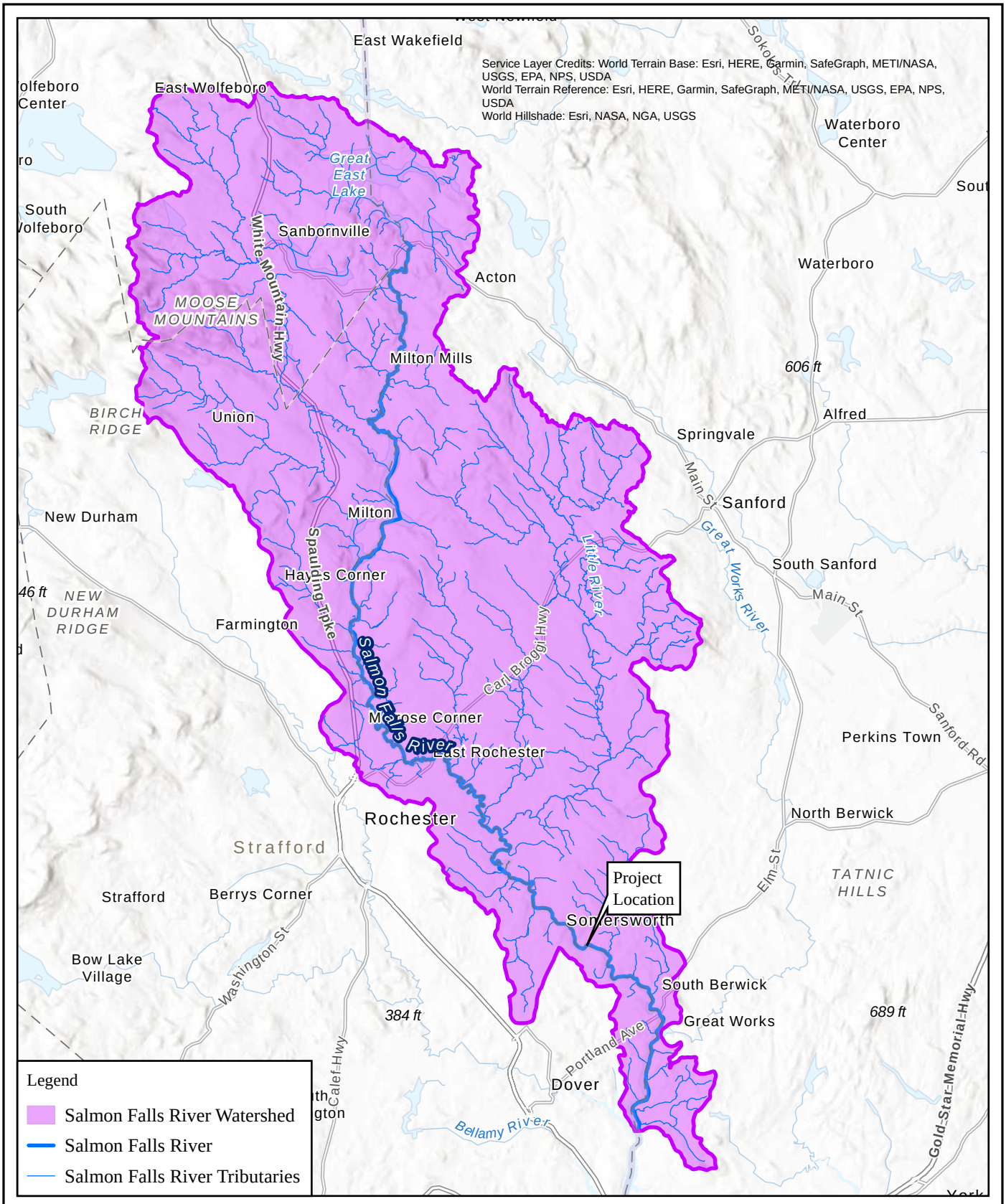
Item	*Information Requested*	*Response (include references to further details)*
	Number, type, and size of turbine/generators, including maximum and minimum hydraulic capacity and maximum and minimum output of each turbine and generator unit	Two (2) identical 260 kW Type "F" Francis turbines and Two (2) identical 380 kW Type "F" Francis turbines. Maximum hydraulic capacity = 702 cfs (199 cfs for Units 1 &3, 152 cfs for Units 2 & 4. Minimum hydraulic capacity = 60 cfs per unit. Maximum output = 400 kW each for Units 1 and 3, 260 kW each for Units 2 and 4. Minimum output = Approx. 70 kW per unit.
	Trashrack clear spacing (inches) for each trashrack	2-inch currently, 0.75-inch starting 2025
	Approach water velocity (ft/s) at each intake if known	0.86 fps
	Dates and types of major equipment upgrades **For recertifications: Indicate only those since last certification**	NA
	Dates, purpose, and type of any recent operational changes **For recertifications: Indicate only those since last certification**	NA
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	NA
Dam or Diversion	Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications	Dam was originally constructed in 1825. The dam was rehabilitated in 1984 and the spillway was rehabilitated in 1991.
	Dam or diversion structure length, height including separately the height of any flashboards, inflatable dams, etc. and describe seasonal operation of flashboards and the like	Dam length = 297 ft. Dam height = 32 ft. Flashboard height = 4 ft.
	Spillway maximum hydraulic capacity	11,260 cfs

Item	*Information Requested*	*Response (include references to further details)*
	Length and type of each penstock and water conveyance structure between the impoundment and powerhouse	Two (2) 8.5-foot diameter steel penstocks. The left penstock bifurcates approximately 120 feet downstream of the intake structure into a 5.3-foot diameter penstock (Unit 4) and a 7.6-foot penstock (Unit 3), both with lengths of 85 feet. The right penstock bifurcates approximately 140 feet downstream of the intake structure into a 7-foot diameter penstock (Unit 2) and a 7.6-foot diameter penstock (Unit 1), both with lengths of 85 feet.
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Power generation
Conduit Facilities Only	Date of conduit construction and primary purpose of conduit	NA
	Source water	NA
	Receiving water and location of discharge	NA
Impoundment and Watershed	Authorized maximum and minimum impoundment water surface elevations **For recertifications: Indicate if these values have changed since last certification**	No maximum. Minimum = 102.4 ft, NGVD 1929
	Normal operating elevations and normal fluctuation range **For recertifications: Indicate if these values have changed since last certification**	Normal full pond = 106.4 feet NGVD 1929, flashboards up. Normal full pond = 102.4 feet NGVD 1929, flashboards down.
	Gross storage volume and surface area at full pool **For recertifications: Indicate if these values have changed since last certification**	Gross Storage Volume = 584 acre-ft. Surface Area = 40 acres.
	Usable storage volume and surface area **For recertifications: Indicate if these values have changed since last certification**	Negligible-Project is run-of-river.
	Describe requirements related to impoundment inflow and outflow, elevation restrictions (e.g., fluctuation limits, seasonality) up/down ramping and refill rate restrictions.	Per water quality certification and FERC license (See Section 1.3).
	Upstream dams by name, ownership (including if owned by an affiliate of the applicant's company) and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Next upstream dam is the Black Dam, owned by Aclara Technologies, Inc., River mile 4.1. The Back Dam does not have a downstream fish passage facility. See Table 1.1-1 and Figure 1.1-2 for other dams on the Salmon Falls River.

Item	*Information Requested*	*Response (include references to further details)*
	Downstream dams by name, ownership (including if owned by an affiliate of the applicant's company), river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Next downstream dam is the Rollinsford Hydroelectric Project (P-3777). Owned by GMP. River mile 0.9. Upstream fish passage facilities for American eel are expected in 2028.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	NA
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control. Indicate locations and acres of flowage rights versus fee-owned property.	0.9 acres of land. 41.1 acres of water. All land within the Project boundary is fee-owned property.
Hydrologic Setting	Average annual flow at the dam, and period of record used	386 cfs. Period of Record: 1968-2005; 2011-2018.
	Average monthly flows and period of record used	January: 367 cfs February: 368 cfs, March: 602 cfs, April: 867 cfs, May: 452 cfs, June: 282 cfs, July: 136 cfs, August: 131 cfs, September: 148 cfs, October: 372 cfs, November: 423 cfs, December: 469 cfs. Period of Record: 1968-2005; 2011-2018.
	Location and name of closest stream gaging stations above and below the facility	Upstream: Salmon Falls near Milton, NH gage (USGS gage number 01072100). Downstream: NA
	Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation[2].	Watershed area at the dam: 220 square miles. Flow data from the Salmon Falls near Milton, NH gage (USGS gage number 01072100) was multiplied by a ratio of the drainage areas at each point (220 mi2/108 mi2).
	Other facility specific hydrologic information (e.g., average hydrograph)	NA
Designated Zones of Effect	Numbers and names of each zone of effect (e.g., "Zone 1: Impoundment")	Zone 1-Impoundment, Zone 2-Bypass Reach, Zone 3-Downstream.

[2] The gage was active from 1968 to 2005 and was operated by the USGS during that time before it was eventually discontinued in 2005. In 2011, the New Hampshire Department of Environmental Services reactivated the gage and has continued to operate and maintain it from 2011 to present[2]. The flow statistics used in the LIHI application were computed in 2019 and used all streamflow data available at that time through 2018 (i.e., 1968 to 2005 and 2011 to 2018).

Item	*Information Requested*	*Response (include references to further details)*
	River mile of upstream and downstream limits of each zone of effect (e.g., "Zone 1 Impoundment: RM 6.3 - 5.1")	Zone 1-Impoundment: RM 4.2-3.1, Zone 2-Bypass Reach: RM 3.1-3.05, Zone 3-Downstream: RM 3.05-2.8
Pre-Operational Facilities Only		
Expected operational date	Date generation is expected to begin	NA
Dam, diversion structure or conduit modification	Description of modifications made to a pre-existing conduit, dam or diversion structure needed to accommodate facility generation. This includes installation of flashboards or raising the flashboard height. Date the modification is expected to be completed	NA
Change in water flow regime	Description of any change in impoundment levels, water flows or operations required for new generation	NA



GREEN MOUNTAIN POWER
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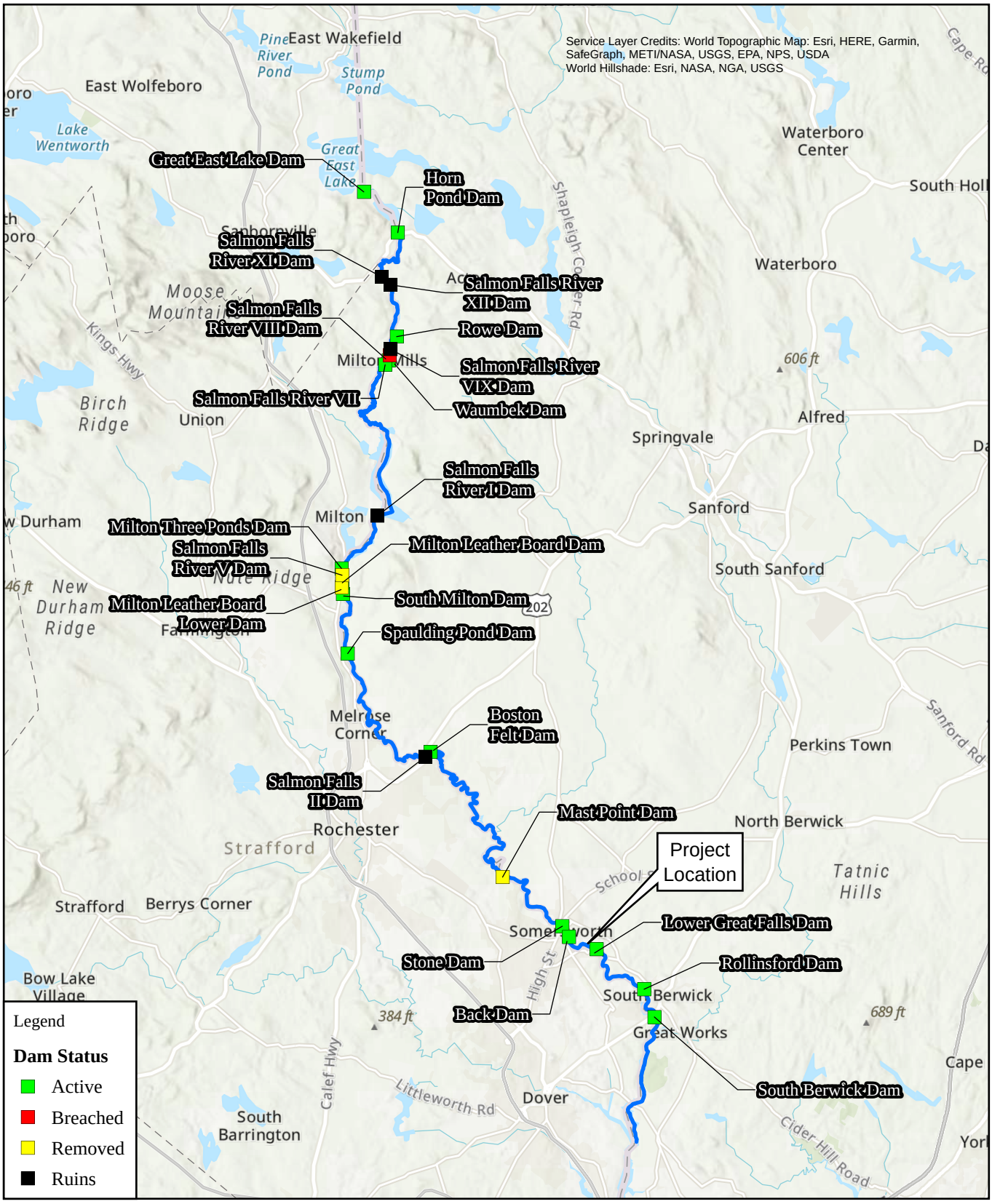
Lower Great Falls Hydroelectric Project
(FERC No. P-4451)
Low Impact Hydropower Institute Application

0 2 4 8 Miles

N

Figure 1.1-1
Project Location Map

Path: D:\GMP\01850\maps\LIHI\LIHI.aprx



GREEN MOUNTAIN POWER
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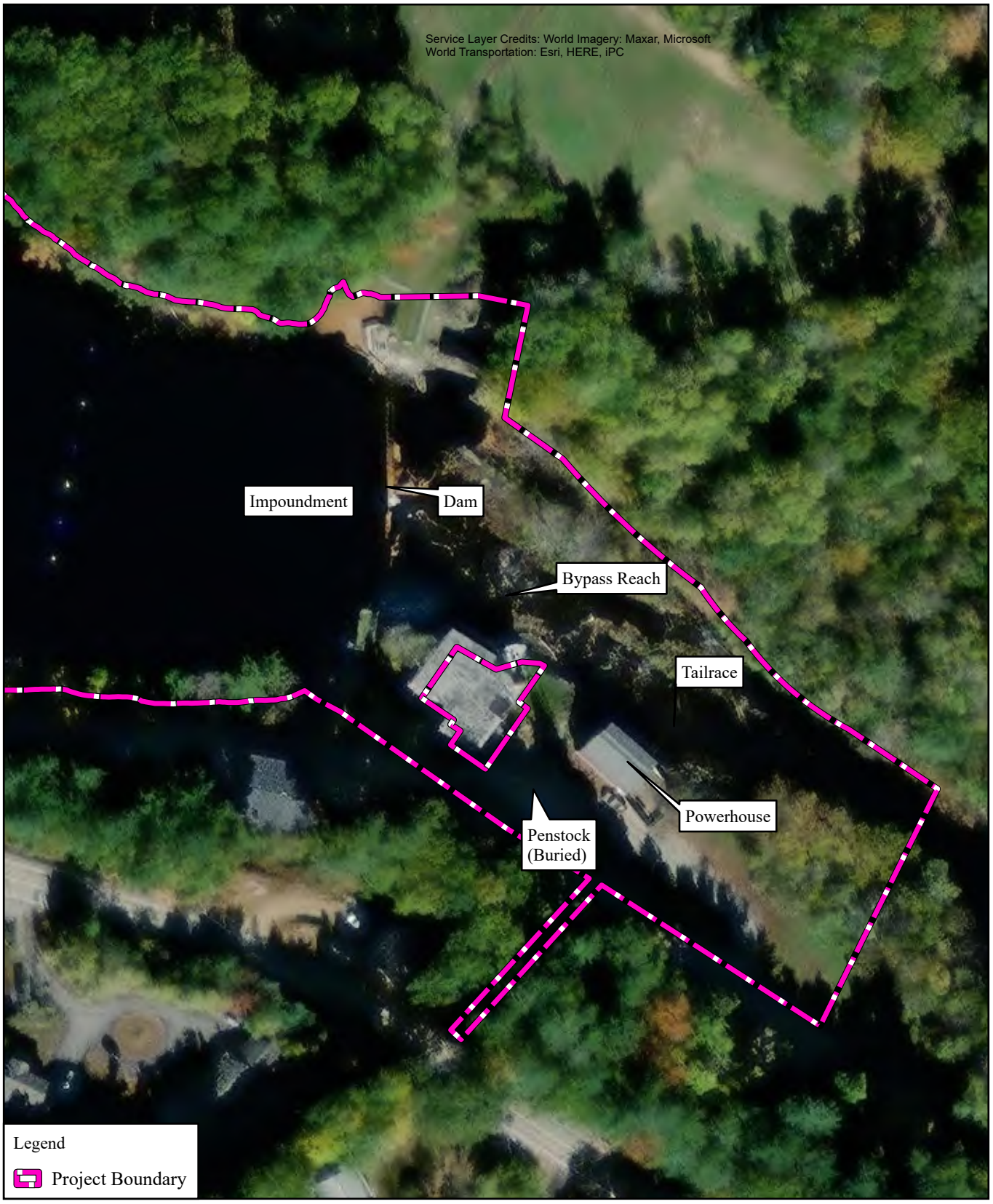
Lower Great Falls Hydroelectric Project
(FERC No. P-4451)
Low Impact Hydropower Institute Application

Figure 1.1-2:
Current and Historic Dams
Along the Salmon Falls River

Path: D:\GMP\01850\maps\LIHI\LIHI.aprx



GREEN MOUNTAIN POWER
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Lower Great Falls Hydroelectric Project
(FERC No. P-4451)
Low Impact Hydropower Institute Application

0 50 100 200 Feet

N

Figure 1.2-1:
Key Project Structures
and Features

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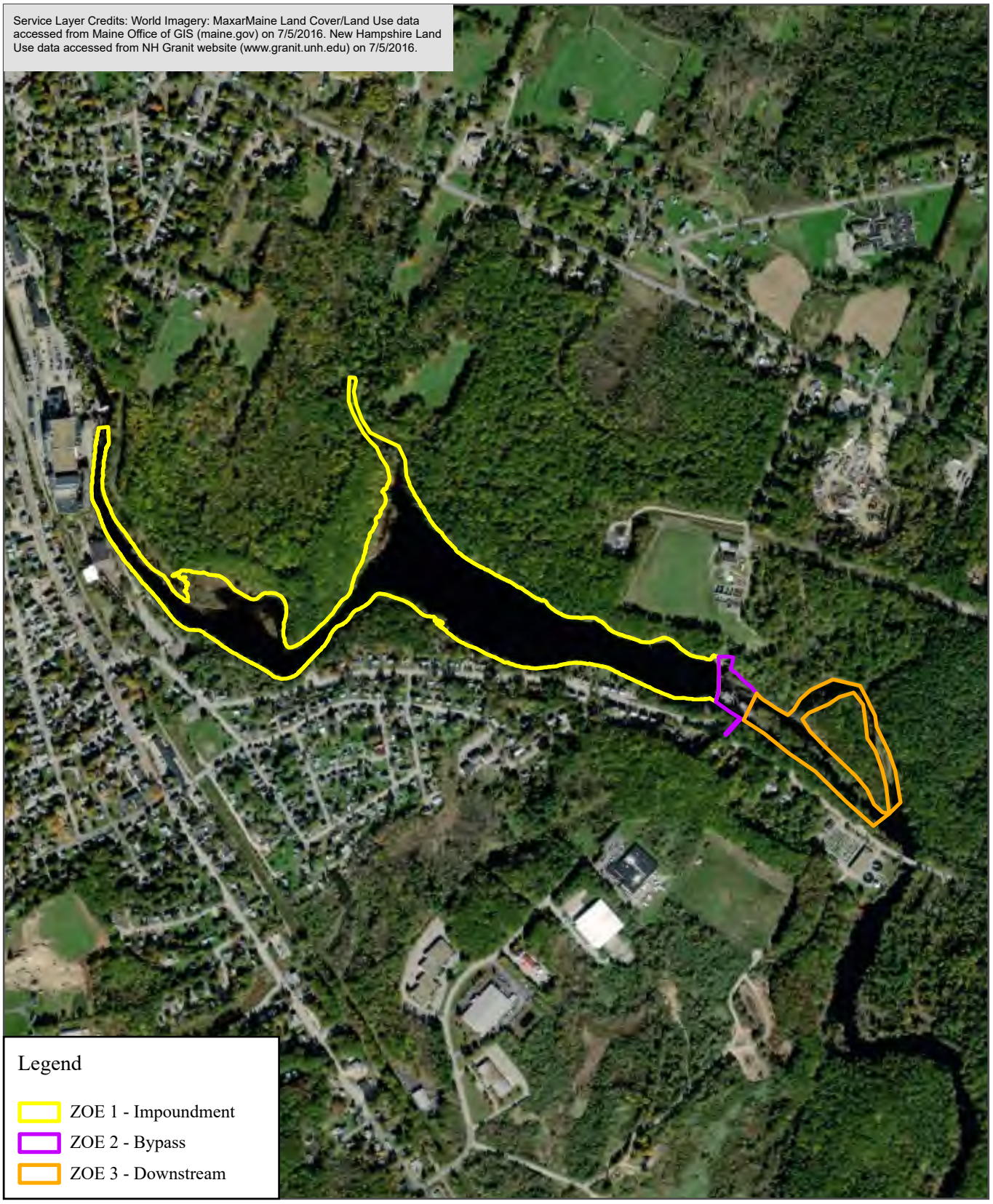

GREEN MOUNTAIN POWER
Generating Possibilities Together

Lower Great Falls Hydroelectric Project
(FERC No. P-4451)
Low Impact Hydropower Institute Application

0 250 500 1,000
Feet

N

Figure 1.5-1:
Zones of Effect

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2 STANDARDS MATRICES

Zone:		1: Impoundment	2: Bypassed Reach (if applicable)	3. Downstream Reach
River Mile at upper and lower extent of Zone:		4.2-3.1	3.1-3.05	3.05-2.8
Criterion		**Standard Selected (type in one numbered standard and PLUS if applicable)**		
A	Ecological Flows	2	2	2
B	Water Quality	2	2	2
C	Upstream Fish Passage	1	2	2
D	Downstream Fish Passage	2	2	1
E	Shoreline and Watershed Protection	1	1	1
F	Threatened and Endangered Species	2	2	2
G	Cultural and Historic Resources	2	2	2
H	Recreational Resources	1	1	1

3 SUPPORTING INFORMATION

3.1 Ecological Flow Standards

3.1.1 Ecological Flows Standards—Impoundment and Downstream ZOE

(*Criterion*	*Standard*	*Instructions*
A	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to formal agency management goals and objectives for fish and wildlife. • Explain how the recommendation provides fish and wildlife protection, mitigation, and enhancement (including instream flows, ramping, and peaking rate conditions, and seasonal and episodic instream flow variations).

Both the Impoundment (Zone 1) and Downstream (Zone 3) ZOE are using standard 2 to justify meeting the ecological flow standard.

- Condition E-10a of the NHDES WQC requires that the Project be operated in a run-of-river mode, such that outflow from the Project equals inflow at all times and water levels above the dam are not drawn down for the purpose of generating power.
- Condition E-10c of the NHDES WQC requires that the target impoundment water elevation under normal operating conditions shall be the top of the flashboards (elevation 106.4 feet NGVD 29) plus any additional elevation required to pass the bypass reach conservation flow. The Licensee shall minimize the magnitude and frequency of fluctuations in the impoundment to the maximum extent practicable and shall not draw the water level in the impoundment down for the purpose of generating power.
- Condition E-10d of the NHDES WQC requires that after drawdown of the Project impoundment for maintenance or emergencies, the Licensee release 90 percent of the inflow downstream to the Salmon Falls River and utilize the remaining 10% of inflow to refill the impoundment.
- Condition E-10e of the NHDES WQC requires that when drawing the water level in the impoundment down for scheduled maintenance, the Licensee lower the impoundment water level no more than six (6) inches per day.
- Condition E-12 of the NHDES WQC requires the development of a Flow/Impoundment Compliance Monitoring Plan and Operation Monitoring Plan, respectively to ensure compliance with impoundment level and bypass flow requirements, as well as reporting of Project operational parameters (i.e., generation, turbine flow, etc.). The Operations Compliance Monitoring Plan was filed for Commission review and approval on July 17, 2023, and as of the date of this application, has not been approved by FERC.[3]

[3] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230717-5083

- To achieve compliance with the run-of-river operational requirements a Programmable Logic Controller (PLC) is utilized to accept various operational inputs and to direct operational outputs. The primary purpose of the PLC is to control headpond water level as river flows vary by modulating the turbine gate setting. A pressure transducer is utilized in the impoundment to determine the water level and transmit the information to the PLC for appropriate action. On-site computers enable electronic data collection and storage and facilitate report printing for monitoring purposes. Per Article 401 of the FERC License, the Licensee filed an Operations Compliance Monitoring Plan (OCMP) with the Commission on July 17, 2023.[4]
- There are no formal agreements with upstream facilities to regulate inflow or outflow at the Project. However, GMP does operate the downstream South Berwick Hydroelectric Project, FERC No. 11163 and the downstream Rollinsford Dam Hydroelectric Project, FERC No. 3777, which provides some level of coordination, if necessary, even though each of the three facilities operate in a run-of-river mode.
- The Project's run-of-river operation provides a stable impoundment level and a natural flow regime below the Project to protect aquatic and riparian habitats. However, there have been two unplanned and one planned run-of-river and impoundment water level deviations following the issuance of the FERC License:
    - An unplanned deviation from run-of-river operations occurred at the Project on May 3 through 9, 2023. Due to high river flows of approximately 3,000 cfs and a partial failure of the flashboards that occurred on May 3, 2023, the impoundment water level dropped approximately two feet lower than the normal pond elevation of 106.4 feet. On May 7, 2023, inflow to the impoundment began to fall to approximately 1,080 cfs. As part of the normal operating procedure, the Project operator began the process of closing the low-level outlet gate. However, one of the hydraulic lines in the gate operating mechanism failed, so that the gate could not be fully closed. This caused the impoundment level to slowly drop an additional two feet to the permanent spillway crest (102.4 feet, NGVD 1929) over the next two days. On May 9, 2023, at approximately 0715 hours with project inflow at approximately 600 cfs, the Project operator was able to take measures to manually close the gate further to reduce flow through it, allowing the impoundment level to return to its original elevation (approximately 104.2 feet, NGVD 1929) prior to the incident. In a letter dated August 23, 2023, FERC determined that the unplanned deviation did not constitute a violation of Article 401.[5]
    - A planned short-term deviation from run-of-river operations occurred at the Project on June 1 through 5, 2023. The drawdown of the impoundment was necessary to complete flashboard repairs that were necessitated by high water that occurred May 2-3, 2023. The drawdown began on June 1, 2023, and returned the Project to normal operations on June 5, 2023. The impoundment reached its lowest level at approximately 4.0-feet below the top of the flashboards, or 102.40 feet NGVD 29 on June 2-3, 2023. The Project minimum bypass flow of 37 cfs was maintained by opening the low-level gate. In a letter dated August 23, 2023, FERC determined that the unplanned deviation did not constitute a violation of Article 401.[6]
    - An unplanned from run-of-river operations occurred at the Project on July 21, 2023. On July 20, 2023, at 1300 hours, the flow release from the Milton Three Ponds dam, which is located approximately 18 miles upstream of the Project and operated by NHDES, was reduced from

[4] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230717-5083.
[5] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230823-3042.
[6] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230823-3028

approximately 422 cfs to 211 cfs. Due to a miscommunication, GMP's Project operator was not aware of the flow release change. The reservoir elevation deviation at the project began on July 21, 2023, at approximately 0330 hours when the reservoir elevation dropped to 106.15 feet due to the decreasing river flow. As a result of a malfunction of the Project alarm system, the reservoir did not recover to its normal elevation of 106.4 feet until 0845 hours on July 21, 2023. In a letter dated September 20, 2023, FERC determined that the unplanned deviation did not constitute a violation of Article 401.[7]

- Article 401 details the requirements, including notification requirements, for planned and unplanned deviations from run-of-river operation. For planned deviations, run-of-river operation may be temporarily modified for short periods, of up to three weeks, after mutual agreement among GMP and NHDES, New Hampshire Fish and Game Department (NHFGD), MDEP, Maine Department of Marine Resources (MDMR), Maine Department of Inland Fisheries and Wildlife (MDIFW), USFWS, and National Marine Fisheries Service (collectively, resource agencies). After concurrence from the resource agencies, the Licensee is required file a report with the Secretary of the Commission as soon as possible, but no later than 14 calendar days after the onset of the planned deviation. Each report must include: (1) the reason(s) for the deviation and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any environmental effects; and (4) documentation of approval from the resource agencies. For planned deviations exceeding three weeks, the Licensee is to file an application for a temporary amendment of the operational requirements of the license and receive Commission approval prior to implementation.

- The NHDES WQC requires that the Licensee file an annual summary report by April 1 of each year (beginning the first April after the date the FERC license is reissued) to NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW a summary report for the previous calendar year with appropriate tables, graphs, text and supporting documentation that demonstrates compliance with the flow/ impoundment management requirements. Where deviations occurred, the report is to indicate when the event occurred, the duration of the deviation, and a description of corrective actions taken to prevent such excursions from reoccurring.

3.1.2 Ecological Flows Standards-- Bypass Reach ZOE

(*Criterion*	*Standard*	*Instructions*
A	2	Agency Recommendation (see Appendix A for definition): • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to formal agency management goals and objectives for fish and wildlife. • Explain how the recommendation provides fish and wildlife protection, mitigation, and enhancement (including instream flows, ramping, and peaking rate conditions, and seasonal and episodic instream flow variations).

The Bypass Reach (Zone 2) ZOE is using standard 2 to justify meeting the ecological flow standard.

[7] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230920-3023

- Minimum bypass flow requirements at the Project are based upon a 2020 IFIM study conducted by the Licensee during relicensing to evaluate the relationship between aquatic habitat and flow within the 250-foot long bypass reach.
- Condition E-10b of NHDES WQC requires that the Licensee shall provide a minimum continuous conservation flow in the bypass reach of 37 cfs, or inflow, whichever is less.
- The bypass minimum flow requirements protect water quality and aquatic habitat in the bypass reach.

3.2 Water Quality Standards

3.2.1 Water Quality Standards-Impoundment, Bypass Reach, and Downstream ZOE

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter or email from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

The Impoundment (Zone 1), Bypass Reach (Zone 2) and Downstream (Zone 3) ZOE are using standard 2 to justify meeting the water quality standard.

- The Project received WQCs from the States of New Hampshire and Maine on April 4, 2022, and April 26, 2022, respectively (Appendices C and D).
- Both New Hampshire and Maine have regulatory authority over water quality in the Salmon Falls River. The Salmon Falls River at the Project is classified as Class B in New Hampshire and Class C in Maine. In New Hampshire, Class B water bodies are considered acceptable for fishing, swimming, and other recreational purposes, and after treatment, are potential water supplies. In Maine, Class C water must ensure suitability for designated uses of drinking water, fishing, agriculture, recreation, industrial processes, cooling water, hydroelectric power generation, navigation, and habitat for fish and other aquatic life.
- In New Hampshire, the Project impoundment is listed on the Clean Water Act section 303(d) list of impaired waters for pH[8]. In Maine, the section of river in which the Project is located is listed on the Clean Water Act section 303(d) list of impaired waters for the following impairments: Escherichia coli, ammonia, eutrophication, dissolved oxygen, phosphorus, and biochemical oxygen demand[9].
- During Project relicensing, the Licensee conducted water quality monitoring for dissolved oxygen and temperature within the Project impoundment, bypass reach, and tailwater. The Licensee additionally analyzed existing water quality data on the Salmon Falls River. Available data indicate that water quality conditions upstream and downstream of the Project generally meet both NH and ME state standards. However, state standards are not always met in the Project impoundment. Water quality sampling done as part of Project relicensing indicated that the Project discharges to the bypass reach and to the tailrace met both ME and NH water quality standards under a variety of Project operation and hydrologic conditions.
- The Project impoundment does not achieve NH and ME state standards for dissolved oxygen at times primarily due to upstream non-point and point source pollutants (per Salmon Falls River TMDL

[8] https://www.epa.gov/system/files/documents/2022-03/2020-2022-nh-303d-list.pdf. See page 7.
[9] https://www.epa.gov/system/files/documents/2022-06/2018-2022-me-integrated-report-appendices.pdf. See pages 57, 109, 110, and 161.

results from the 1990's to 2018). This condition presents itself particularly during the low flow, warm summer months while the Project is often shut down due to inflows being below the minimum hydraulic capacity of 60 cfs. In these cases, all Project inflow is passed via the two (12-inch and 4-inch diameter) pipes located at the base of the Project dam, and via spillage over the dam crest. Project operations do not appear to contribute to these periods of poor water quality.

- To improve water quality in the Project impoundment during low flow, the Licensee filed a Water Quality Mitigation and Enhancement Plan (WQMEP) with FERC on May 24, 2023, following consultation with state and federal resource agencies.[10] As of the date of this application, the WQMEP has not yet been approved by FERC. Condition E-14 of the NHDES WQC and Condition A of the MDEP WQC requires the Licensee to implement the WQMEP after FERC approval.
- Condition E-15 of the NHDES WQC also requires long term water quality monitoring and reporting every five years beginning the fifth year after license issuance and ending five years prior to the expiration of the new license. The purpose of the monitoring is to 1) determine the future effects of Project operation during the duration of the issued license, both spatially and temporally (in terms of flow, impoundment elevation and power generation) on water temperature and dissolved oxygen (mg/L and percent saturation); 2) to compare results to New Hampshire surface water quality standards; and 3) to determine if additional changes in Project operation are necessary to comply with surface water quality standards. Should monitoring indicate that water quality standard excursions persist, the Licensee will consult with NHDES and, if requested by NHDES in writing, submit a new or updated WQMEP in accordance with Condition E-14.
- Condition B of the MDEP WQC requires that five years after implementation of the WQMEP, the Licensee is to consult with MDEP and review the effectiveness of the Plan. If implementation of the WQMEP has not resulted in compliance with the State's water quality standards for dissolved oxygen, the Licensee is then required to submit a revised WQMEP to the MDEP for review and approval, and then implement the revised WQMEP to bring operation of the Project into compliance with these water quality standards.
- Condition E-10a of the NHDES WQC requires that the Project be operated in a run-of-river mode, such that outflow from the Project equals inflow at all times and water levels above the dam are not drawn down for the purpose of generating power. A pond level sensor is installed near the Project intake to monitor and ensure the Project impoundment is maintained at the target impoundment water elevation under normal operating conditions at the flashboard crest elevation of 106.4 feet NGVD 29, and to regulate turbine operation.
- Condition E-10b of NHDES WQC requires that the Licensee shall provide a minimum continuous conservation flow in the bypass reach of 37 cfs, or inflow, whichever is less.

[10] FERC Accession No. 20230524-5088. https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230524-5088.

3.3 Upstream Fish Passage Standards

The Project waters support a variety of common freshwater fish species. The only diadromous fish species in the Project waters is American Eel (*Anguilla rostrata*) until the downstream Rollinsford Hydroelectric Project implements upstream passage as required under its new FERC license after which species including American shad and river herring would have access to the Project tailrace.

3.3.1 Upstream Fish Passage Standards-Impoundment ZOE

Criterion	*Standard*	*Instructions*
C	1	• Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is not or was not the cause of the extirpation.

The Impoundment ZOE (Zone 1) is using standard 1 to justify meeting the upstream fish passage standard since once the fish pass upstream of the dam into the impoundment, they are not restricted in any way. There is no barrier to restrict further upstream movement.

3.3.2 Upstream Fish Passage Standards-Bypass Reach and Downstream ZOE

Criterion	*Standard*	*Instructions*
C	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented. • Provide evidence that required passage facilities are being operated and maintained as mandated (e.g., meets seasonal operational requirements, coordination with agencies, effectiveness relative to performance targets).

The Bypass Reach and Downstream ZOE (Zones 2 and 3) are using standard 2 to justify meeting the upstream fish passage standard.

- Appendix E contains the DOI Preliminary and Modified Prescriptions for Fishways (the Prescriptions) pursuant to Section 18 of the Federal Power Act. Regarding upstream anadromous fish passage, the Prescriptions require the following measures be implemented during the term of the new license.

- Construct, operate, and maintain upstream fish passage facilities that pass anadromous fish species in a safe, timely and effective manner. Based on the best scientific information available at this time, these fishways could satisfy the standard of safe, timely, and effective: (a) a technical fishway from the Project's tailrace; (b) a technical fishway at Project's dam; or (c) a nature-like fishway (NLF) at the Project's dam.
- The fishway shall be constructed and operational by March 15 of the fourth calendar year after permanent volitional upstream fishways for American shad and river herring become operational at the downstream Rollinsford Hydroelectric Project.

- The agreed upon upstream fish passage measures for the downstream Rollinsford Hydroelectric Project (FERC No. 3777) include provision to trap migrating American shad and river herring at the downstream South Berwick Project and distribute those fish upstream of the Rollinsford and Lower Great Falls Projects. Therefore, it is likely that anadromous fish will be present upstream and downstream of the Lower Great Falls Project beginning in 2025 as a result of the interim trap and transport program.
- For upstream American eel passage, the Prescriptions require the following measures be implemented during the term of the new license.
    - Construct, operate, and maintain upstream fish passage facilities that provide safe, timely, and effective upstream passage for American eels.
    - To determine proper siting of the upstream eelway(s), the Licensee shall conduct a two-season upstream eel ramp siting survey beginning the first full passage season after license issuance.
    - Based on results of the siting survey, the Licensee shall, construct permanent eelway(s) to be operational no later than May 1 of the second calendar year after the siting surveys are complete.
    - On May 24, 2023, the Licensee filed its Upstream Eel Ramp Siting Survey for the Project with the Commission.[11] On October 5, 2023, FERC issued a letter acknowledging receipt of the submittal.[12]
    - 2023 was the first year of the two-year siting survey. A site visit was held on May 19, 2023, with resource agencies to select the temporary ramp locations. Two temporary eel ramps were installed at the Project and began operating on May 26, 2023, after spillage flows subsided and operated until October 31, 2023. Weekly night-time visual observation surveys were performed during the expected peak migration period (June 1 to August 15), and supplemental electrofishing surveys were performed twice during the night-time eel study period (on week 3 and week 6).
- The Prescription also requires development of a Fishway Effectiveness Monitoring Plan (FEMP) in consultation with and approved by the USFWS. The FEMP will contain plans for ensuring the effectiveness of the upstream anadromous and eel passage measures required by the Prescription. Effectiveness testing measures will commence the first migratory season after the upstream fishway(s) is operational and continue for a minimum of two (2) fish passage seasons.

[11] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230524-5256
[12] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20231005-3060

- Finally, the Prescription requires development of a Fishway Operation and Maintenance Plan (FOMP) within 1 year of license issuance to cover operations and maintenance of the upstream fish passage facilities at the Project. The FOMP shall include: (a) a schedule for routine fishway maintenance to ensure the fishways are ready for operation at the start of the migration season; (b) procedures for routine upstream and downstream fishway operations; and (c) procedures for monitoring and reporting on the operation and maintenance of the facilities as they affect fish passage.
- There are currently no passage performance standards required at the Project.

3.4 Downstream Fish Passage and Protection Standards

3.4.1 Downstream Fish Passage Standards-Impoundment and Bypass Reach ZOE

Criterion	*Standard*	*Instructions*
D	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented. • Provide evidence that required passage facilities are being operated and maintained as mandated (e.g., meets seasonal operational requirements, coordination with agencies, effectiveness relative to performance targets).

The Impoundment and Bypass Reach ZOE (Zones 1 and 2) are using standard 2 to justify meeting the downstream fish passage standard.

- Appendix E contains the DOI Preliminary and Modified Prescriptions for Fishways (the Prescriptions) pursuant to Section 18 of the Federal Power Act. Regarding downstream anadromous fish passage, the Prescriptions require the following measures be implemented during the term of the new license.
    - Within 3 years of license issuance, construct, operate, and maintain a downstream passage and protection system that provides safe, timely, and effective downstream passage for both spent adult and juvenile anadromous fish.
    - Develop a plan to provide permanent downstream alosine passage and protection, including the design of permanent downstream passage facilities, developed in consultation with, and approved by, the USFWS.
- For downstream American eel passage, the Prescriptions require the following measures be implemented during the term of the new license.
    - Develop a plan to provide permanent downstream eel passage and protection including the design of permanent eel passage facilities and/or operational measures, to be developed in consultation with, and approved by the USFWS.
    - Within three years of license issuance, construct, operate, and maintain a downstream eel passage and protection system that provides safe, timely, and effective downstream passage for American eels.
    - Upon license issuance, implement, as an interim measure, targeted nighttime turbine shutdowns to protect emigrating eels during the first year of license issuance. Turbine shutdowns will occur from dusk to dawn for three consecutive nights following rain accumulations of 0.50 inch or more over a 24-hour period. Turbine shutdowns will occur during the duration of the downstream eel passage season (August 15-November 15). The shutdowns were implemented beginning in the 2023 downstream eel passage season.

- Article 403 requires the Licensee to file within one year of license issuance, for Commission approval, a downstream eel and fish passage plan that provides for the installation of downstream eel and fish passage facilities at the Project for downstream migrating American eels and anadromous fish species. The downstream fish passage facilities must consist of a two-foot-high flume fixed to the crest of the spillway that would convey 35 cfs over the dam and drop fish approximately 19 feet to a 5.25-foot-deep plunge pool downstream of the dam. The downstream fish passage facilities must be operational by May 15 of the third year after license issuance (2026).
- Article 404 requires that by May 15, 2025, the Licensee must replace the current trashrack having 2.0-inch clear bar spacing with a trashrack that has 0.75-inch clear bar spacing, to protect downstream migrating fish from turbine entrainment and mortality. Pursuant to Article 301 of this license, the Licensee must provide contract plans and specifications to the Division of Dam Safety and Inspections (D2SI)-New York Regional Engineer and receive authorization prior to starting construction. Within 90 days of completing the trashrack replacement, the Licensee must file as-built exhibits in accordance with Article 206 of this license.
- In its April 14, 2021, filing responding to FERC's Notice of Application Ready for Environmental Analysis, the DOI describes the entrainment risks associated with trashracks with 2.0-inch spacing as justification for recommending trashrack replacement with 0.75-inch spacing.[13]
- The Prescriptions also require development of a FEMP in consultation with and approved by the USFWS. The FEMP will contain plans for ensuring (1) the effectiveness of the downstream anadromous and downstream eel passage measures required by the Prescription; and (2) that the minimum bypass flow that provides safe, timely, and effective downstream passage to emigrating diadromous species (i.e., does not strand fish). Effectiveness testing measures will commence the first migratory season after the downstream fishway(s) is operational and continue for a minimum of two (2) fish passage seasons.
- Finally, the Prescriptions require development of a FOMP within one year of license issuance to cover operations and maintenance of the downstream fish passage facilities at the Project.
- There are currently no passage performance standards required at the Project.
- The fish species found in the Project area are summarized below in Table 3.4.1-1.

[13] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20210414-5060

3.4.2 Downstream Fish Passage Standards-Downstream ZOE

Criterion	*Standard*	*Instructions*
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the species populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of fish species requiring passage in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is not or was not the cause of the extirpation.

The Downstream ZOE (Zone 3) is using standard 1 to justify meeting the downstream fish passage standard since once the fish pass downstream of the dam into the tailwater, they are not restricted in any way. There is no barrier to restrict further downstream movement.

TABLE 3.4.1-1: FISH SPECIES FOUND IN THE PROJECT AREA

Common Name	Scientific Name	Notes
American Eel	*Anguilla rostrata*	Diadromous
Black Crappie	*Pomoxis nigromaculatus*	Unauthorized Introduction
Blueback Herring	*Alosa aestivalis*	Diadromous
Bluegill	*Lepomis macrochirus*	Unauthorized Introduction
Bridle Shiner	*Notropis bifenatus*	
Brook Trout	*Salvelinus fontinalis*	
Brown Bullhead	*Ameiurus nebulosus*	
Brown Trout	*Salmo trutta*	Stocked for sport
Common Shiner	*Luxilus cornutus*	
Eastern Silvery Minnow	*Hybognathus regius*	
Fallfish	*Semotilus corporalis*	
Golden Shiner	*Notemigonus crysoleucas*	
Largemouth Bass	*Micropterus salmoides*	Stocked for sport[14]
Longnose Dace	*Rhinichthys cataractae*	
Rainbow Trout	*Oncorhynchus mykiss*	Stocked for sport
Rainbow Smelt	*Osmerus mordax*	Diadromous
Redfin Pickerel	*Esox americanus americanus*	
Sea Lamprey	*Petromyzon marinus*	Diadromous
Smallmouth Bass	*Micropterus dolomieu*	
White Perch	*Morone americana*	
Yellow Perch	*Perca flavescens*	
White Sucker	*Catostomus commersoni*	

[14] Largemouth Bass were historically stocked for sport but are now self-sustaining populations.

3.5 Shoreline and Watershed Protection Standards

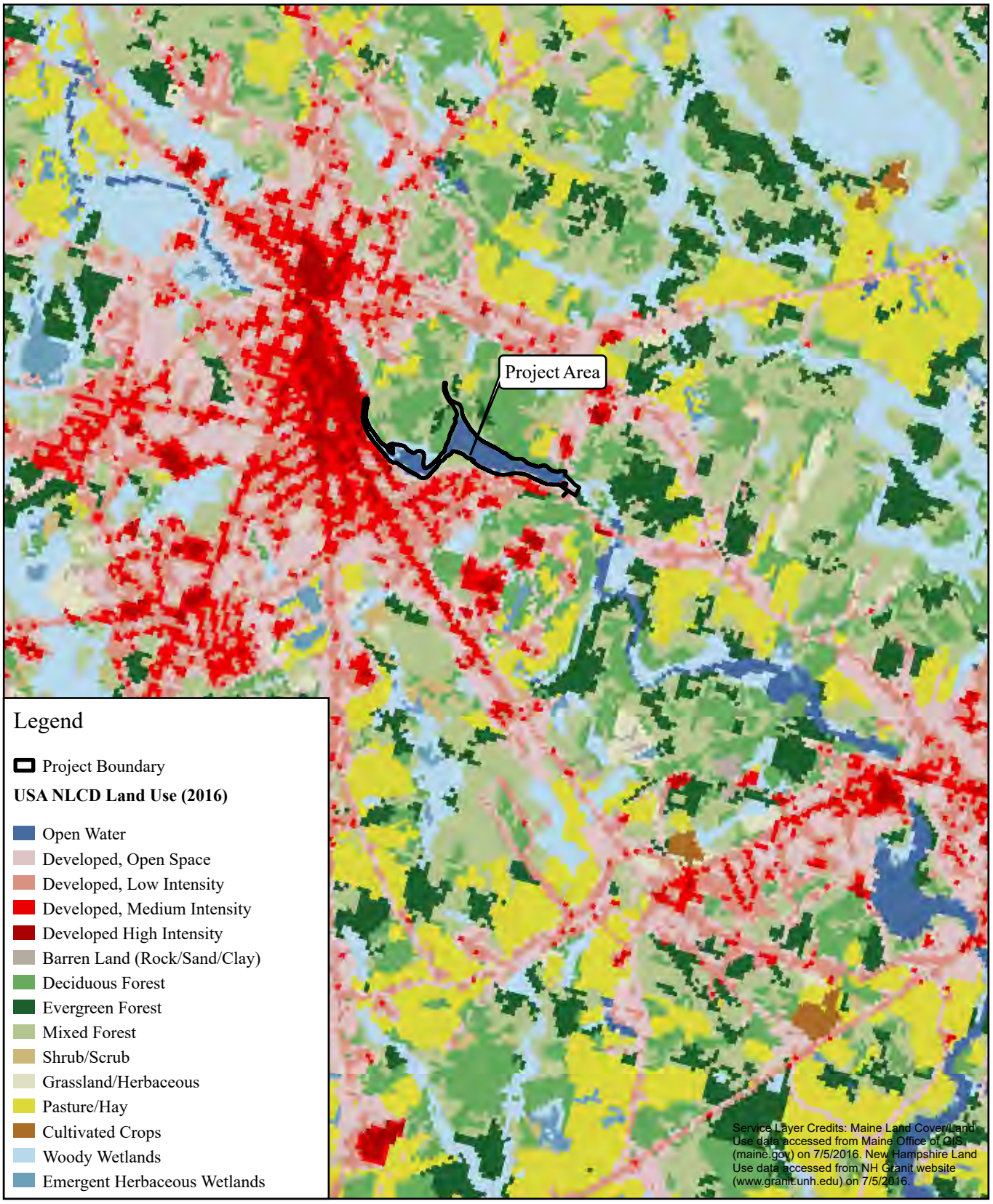
3.5.1 Shoreline and Watershed Protection Standards-Impoundment, Bypass Reach, and Downstream ZOE

Criterion	*Standard*	*Instructions*
E	1	Not Applicable / De Minimis Effect: • If there are no lands with significant ecological value associated with the designated ZoE, document and justify this (e.g., describe the land use and land cover within the FERC project or facility boundary, and absence of critical habitat for protected species). • Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.

The Impoundment (Zone 1), Bypass Reach (Zone 2) and Downstream (Zone 3) ZOE are using standard 1 to justify meeting the shoreline and watershed protection standard.

- There are approximately 0.9 acres of land and 41.1 acres of water within the FERC Project boundary.
- Land use adjacent to and within the Project boundary is primarily developed, forested, or farmland. Upstream of the dam, land in NH is industrialized or residential. At the Project dam, the NH bank is heavily developed for industry, smaller commercial facilities, and residential uses. NH land here is classified as residential and industrial/commercial, and ME land is classified as developed with low and high intensities, as well as developed open space. Downstream of the dam and powerhouse, both the ME and NH lands are classified as developed through the tailrace of the Project. Figure 3.5.1-1 shows land use designations in the Project vicinity.
- The lands within the Project boundary are limited to those required for Project operations. The Project's run-of- river operation and stable pond elevations provide protection for the Project's shoreline areas.
- The Licensee does not have a shoreline management plan or policy with regards to permitting the development of piers, boat docks, or other shoreline facilities at the Project. In addition, the Licensee does not maintain a buffer zone around the Project impoundment. None of these provisions were prescribed within the recent Project relicensing process.
- Within the Project boundary there are no lands of ecological significance or defined critical habitats for threatened or endangered species.

The Project's run-of-river operation provides a stable impoundment level and a natural flow regime that minimizes shoreline erosion.



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Low Impact Hydropower Institute Application

0 0.25 0.5 1 Miles

N

Figure 3.5.1-1:
Land Use Designations
in the Project Vicinity

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3.6 Threatened and Endangered Species Standards

3.6.1 Threatened and Endangered Species Standards-Impoundment, Bypass Reach, and Downstream ZOE

Criterion	*Standard*	*Instructions*
F	2	Finding of No Negative Effects: • Identify all federal and state listed species that are or may be in the immediate facility area based on current data from the appropriate state and federal natural resource management agencies. • Provide documentation that there is no demonstrable negative effect of the facility on any listed species in the area from an appropriate natural resource management agency or provide documentation that habitat for the species does not exist within the ZoE or is not impacted by facility operations.

The Impoundment (Zone 1), Bypass Reach (Zone 2) and Downstream (Zone 3) ZOE are using standard 2 to justify meeting the threatened and endangered species standard.

- An inquiry through the USFWS's Information for Planning and Consultation (IPaC) tool was performed to identify species listed as threatened or endangered under the federal Endangered Species Act (ESA) that should be considered when evaluating the potential impacts of the Project. The geographic range for the inquiry was limited to a one-mile buffer of the Project boundary. The northern long-eared bat (*Myotis septentrionalis*) (NLEB), listed as endangered, and the monarch butterfly (*Danaus plexippus*), listed as a candidate species, were the only species identified within one mile of the Project boundary. The IPac Resource List generated for the Project is provided in Appendix F. No critical habitats documented are within one mile of the Project boundary.
- Although there is no documentation of NLEB at the Project, and no known NLEB hibernacula sites occur within 0.25 mile of the Project, upland and wetland forest in the Project vicinity may provide suitable habitat for NLEB summer roosting and foraging activities. No critical habitat has been designated for this species. The Project is located within the white-nose syndrome buffer zone for this species.
- Article 405 of the FERC license restricts the removal of trees with diameters that are equal to or greater than three inches at breast height from April 1 through October 1, to reduce the likelihood of disturbing NLEB and their newly born pups during the broader, active season of NLEB at the Project. As part of the relicensing process, FERC staff determined that the NLEB could be affected by construction of the new upstream and downstream fish and eel passage facilities at the Project.
- The small whorled pogonia (*Isotria medeoloides*) is a member of the orchid family that is listed as threatened under the ESA. The small whorled pogonia is widely but sparsely distributed throughout 15 states and Canada. The species was not included in the IPaC Resource List generated as part of this application, however in its April 14, 2021, filing responding to FERC's Notice of Application Ready for Environmental Analysis, the DOI stated that the small whorled pogonia may occur in the vicinity of the Project.[15] Article 406 of the FERC license requires the Licensee to conduct surveys for the small whorled pogonia prior to any ground-disturbing activities.

[15] FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20210414-5060

3.7 Cultural and Historic Resources Standards

3.7.1 Cultural and Historic Resources Standards: Impoundment, Bypass Reach, and Downstream ZOE

Criterion	*Standard*	*Instructions*
G	2	Approved Plan: • Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. • Document that the facility is in compliance with all such plans.

The Impoundment (Zone 1), Bypass Reach (Zone 2) and Downstream (Zone 3) ZOE are using standard 2 to justify meeting the cultural and historic resources standard.

- A Phase I archaeological survey within the Maine portion of the Project boundary was conducted in 2018. As a result of the Phase I Survey, three new archaeological sites were recorded. The sites included one newly identified Native American site, site 3.16 ME, and two post-contact Euroamerican sites (ME 039-008 and ME 039-009). The Maine Historic Preservation Commission (MHPC) concurred that Phase II archaeological testing was appropriate at the three newly discovered archaeological sites (sites 3.16 ME, ME 039-008 and ME 039-009).
- Archaeological Phase II testing was conducted at post-contact sites ME 039-008 and ME 039-009, and pre-contact Native American site 3.16 ME in July 2019. Results indicated that sites ME 039-008 and ME 039-009 are likely eligible for inclusion in the National Register of Historic Places (NRHP) (under criteria a and d) for their association and potential to yield significant information associated with 19th century economic and industrial development in Berwick, ME and Somersworth, NH, including the early production of hydropower. Based on the results of the excavation at site 3.16 ME, the site appears eligible for the NRHP (under criterion d) for its potential to yield important information in prehistory.
- Within the New Hampshire portion of the Area of Potential Effect (APE), the New Hampshire Division of Historical Resources (NHDHR) concluded that the FERC relicensing of the Project will not have any impacts on properties of known or potential archaeological, or cultural significance.
- An architectural survey within the Project APE was conducted in 2018. The purpose of the survey was to identify historic resources within the Project APE currently listed or determined eligible for listing in the NRHP. No historic buildings more than fifty years of age were identified within the ME portions of the APE. Within the NH portion of the APE, the NHDHR concluded that the FERC relicensing of the Project will not have any impacts on properties or districts that are listed or may be eligible for the NRHP.
- Article 407 of the FERC license and the terms of a Programmatic Agreement with the New Hampshire and Maine SHPOs requires the Licensee to develop and implement an Historic Properties Management Plan (HPMP) to ensure that measures are in place to protect Project historic properties from adverse effects related to the operation and maintenance of Project facilities and potential adverse effects related to installation of eel and fish passage structures. An HPMP also ensures that any previously undiscovered archaeological resources are not adversely affected by the Project during the term of the FERC license. As part of the Programmatic Agreement, the Licensee must file, for Commission approval, a HPMP within one year of license issuance. If the Programmatic Agreement is terminated prior to Commission approval of the HPMP, the Licensee must obtain approval from the Commission and the New Hampshire and Maine State Historic Preservation Officers, before

engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the Project's areas of potential effects.

3.8 Recreational Resources Standards

3.8.1 Recreational Resources Standards: Impoundment, Bypass Reach, and Downstream ZOE

- The most recent FERC Environmental and Recreation Inspection at the Project was completed on August 24, 2011.[16]

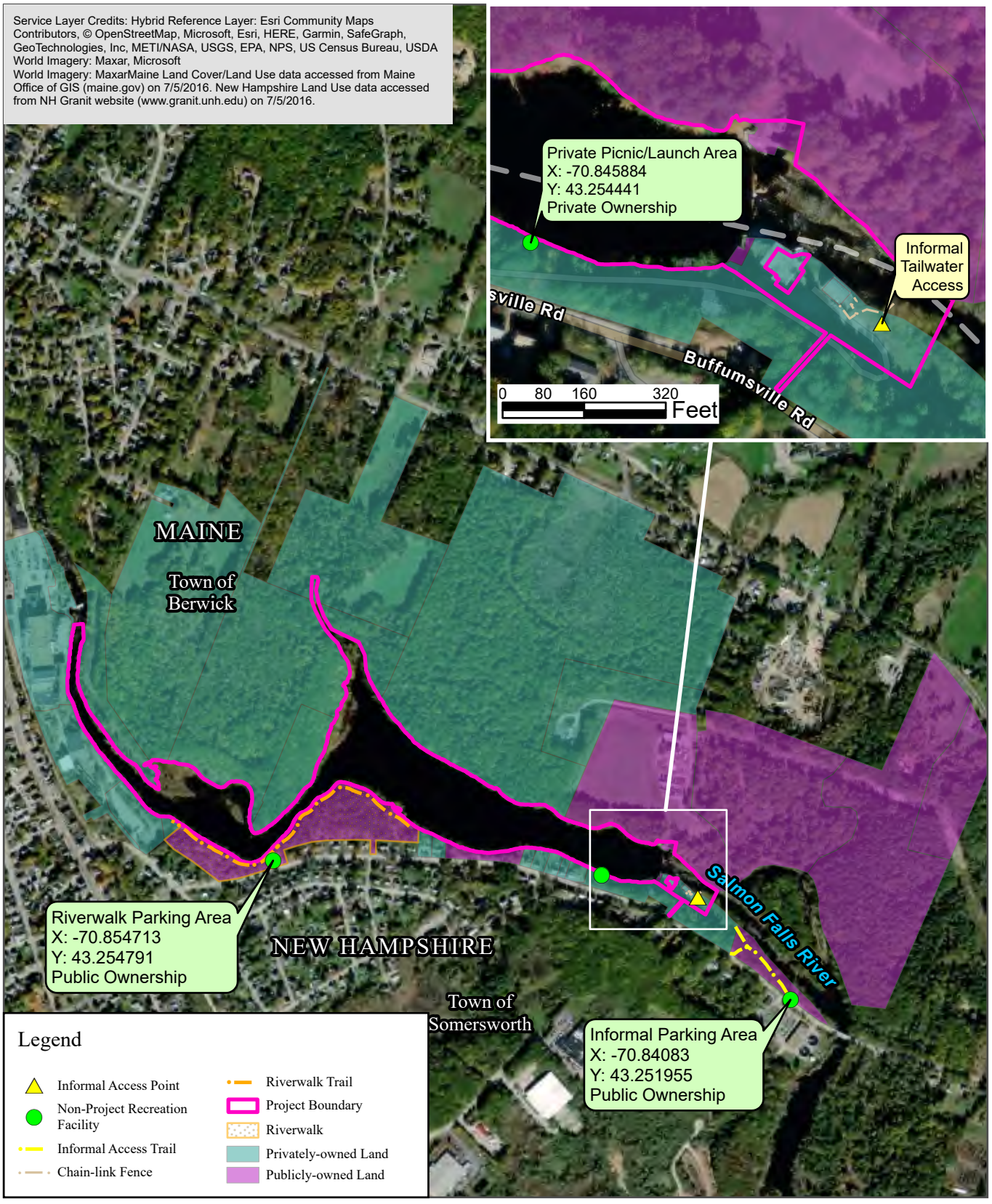
Criterion	*Standard*	*Instructions*
H	1	Not Applicable / De Minimis Effect: • Document that the facility does not occupy lands or waters in the designated ZoE to which public access can be granted and that the facility does not otherwise impact recreational opportunities in the facility area.

3.8.2 Recreation Amenities Associated with the Project

The Impoundment (Zone 1), Bypass Reach (Zone 2) and Downstream (Zone 3) ZOE are using standard 1 to justify meeting the recreational resources standard.

- There are no licensed Project recreation facilities due to the small Project footprint of 0.9 acres of land. However, the City of Somersworth owns, operates, and maintains a recreation facility adjacent to the Project boundary (Figure 3.8-1).
    - Riverwalk Park: Located along the shoreline of the Project impoundment on the New Hampshire side of the Project. The 10-acre area is comprised of a parking area has capacity for approximately 12 vehicles (Figure 3.8-2), a river overlook (Figure 3.8-3), a trail that winds along the impoundment (Figure 3.8-4), and several shoreline locations providing access to the water for canoeists and kayakers. The trail extends from the parking area located on Buffumville Road approximately 0.2 miles to the west and approximately 0.3 miles to the east. The entirety of the trail is located within the publicly owned Riverwalk Park. The Riverwalk is open to the public during daylight hours.
- There is a private picnic area and car-top launch located just upstream of the Project dam. This is a non-Project facility. The area is owned and maintained by the owner (Great Baxter Mills, LLC) of the apartment complex located adjacent to the Project dam, amenities include a picnic table and fire pit. The site is for exclusive use by apartment complex residents.
- Access to the Project bypass and tailrace on the NH side is restricted by Project security fencing; however, there is an informal trail providing access to the Project tailwater on the NH side, just downstream of the tailrace fencing (Figure 3.8-5). There is no public parking area or signage associated with this site. Further downstream of the Project, an informal trail provides access along the NH side of the river reach below the Project (Figure 3.8-6). At the trailhead originating along Buffumsville Road, there is a small informal parking area with capacity for approximately 2 to 4 vehicles. The parking area and trail are located on land owned by City of Somersworth. There is no signage at the site.
- Article 409 of the FERC license requires the Licensee to notify FERC if the City's Riverwalk Park or Great Baxter Mills, LLC's private picnic area and car-top boat launch cease operation.

[16] FERC Accession No. 20111013-4007: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20111013-4007



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0 250 500 1,000
Feet

N

Figure 3.8-1:
Recreation Facilities
and Access Points

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FIGURE 3.8-2: RIVERWALK PARKING AREA

FIGURE 3.8-3: RIVER OVERLOOK

FIGURE 3.8-4: RIVERWALK TRAIL

FIGURE 3.8-5: INFORMAL ACCESS POINT TO PROJECT TAILWATER

FIGURE 3.8-6: INFORMAL ACCESS TRAIL AND PARKING AREA NEAR BUFFUMSVILLE ROAD

4 CONTACT FORMS

4.1 Applicant-Related Contacts

Facility Owner:	
Name and Title	Robert M. Belmore, City Manager
Company	City of Somersworth, NH
Phone	(603) 692-9503
Email Address	Click or tap here to enter text.
Mailing Address	One Government Way, Somersworth, NH 03878
Facility Owner/Operator (if different from Owner):	
Name and Title	John Tedesco
Company	Green Mountain Power
Phone	802-655-8753
Email Address	John.Tedesco@greenmountainpower.com
Mailing Address	163 Acorn Lane, Colchester, VT 05446
Consulting Firm / Agent for LIHI Program (if different from above):	
Name and Title	Kirk Smith, Director of Licensing
Company	Gomez and Sullivan Engineers, DPC
Phone	603.340.7667
Email Address	ksmith@gomezandsullivan.com
Mailing Address	41 Liberty Hill Road - Building 1, P.O. Box 2179, Henniker, NH 03242
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	John Tedesco
Company	Green Mountain Power
Phone	802-655-8753
Email Address	John.Tedesco@greenmountainpower.com
Mailing Address	163 Acorn Lane, Colchester, VT 05446
Party responsible for accounts payable:	
Name and Title	John Tedesco
Company	Green Mountain Power
Phone	802-655-8753
Email Address	John.Tedesco@greenmountainpower.com
Mailing Address	163 Acorn Lane, Colchester, VT 05446

4.2 Current Relevant State, Federal, and Tribal Resource Agency Contacts (excluding FERC).

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	United States Fish and Wildlife Service	☒ Flows ☐ Water Quality ☒ Fish/Wildlife ☒ Watershed ☒ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Kenneth Hogan North Atlantic-Appalachian Region Hydropower Program Coordinator	
Phone	603-227-6426	
Email address	kenneth_hogan@fws.gov	
Mailing Address	70 Commercial Street, Suite 300, Concord, New Hampshire 03301	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	National Marine Fisheries Services	☒ Flows ☐ Water Quality ☒ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Christopher Boelke, Chief, New England Branch, Habitat and Ecosystem Services Division	
Phone	978-281-9131	
Email address	christopher.boelke@noaa.gov	
Mailing Address	55 Great Republic Drive, Gloucester, MA 01930	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	New Hampshire Department of Environmental Services	☒ Flows ☒ Water Quality ☐ Fish/Wildlife ☒ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	James Tilley, Water Quality Certification Supervisor	
Phone	603-271-0699	
Email address	james.w.tilley@des.nh.gov	
Mailing Address	29 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	New Hampshire Fish and Game Department	☒ Flows ☒ Water Quality ☒ Fish/Wildlife ☐ Watershed ☒ T&E Species ☐ Cultural/Historic ☒ Recreation
Name and Title	Mike Dionne, Environmental Review Coordinator	
Phone	603-271-1136	
Email address	Michael.Dionne@wildlife.nh.gov	
Mailing Address	11 Hazen Drive, Concord, NH 03301	

Agency Contact		*Area of Responsibility (check applicable boxes)*
Agency Name	New Hampshire Department of Historical Resources	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Benjamin Wilson, Director and State Historic Preservation Officer	
Phone	603-271-3483	
Email address	benjamin.wilson@dncr.nh.gov	
Mailing Address	19 Pillsbury Street- 2nd Floor, Concord, NH 03301-3570	

Agency Contact		*Area of Responsibility (check applicable boxes)*
Agency Name	Maine Department of Environmental Protection	☒ Flows ☒ Water Quality ☒ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☒ Recreation
Name and Title	Kyle Olcott, Hydropower Coordinator, Bureau of Land Resources	
Phone	207-641-9012	
Email address	Kyle.Olcott@maine.gov	
Mailing Address	17 State House Station, 28 Tyson Drive, Augusta, ME 04333-0017	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Maine Department of Inland Fisheries and Wildlife	☒ Flows ☒ Water Quality ☒ Fish/Wildlife ☐ Watershed ☒ T&E Species ☐ Cultural/Historic ☒ Recreation
Name and Title	John Perry, Environmental Review Coordinator	
Phone	207-287-5254	
Email address	John.Perry@maine.gov	
Mailing Address	284 State Street, 41 SHS, Augusta, Maine 04333-0041	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Maine Department of Marine Resources	☐ Flows ☐ Water Quality ☒ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Casey Clark, Marine Resource Scientist	
Phone	207-350-9791	
Email address	casey.clark@maine.gov	
Mailing Address	21 State House Station, Augusta, ME 04333-0021	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Maine Historic Preservation Commission	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Mr. Kirk Mohney, Director and State Historic Preservation Officer	
Phone	207-287-3811	
Email address	kirk.mohney@maine.gov	
Mailing Address	55 Capitol Street, 65 State House Station, Augusta, ME 04333-0065	

5 ATTESTATION AND WAIVER FORM

All applications for LIHI Certification must include the following statement before they can be reviewed by LIHI:

ATTESTATION

As an Authorized Representative of Green Mountain Power, the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's certification program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The Undersigned further acknowledges that if LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to the final certification decision and prior to marketing the electricity product as LIHI Certified® (which includes selling RECs in a market that requires LIHI Certification).

The Undersigned further agrees to hold the Low Impact Hydropower Institute, the Governing Board, and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's certification program.

FOR PRE-OPERATIONAL CERTIFICATIONS:

The Undersigned acknowledges that LIHI may suspend or revoke the LIHI Certification should the impacts of the facility, once operational, fail to comply with the LIHI program requirements.

Authorized Representative:

Name: John Tedesco

Title: Generation Project Coordinator

Authorized Signature: John Tedesco

Date: October 24, 2023

APPENDIX A: PROJECT FACILITY PHOTOGRAPHS

FIGURE A-1: PROJECT DAM

FIGURE A-2: TRASH GATE

FIGURE A-3: PROJECT IMPOUNDMENT

FIGURE A-4: INTAKE HEADWORKS

FIGURE A-5: PROJECT POWERHOUSE/TAILRACE

APPENDIX B: FERC LICENSE ORDER

182 FERC ¶ 61,024
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Willie L. Phillips, Acting Chairman;
James P. Danly, Allison Clements,
and Mark C. Christie.

Green Mountain Power Corporation and City of Somersworth, New Hampshire — Project No. 4451-024

ORDER ISSUING SUBSEQUENT LICENSE

(Issued January 20, 2023)

INTRODUCTION

1. On April 30, 2020, Green Mountain Power Corporation and the City of Somersworth, New Hampshire (GMP and the City, respectively), filed, pursuant to Part I of the Federal Power Act (FPA),[1] an application for a subsequent license to continue operating and maintaining the 1.28-megawatt (MW) Lower Great Falls Hydroelectric Project No. 4451 (Lower Great Falls Project, or project). The project is located on the Salmon Falls River within the City of Somersworth, Strafford County, New Hampshire, and the Town of Berwick, York County, Maine.[2]

2. As discussed below, this order issues a subsequent license for the Lower Great Falls Project.

BACKGROUND

3. The Commission issued the original license for the project on April 22, 1982, with an effective date of May 1, 1982, and an expiration date of April 30, 2022.[3] Since the

[1] 16 U.S.C. §§ 791(a) – 825(r).

[2] Because the project is located on a navigable waterway of the United States, it is required to be licensed by section 23(b)(1) of the FPA. 16 U.S.C. § 817(1). *See Spaulding Fibre Co., Inc.*, 12 FERC ¶ 61,028 (1980) (finding the Salmon Falls River is a navigable waterway of the United States).

[3] *Somersworth Hydropower Assocs.*, 19 FERC ¶ 62,108 (1982). The license was transferred to Somersworth Hydropower Company and the City of Somersworth, New Hampshire, on September 1, 1987. *Somersworth Hydropower Assocs.*, 40 FERC

expiration date, GMP and the City have operated the project pursuant to section 16.21 of the Commission's regulations, pending the disposition of the application.[4]

4. On October 28, 2020, the Commission issued a public notice that was published in the *Federal Register*, accepting the application for filing, and setting December 27, 2020, as the deadline for filing motions to intervene and protests.[5] The Maine Department of Inland Fisheries and Wildlife (Maine DIFW) and U.S. Department of the Interior (Interior) filed timely notices of intervention on December 7, 2020, and December 15, 2020, respectively.[6] Neither of the intervenors opposes relicensing the project.

5. On February 10, 2021, the Commission issued a public notice that was published in the *Federal Register* indicating the application was ready for environmental analysis, and setting April 11, 2021, as the deadline for filing comments, recommendations, terms and conditions, and prescriptions.[7] Interior filed comments and recommendations on April 14, 2021, and a preliminary fishway prescription on April 16, 2021, pursuant to FPA section 18.[8]

6. On April 6, 2021, GMP, on behalf of itself and the City, filed a Settlement Agreement for Fishways (Settlement Agreement) entered into by GMP, the City, and

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¶ 62,274 (1987). The license was transferred to Green Mountain Power and the City of Somersworth, New Hampshire, on May 24, 2017. *Somersworth Hydropower Co., Inc.*, 159 FERC ¶ 62,204 (2017).

[4] 18 C.F.R. § 16.21 (2021). *See* May 11, 2022 Notice of Authorization for Continued Project Operation.

[5] 85 Fed. Reg. 70,143 (Nov. 4, 2020). The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2) (2021). Because the 60-day filing deadline fell on a Sunday (i.e., December 27, 2020), the filing deadline was extended until the close of business on Monday, December 28, 2020.

[6] Under Rule 214(a) of the Commission's Rules of Practice and Procedure, Maine DIFW and Interior each became a party to the proceeding upon the timely filing of the notices of intervention. 18 C.F.R. § 385.214(a) (2021).

[7] 86 Fed. Reg. 9924 (Feb. 17, 2021). Because the 60-day filing deadline fell on a Sunday (i.e., April 11, 2021), the filing deadline was extended until the close of business on Monday, April 12, 2021. 18 C.F.R. § 385.2007(a)(2) (2021).

[8] 16 U.S.C. § 811.

Interior. The Settlement Agreement reflects agreement concerning the terms of Interior's fishway prescription. On October 7, 2021, GMP, on behalf of itself and the City, filed a letter stating that the terms of the Settlement Agreement are their relicensing proposal for providing upstream fish passage at the project.

7. Commission staff issued an environmental assessment (EA) on July 7, 2022, analyzing the effects of the proposed project and alternatives to it, and setting a deadline for comments of August 21, 2022.[9] Interior filed comments on August 18, 2022, and GMP filed comments on August 22, 2022.

8. The interventions, comments, recommendations, and fishway prescription have been fully considered in determining whether, and under what conditions, to issue the license.

PROJECT DESCRIPTION

A. Project Area

9. The Lower Great Falls Project is located at river mile (RM) 7.4 of the Salmon Falls River. The Salmon Falls River runs for approximately 38 miles from the mouth of the Great East Lake to its confluence with the Cocheco River, where the two rivers join to form the Piscataqua River, which flows approximately 12.7 miles to the Gulf of Maine. The Salmon Falls River Basin has a drainage area of approximately 236 square miles.

10. There are 15 dams on the Salmon Falls River, seven of which are used for hydropower generation.[10] The non-powered dams are used for flood control, water supply, and recreation. Land in the project vicinity is forested and interspersed with commercial and residential use.

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[9] Because the 45-day filing deadline fell on a Sunday (i.e., August 21, 2022), the filing deadline was extended until the close of business on Monday, August 22, 2022. 18 C.F.R. § 385.2007(a)(2).

[10] Of the seven projects used for hydropower generation, four operate under FERC-issued licenses and the remaining three operate under FERC-issued small hydropower project exemptions. The four licensed hydroelectric projects are South Berwick Project No. 11163 (RM 3.9), Rollinsford Project No. 3777 (RM 5.0), Lower Great Falls Project No. 4451 (RM 7.4), and Somersworth Project No. 3820 (RM 8.8); the three hydroelectric exemption projects are Boston Felt Project No. 4542 (RM 19.8), North Rochester Project No. 3985 (RM 25.8), and South Milton Project No. 3984 (RM 28.1).

B. Project Facilities

11. The Lower Great Falls Project includes a 297-foot-long, 32-foot-high stone masonry and concrete dam (Lower Great Falls Dam) that consists of the following sections: (1) a 50-foot-long north abutment section with two eight-foot-wide, eight-foot-high -low-level outlet gates that control flow into two seven-foot-diameter, 40-foot-long outlet pipes;[11] (2) a 176-foot-long spillway section with a 5.25-foot-wide, four-foot-high debris sluice gate, four-foot-high flashboards, and a crest elevation of 106.4 feet National Geodetic Vertical Datum of 1929 (NGVD 29) at the top of the flashboards; and (3) a 71-foot-long south abutment section with a 40.5-foot-wide, 20-foot-high intake structure equipped with four five-foot-wide, 10.5-foot-high steel frame gates and a trashrack- with two-inch clear bar spacing. The dam creates an impoundment that has a surface area of 40.2 acres at an elevation of 106.4 feet NGVD 29.[12]

12. From the impoundment, water flows through the intake structure to: (1) an 8.5-foot-diameter, 120-foot-long steel penstock that bifurcates into a 5.3-foot-diameter, 85-foot-long section and a 7.6-foot-diameter, 85-foot-long section; and (2) an 8.5-foot-diameter, 140-foot-long steel penstock that bifurcates into a seven-foot-diameter, 85-foot-long section and a 7.6-foot-diameter, 85-foot-long section. The penstocks provide water to two 260-kilowatt (kW) F-type Francis turbine-generator units and two 380-kW F-type Francis turbine-generator units located in a 46-foot-long, 30-foot-wide concrete and brick masonry powerhouse, for a total installed capacity of 1.28 MW. Water is discharged from the turbines through draft tubes to a 55-foot-long, 30-foot-wide tailrace, where it returns to the Salmon Falls River. The project bypasses approximately 250 feet of the Salmon Falls River (bypassed reach).

13. Electricity generated at the powerhouse is transmitted via a 260-foot-long, 4.16-kilovolt (kV) underground transmission line to the local distribution grid approximately 200 feet southwest of the powerhouse.

14. There are no project recreation facilities. A more detailed description of the project facilities is contained in ordering paragraph (B)(2).

C. Project Boundary

15. The current project boundary encloses approximately 42.9 acres, including: (1) about 40.4 acres of land and water in and around the impoundment; (2) the

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[11] Water flows though the low-level outlet pipes into the remains of an old mill foundation before emptying into the Salmon Falls River.

[12] EA at 6.

250-foot-long bypassed reach; (3) 0.24 acre of land that is occupied by two apartment buildings and an associated parking lot;[13] (4) 0.56 acre of land associated with Olde Mill Road; (5) the access road to the powerhouse; and (6) land underlying the project facilities listed above.[14]

16. GMP and the City propose to modify the current project boundary along the impoundment to follow a contour elevation of 106.4 feet NGVD 29 (i.e., the flashboard crest elevation), which would result in removing approximately 0.2 acre of land that is above 106.4 feet NGVD 29. GMP and the City also propose to: (1) remove 0.9 acre of land adjacent to the project powerhouse;[15] (2) add 0.07 acre of land associated with the north abutment of the dam and the low-level outlet pipes; and (3) add a 120-foot-long, 10-foot-wide area associated with the transmission line. The proposed changes would decrease the area enclosed by the project boundary from 42.9 to 41.9 acres.

D. Current Project Operation

17. GMP and the City voluntarily operate the project in a run-of-river mode, such that, at any given point in time, outflow from the project approximates inflow, maintaining the project impoundment at the flashboard crest elevation of 106.4 feet NGVD 29. When the project is generating, water is diverted from the impoundment to the intake structure. From the intake structure, water flows through the penstocks to the turbines, where it is then discharged to the project tailrace and the Salmon Falls River. When not generating, water is passed over the project dam into the bypassed reach.

18. Article 23 of the current license requires GMP and the City to release a minimum flow of 6.05 cubic feet per second (cfs) or inflow to the impoundment, whichever is less, from the dam to the bypassed reach to protect aquatic resources in the Salmon Falls River. GMP and the City release the minimum flow to the bypassed reach through a

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[13] The apartment buildings are owned and operated by Great Baxter Mills, LLC. One of the apartment buildings is adjacent to the south abutment of the dam and the other is located on the shoreline of the bypassed reach, approximately 25 feet downstream of the dam.

[14] The current project boundary includes 30-foot-long portion of the 50-foot-long north abutment, and a 140-foot-long portion of the 260-foot-long transmission line.

[15] GMP and the City do not describe the 0.9 acre of land in detail. Based on sheet 1 of the proposed Exhibit G in the application, the 0.9 acre includes: (1) 0.56 acre associated with Olde Mill Road; (2) 0.04 acre occupied by a non-project apartment building adjacent to the south abutment of the dam; (3) 0.2 acre associated with the access road to the powerhouse; and (4) 0.1 acre associated with the parking lot and land adjacent to the apartment buildings.

12-inch-diameter pipe and a 4 inch-diameter pipe at the base of the dam.[16] Direct flow measurements downstream of the dam indicate that the pipes release approximately 10.3 cfs when the impoundment is at 106.4 feet NGVD 29.[17]

19. The minimum and maximum hydraulic capacities of the powerhouse are 60 and 702 cfs, respectively. GMP and the City discharge all flow over the dam to the bypassed reach until inflow to the impoundment reaches 70.3 cfs (minimum hydraulic capacity of the project plus the flow release through the pipes at the base of the dam). When inflow is between 70.3 cfs and 712.3 cfs (maximum hydraulic capacity of the powerhouse plus the flow release through the pipes at the base of the dam), the licensees release a flow of 10.3 cfs to the bypassed reach and divert the remaining flow from the Salmon Falls River to the turbine-generator units to generate electricity. When inflow exceeds 712.3 cfs, GMP and the City operate the four turbine-generator units at their maximum hydraulic capacities, release a flow of 10.3 cfs from the pipes at the base of the dam, and release the remaining flow over the dam. When inflow exceeds 712.3 cfs and water rises to approximately 10 inches above the flashboard crest, GMP and the City open the debris sluice gate and the low-level outlet gate to discharge additional flow. These discharges to the Salmon Falls River downstream of the dam and powerhouse occur in both Maine and New Hampshire.

20. The project's average annual generation is approximately 3,916.8 megawatt-hours (MWh). Generation at the project occurs on a year-round basis and is typically highest during the spring season (March and April) when river flow is highest.

E. Proposed Operation and Environmental Measures

21. To protect aquatic resources and water quality, GMP and the City propose to continue operating the project in a run-of-river mode, such that outflow approximates inflow at any given point in time, and the surface elevation of the impoundment is maintained at the flashboard crest elevation of 106.4 feet NGVD 29 under normal operating and flow conditions.

22. To enhance water quality in the impoundment, GMP and the City propose to implement a Water Quality Mitigation and Enhancement Plan (water quality plan) that includes: (1) lowering the impoundment by three feet by releasing flow for project

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[16] The pipes drain water that collects between the old earthfill and stone masonry dam, and the reinforced concrete cap that was added to the dam in the early 1990's. The collected water originates from the entire water column within the impoundment.

[17] *See Somersworth Hydropower Assocs.*, 62 FERC ¶ 62,220 (1993); *see also* GMP's and the City's October 29, 2021 Response to Staff's Request for Additional Information.

generation during "critical low flow periods"[18] to "flush stagnant water from the impoundment;" (2) refilling the impoundment by retaining all inflow except for the proposed 30-cfs bypassed reach minimum flow; and (3) monitoring water temperature and dissolved oxygen (DO) concentrations in the impoundment, bypassed reach, and tailrace from July through September for three years after license issuance to determine the effectiveness of the impoundment drawdown procedures in improving water quality within the impoundment.

23. To enhance aquatic habitat in the bypassed reach, GMP and the City propose to increase the minimum flow from 10.3 to 30 cfs or inflow, whichever is less, by releasing 10 cfs from the two existing pipes at the base of the dam and 20 cfs from either: (1) a new notch in the flashboards of the dam; (2) the proposed downstream eel passage facility, when it is operating to pass downstream migrating eels; or (3) the low-level outlet gate at the base of the dam, when the impoundment is drawn down for flashboard repairs.

24. To provide upstream passage for American shad and river herring,[19] GMP and the City propose to construct and operate a 4-foot-wide Denil fishway at the dam by March 15 of the fourth passage season after permanent upstream passage facilities are installed at the Rollinsford Project No. 4451 (Rollinsford Project), located approximately 2.4 miles downstream of the Lower Great Falls Project (section 2 of Settlement Agreement).

25. To provide upstream eel passage, GMP and the City propose to: (1) conduct an upstream eel passage facility siting survey for two passage seasons after license issuance to determine the optimal location for siting an upstream eel ramp; (2) install an upstream eel ramp within four years after license issuance; and (3) operate the ramp from May 1 through September 15.

26. To protect downstream migrating eels from September 1 through October 31, GMP and the City propose to implement nighttime turbine shutdowns from 8 p.m. to 4 a.m. for three consecutive nights following rain accumulations of 0.5 inch or more over a 24-hour period, within four years of license issuance.

27. To provide downstream eel passage at the project, GMP and the City propose to install a two-foot-high flume on the crest of the spillway that conveys 35 cfs over the

[18] GMP and the City define "critical low flow periods" as when total inflow to the project has been less than 60 cfs for seven consecutive days during the months of July through September.

[19] Blueback herring and alewife are difficult to distinguish visually and are therefore often collectively referred to as river herring.

spillway to a new 5.25-foot-deep plunge pool downstream of the dam within four years after license issuance; and operate the facility from September 1 through October 31.

28. To protect cultural resources within the project boundary, GMP and the City propose to consult with the New Hampshire and Maine State Historic Preservation Officers (SHPO) prior to conducting any land-disturbing activities or alterations to known historic structures within the project boundary, to determine whether to conduct archaeological or historical surveys, or to implement avoidance or mitigation measures during the activity.

SUMMARY OF LICENSE REQUIREMENTS

29. This license, which authorizes 1.28 MW of renewable energy generation capacity, requires most of the proposed measures noted above, the staff-recommended measures described below, the conditions required by the Maine Department of Environmental Protection's (Maine DEP) and the New Hampshire Department of Environmental Service's (New Hampshire DES) water quality certifications (Appendices A and B), and the conditions required by Interior's section 18 fishway prescription (Appendix C). Combined, these measures will protect or enhance aquatic resources, water quality, federally listed species, and cultural resources at the project.

30. This license does not require GMP's and the City's proposal to protect downstream migrating eels by implementing nighttime turbine shutdowns from September 1 through October 31 from 8 p.m. to 4 a.m. for three consecutive nights following rain accumulations of 0.5 inch or more over a 24-hour period, beginning four years after license issuance. Instead, this license requires GMP and the City to protect downstream migrating eels by replacing the existing trashrack that has 2.0-inch clear bar spacing with a trashrack that has 0.75-inch clear bar spacing by May 15 of the third calendar year after license issuance.

31. This license also requires GMP and the City to develop a plan to provide passage for downstream migrating American eel, American shad, and river herring, which includes: (1) installing the proposed 2-foot-high flume at the spillway and the proposed 5.25-foot-deep plunge pool downstream of the dam by May 15 of the third passage season after license issuance; and (2) operating the proposed passage facilities from May 15 through November 15 each year, instead of GMP's and the City's proposal to install the downstream passage facilities within four years after license issuance to provide passage for eels from September 1 through October 31.

32. To protect the threatened northern long-eared bat, this license requires GMP and the City to avoid the removal of non-hazardous trees greater than or equal to three inches diameter at breast height from April 1 through October 31.

33. To protect the threatened small whorled pogonia, this license requires GMP and the City to survey for small whorled pogonia prior to any ground-disturbing activities and consult with the U.S. Fish and Wildlife Service (FWS) to determine if any measures are needed to protect any small whorled pogonias identified during the survey.

34. To protect historic properties that are eligible for or listed on the National Register of Historic Places (National Register), this license requires GMP and the City to develop a Historic Properties Management Plan (HPMP) in consultation with the New Hampshire and Maine SHPOs, instead of GMP's and the City's proposal to consult with the SHPOs prior to conducting land-disturbing activities or making alterations to known historic structures within the project boundary.

WATER QUALITY CERTIFICATIONS

35. Under section 401(a)(1) of the Clean Water Act (CWA),[20] the Commission may not issue a license authorizing the construction or operation of a hydroelectric project unless the state water quality certifying agency has either issued a water quality certification (certification) for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year. Section 401(d) of the CWA provides that the certification must become a condition of any federal license that authorizes construction or operation of the project.[21] Discharges to the Salmon Falls River downstream of the project dam and powerhouse occur in both Maine and New Hampshire. Therefore, a certification is needed from each state.

A. Maine Water Quality Certification

36. On April 6, 2021, GMP and the City applied to Maine DEP for a water quality certification for the Lower Great Falls Project, which Maine DEP received on the same date. On April 6, 2022, Maine DEP issued a certification for the project that includes five conditions. Three of the conditions (conditions 1 through 3) are general or administrative in nature and are not discussed further. The remaining conditions require GMP and the City to: (1) implement the proposed water quality plan (Condition A); and (2) review the effectiveness of the proposed water quality plan within five years after implementation (Condition B). The conditions of Maine DEP's certification are set forth in Appendix A of this order and incorporated into the license by ordering paragraph (E).[22]

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[20] 33 U.S.C. § 1341(a)(1).

[21] *Id.* § 1341(d).

[22] *See infra* PP 95 – 97 for a discussion of these conditions under FPA section 10(a).

B. New Hampshire Water Quality Certification

37. On April 6, 2021, GMP and the City applied to the New Hampshire DES for a water quality certification for the Lower Great Falls Project, which New Hampshire DES received on the same date. On April 4, 2022, New Hampshire DES issued a certification for the project that includes 16 conditions. Nine of the conditions (conditions E-1 through E-9) are general or administrative in nature and are not discussed further. The remaining conditions require GMP and the City to:

(1) operate the project in an instantaneous run-of river mode whereby outflow to the project equals inflow at all times, and water levels upstream of the dam are not drawn down for the purpose of generating power (condition E-10a), instead of operating the project in a run-of-river mode, such that outflow approximates inflow at any given point in time, as proposed by GMP and the City;

(2) release a year-round minimum bypassed reach flow of 37 cfs or inflow, whichever is less, to protect aquatic life in the bypassed reach (condition E-10b), instead of a minimum flow of 30 cfs or inflow, as proposed by GMP and the City;

(3) maintain the elevation of the impoundment at the flashboard crest elevation of 106.4 feet NGVD 29, "plus any additional elevation required to pass" the minimum bypassed reach flow required by condition E-10b (condition E-10c);

(4) when drawing down the impoundment for scheduled maintenance, lower the impoundment water level no more than six inches per day to protect aquatic resources in the impoundment (condition E-10e);

(5) when refilling the impoundment after a drawdown for maintenance or emergencies, release 90% of the inflow downstream to the Salmon Falls River and use the remaining 10% of inflow to refill the impoundment (condition E-10d);

(6) implement notification and reporting procedures for deviations from the certification conditions, including: (1) notify resource agencies within 24 hours after a deviation from the minimum flow or impoundment management requirements; (2) file a report with resource agencies within 45 days of a deviation describing the cause, severity, and duration of the deviation; any adverse environmental effects from the deviation; and corrective measures; and (3) file a report with the agencies by April 1 of each year demonstrating compliance with the minimum flow and impoundment management requirements; and describing any deviations

and corrective measures taken to prevent the reoccurrence of the deviation (condition E-11);

(7) develop an operation compliance monitoring plan (condition E-12);

(8) provide upstream and downstream passage for anadromous fish and American eel in a manner consistent with Interior's section 18 fishway prescription (condition E-13);

(9) develop a water quality improvement plan that includes measures to: (1) ensure that water in the impoundment, bypassed reach, and tailrace either: (a) meets New Hampshire DES's water quality standards or (b) is not "any worse than in the upstream riverine segment," to the extent that the riverine segment immediately upstream of the project is not meeting water quality standards; (2) monitor the effectiveness of the measures; (3) schedule the implementation of the measures; and (4) report on monitoring results (condition E-14), instead of developing the water quality plan proposed by GMP and the City;

(10) monitor DO and temperature in the riverine reach upstream of the impoundment, and in the impoundment, tailrace, and bypassed reach every five years, including five weeks of monitoring during "periods of relatively low flows and high temperatures" and "when the Project is, and is not, generating," in order to determine whether changes in project operation are necessary to comply with New Hampshire DES's water quality standards during the term of a subsequent license (condition E-15), instead of monitoring DO and temperature from July through September for three years after license issuance, as proposed by GMP and the City; and

(11) if New Hampshire DES notifies GMP and the City that invasive species control efforts are needed in portions of the river affected by the project, then GMP and the City must fund invasive species control efforts, and temporarily modify project operation as necessary to control invasive species (condition E-16).

1. Run-of-River Operation

38. New Hampshire DES's certification condition E-10a requires GMP and the City to operate the project in an instantaneous run-of-river mode whereby outflow from the project equals inflow at all times. This would be a change from the current run-of-river mode of operation, where outflow from the project approximates inflow to the impoundment at any given point in time.

39. The project is not capable of operating in an instantaneous run-of-river mode, with total outflow from the project equaling inflow on an instantaneous basis. The project is operated in a run-of-river mode using an automatic pond level control system. This system measures changes to the surface elevation of the impoundment, thus providing an indirect measure of changes to inflow. As inflow increases or decreases, a certain amount of time elapses before the impoundment elevation changes, depending on the rate and magnitude of the change in inflow. Once the change in inflow affects the impoundment elevation, the pond level control system automatically adjusts turbine flow. Based on these technical limitations and the delay associated with adjusting project outflow to match inflow, it is not possible to match outflows and inflows on an instantaneous basis, as required by New Hampshire DES's certification condition E-10a. Additionally, New Hampshire DES has not described how operating the project in an instantaneous run-of-river mode would provide additional protection or benefits to aquatic resources compared to the current mode of run-of-river operation.

40. Continuing to operate the project such that the total outflow from the project approximates, rather than equals, inflow at any point in time would result in stable impoundment elevations, which in turn would help protect fish spawning areas and freshwater mussel beds from becoming dewatered and limit project-related erosion along the impoundment shoreline. Operating the project in this manner would likewise ensure that downstream flows are not affected by project operation. Therefore, operating the project as run-of-river – defined as the sum of all outflows approximating the sum of all inflows at any given point in time – would provide the same level of benefits to aquatic resources upstream and downstream of the project as New Hampshire DES's certification condition E-10a, and is operationally feasible. However, condition E-10a is included in the license because it is mandatory under section 401 of the CWA.

2. Minimum Bypassed Reach Flow

41. New Hampshire DES's certification condition E-10b requires that GMP and the City release 37 cfs to the bypassed reach or inflow, whichever is less. In contrast, GMP and the City propose to enhance aquatic habitat in the bypassed reach by increasing the current minimum flow from 10.3 cfs to 30 cfs or inflow, whichever is less.

42. In the EA, Commission staff concluded that increasing the minimum bypassed reach flow from 10.3 cfs to 30 or 37 cfs would benefit aquatic resources in the bypassed reach by providing additional aquatic habitat. Relative to 10.3 cfs, the proposed minimum flow of 30 cfs would provide an approximately 71%, 24%, and 61% increase in suitable habitat for adult shad and river herring, brown trout, and longnose dace in the bypassed reach, respectively. By comparison, New Hampshire DES's required minimum

flow of 37 cfs would provide an approximately 80%, 33%, and 80% increase in suitable habitat for these species in the bypassed reach.[23]

43. In the EA, staff concluded that a minimum flow of 37 cfs would reduce annual energy production at the project by 404 MWh and result in an annual lost opportunity cost of $20,130. GMP's and the City's proposal to release a minimum flow of 30 cfs would reduce annual energy production at the project by 298 MWh, and result in an annual lost opportunity cost of $14,870. Staff concluded that the aquatic habitat benefits associated with the proposed 30-cfs minimum flow would be worth the cost, and recommended it. Staff concluded that the additional aquatic benefits associated with a 37-cfs minimum flow would not outweigh the additional annual lost opportunity cost of $5,260, and did not recommend it. However, condition E-10b, stipulating a 37-cfs minimum flow, is included in the license because it is mandatory under section 401 of the CWA.

44. The 16 conditions of New Hampshire DES's certification are set forth in Appendix B of this order and incorporated into the license by ordering paragraph (E).

COASTAL ZONE MANAGEMENT ACT

45. Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA),[24] the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within six months of its receipt of the applicant's certification.[25]

46. By letter dated April 18, 2017, the Maine Department of Marine Resources notified GMP and the City that the project is not located within the state's designated coastal zone and a coastal zone consistency review is not required.[26]

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[23] EA at app. I-14.

[24] 16 U.S.C. § 1456(c)(3)(A).

[25] Discharges to the Salmon Falls River downstream of the project dam and powerhouse occur in both Maine and New Hampshire. Therefore, the applicants contacted both states for a consistency review.

[26] *See* GMP's and the City's October 13, 2020 Additional Information Response at Attachment 4.

47. On January 6, 2022, GMP and the City submitted a certification of consistency to the New Hampshire DES for compliance with the CZMA. By letter dated April 5, 2022, and filed with the Commission on October 21, 2022, New Hampshire DES issued GMP and the City its determination of consistency with the New Hampshire Coastal Management Program. The determination does not include any stipulations for compliance.

SECTION 18 FISHWAY PRESCRIPTION

48. Section 18 of the FPA[27] provides that the Commission must require the construction, maintenance, and operation by a licensee of such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior, as appropriate.

49. On April 16, 2021, Interior filed a preliminary fishway prescription for the project that is consistent with the above-described Settlement Agreement.[28] The preliminary fishway prescription is attached to this order as Appendix C, and is made a requirement of this license by ordering paragraph (F).

50. The prescription requires GMP and the City to:

(1) provide upstream passage for American shad and river herring by installing either a "technical" fishway[29] from the tailrace, a technical fishway at the dam, or a "nature-like" fishway[30] at the dam by March 15 of the fourth calendar year after permanent upstream fishways for American shad and

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[27] 16 U.S.C. § 811.

[28] The preliminary prescription stated that Interior would finalize its prescription within 30 days of the comment period for the EA (i.e., by September 20, 2022). On October 12, 2022, Interior notified the Commission that it will file a modified fishway prescription by February 28, 2023. Any requirements that Interior submits with its modified fishway prescription will become conditions of the license after the license is issued. *See City of Tacoma, Wash. v. FERC*, 460 F.3d 53 (D.C. Cir. 2006).

[29] A "technical" fishway is a constructed chute, series of pools, or elevator-like lift designed to provide a pathway over a dam for fish migrating upstream. Interior states that a 4-foot-wide Denil fish ladder (or equivalent) installed at a slope no greater than 1:8 (vertical:horizontal) would accommodate the anticipated production potential of the Lower Great Falls impoundment, including 12,425 river herring, 1,595 shad, and approximately 500 resident or target species.

[30] A nature-like fishway is a fishway structure that is designed to mimic the natural functions and/or aesthetics of a river.

river herring become operational at the Rollinsford Hydroelectric Project No. 3777 (conditions 11.6 and 11.8);

(2) operate and maintain the upstream fish passage facilities annually from April 15 through July 15 (condition 11.3);

(3) conduct a two-season upstream eel passage facility siting survey beginning the first full passage season after license issuance, and consult with the FWS and other resource agencies to determine the optimal location for siting permanent upstream eel passage facilities (condition 11.9);

(4) install an upstream eel passage facility no later than May 1 of the fourth year after license issuance or the second calendar year after completing the siting survey, and operate and maintain the facility from May 1 through October 31 annually (conditions 11.3, 11.6, and 11.9);

(5) develop a plan to provide downstream passage for American shad and river herring within three years of license issuance, including design plans for fish passage facilities, and operate and maintain the facilities from June 1 through November 15 (conditions 11.3, 11.6, and 11.11);

(6) develop a plan to provide downstream passage for American eel within three years of license issuance, including design plans for eel passage facilities and/or operational measures, and implement the measures from August 15 through November 15 (condition 11.3, 11.6, and 11.10);

(7) to protect emigrating eels until permanent downstream passage facilities are operational, shut down the turbines from dusk to dawn for three consecutive nights following rain accumulations of 0.50 inch or more over a 24-hour period, from August 15 through November 15 annually (conditions 11.3 and 11.10);

(8) design upstream and downstream eel and anadromous fish passage facilities in a manner consistent with the FWS's Design Criteria Manual (conditions 11.8, 11.9, and 11.10);

(9) develop a fishway operation and maintenance plan that includes provisions for: (1) operating and maintaining upstream and downstream fish passage facilities at the project; and (2) monitoring and reporting on the operation and maintenance of the facilities as they affect fish passage (condition 11.4); and

(10) develop plans for testing the effectiveness of upstream and downstream fish passage facilities for a minimum of two years after the facilities are operational (condition 11.7.1).

51. By a letter filed April 16, 2021, Interior requested that the Commission reserve authority to prescribe fishways. Consistent with Commission policy, Article 402 of this license reserves the Commission's authority to require fishways that may be prescribed by Interior for the Lower Great Falls Project.

THREATENED AND ENDANGERED SPECIES

52. Section 7(a)(2) of the Endangered Species Act of 1973 (ESA)[31] requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of their designated critical habitat.

53. Based on the FWS's Information for Planning and Consultation (IPaC) website, the northern long-eared bat (*Myotis septentrionalis*), federally-listed as threatened, has the potential to occur at the project.[32] On April 14, 2021, Interior filed a letter stating that the small whorled pogonia, federally-listed as threatened, may also occur in the project vicinity. No critical habitat has been designated for the northern long-eared bat or small whorled pogonia.

A. Northern Long-Eared Bat

54. FWS finalized an ESA section 4(d) rule for the northern long-eared bat in January 2016.[33] In the FWS's January 5, 2016 Programmatic Biological Opinion for the

[31] 16 U.S.C. § 1536(a).

[32] *See* Commission staff's October 20, 2022 memorandum on FWS's Updated List of Threatened, Endangered, Candidate, and Proposed Species; *see also* IPaC, FWS, https://ipac.ecosphere.fws.gov/ (accessed Oct. 20, 2022). On November 30, 2022, FWS published a final rule reclassifying the northern long-eared bat as endangered, and removing its species-specific rule issued under section 4(d) of the ESA. The rule is effective on January 30, 2023. 87 Fed. Reg. 73,488 (Nov. 30, 2022).

[33] Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat, 81 Fed. Reg. 1900 (Jan. 14, 2016). Section 4(d) of the ESA directs FWS to issue regulations deemed "necessary and advisable to provide for the conservation of [threatened] species." 16 U.S.C. § 1533(d).

section 4(d) rule,[34] FWS found that incidental take of the northern long-eared bat is not prohibited unless the action affects a northern long-eared bat hibernaculum, includes tree removal near a hibernaculum, or includes removal of an occupied maternity roost tree or any trees within 150 feet of an occupied roost tree.[35]

55. In the EA, Commission staff determined that the northern long-eared bat could be affected by construction of the new upstream and downstream fish and eel passage facilities at the project.[36] Commission staff recommended that non-hazardous tree removal be conducted outside of the bat's active period of April 1 through October 31, to minimize the adverse effects of the installation of fish and eel passage facilities on the northern long-eared bat.[37] With this measure in place, staff concluded that relicensing the project may affect the northern long-eared bat, but any incidental take that may result is not prohibited under section 4(d) of the ESA. By letter dated July 7, 2022, Commission staff requested FWS's concurrence that relicensing the project with the staff-recommended measures is not likely to adversely affect the northern long-eared bat. On August 18, 2022, FWS concurred with Commission staff's conclusions.[38] No further action is required for the northern long-eared bat.

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[34] FWS, Midwest Regional Office, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions* (Jan. 5, 2016), https://www.fws.gov/sites/default/files/documents/BOnlebFinal4d.pdf (Programmatic Biological Opinion).

[35] FWS's Programmatic Biological Opinion states that northern long-eared bats roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags with a diameter of three inches or greater at breast height. *See* Programmatic Biological Opinion at 11, 18. Diameter "at breast height" refers to the tree diameter as measured about four to 4.5 feet above the ground. FWS defines "tree removal" as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bat. Hazardous trees are trees that are removed for the protection of human life and property. Removal of hazardous trees is not prohibited under the 4(d) rule. Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat, 81 Fed. Reg. at 1901-1902.

[36] EA at app. E-3.

[37] *Id*. at app. I-10 – I-11.

[38] In addition, an official letter generated by the FWS's New England Ecological Services Field Office on June 23, 2022, stated that relicensing the project with staff's recommended tree-clearing restriction would be consistent with the FWS's January 5, 2016

56. Article 405 requires GMP and the City to limit the removal of trees greater than or equal to three inches in diameter at breast height to the period of November 1 through March 31, which is outside of the species' active season.

B. Small Whorled Pogonia

57. In its April 14, 2021 letter, Interior states that the small whorled pogonia may occur in the project vicinity. Suitable forest habitat for the small whorled pogonia could exist along the north side of the impoundment and in a few sections along the south side of the impoundment, where mature oak and softwood forests occur on the shoreline.

58. Under FPA section 10(j), Interior recommends that a qualified botanist conduct surveys for small whorled pogonia prior to any ground disturbing activities at the project. To the extent any small whorled pogonia is identified, FWS recommends that GMP and the City consult with the FWS on potential measures to protect the small whorled pogonia.

59. In the EA,[39] staff acknowledged that the small whorled pogonia could occur in the project area and could be affected by ground disturbance associated with the installation of upstream fish passage facilities proposed by the applicant and prescribed by Interior. Staff concluded that Interior's section 10(j) recommendation would protect small whorled pogonia from project effects, and recommended the measure.

60. By letter dated July 7, 2022, Commission staff requested FWS's concurrence that relicensing the project with the staff-recommended measure is not likely to adversely affect the small whorled pogonia. On August 18, 2022, FWS concurred with Commission staff's conclusions.[40] No further action is required for the small whorled pogonia.

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intra-Service programmatic biological opinion on the 4(d) rule for the northern long-eared bat and verified that the Commission's responsibilities were therefore fulfilled under ESA section 7(a)(2), with respect to the northern long-eared bat. *See* Commission staff's July 7, 2022 Memorandum on *Streamlined Consultation for the Northern Long-Eared Bat under the Final 4(d) Rule.*

[39] EA at app. E-4 & I-11.

[40] *See* FWS' Comments on the Draft Environmental Assessment, 10(j) Preliminary Determination of Inconsistency, and Request for Endangered Species Act Concurrence (Aug. 18, 2022).

61. Article 406 requires GMP and the City to survey for small whorled pogonia prior to ground-disturbing activities and, if the small whorled pogonia is found, consult with FWS on potential measures to protect the species.

C. Proposed Species

62. On September 14, 2022, FWS proposed to list the tricolored bat (*Perimyotis subflavus*) as endangered based upon the range-wide impacts of white-nose syndrome that have caused declines in affected colonies.[41] Critical habitat is not being proposed for the species.

63. Tricolored bats are known to occur in 39 states including Maine and New Hampshire.[42] The active season for the tricolored bat is similar to the northern long-eared bat. During spring, summer, and fall, tricolored bats in the Eastern U.S. predominantly roost in foliage of live or recently dead deciduous hardwood trees, and form summer maternity colonies where young are born.[43]

64. Construction activities associated with the installation of new upstream and downstream fish and eel passage facilities could affect the tricolored bat, as discussed in the EA for the northern-long eared bat.[44] Article 405 requires GMP and the City to limit the removal of trees greater than or equal to three inches in diameter at breast height to the period of November 1 through March 31, which is outside of the species' active season. This tree clearing restriction will limit project effects on any bats present at the project. Because relicensing this project requires no change to project operation, and considering the limited scope of the project, we conclude that relicensing the project is not likely to jeopardize the continued existence of the tricolored bat.

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[41] 87 Fed. Reg. 56,381 (Sept. 14, 2022). Although proposed species are provided no special protection under the ESA, we nevertheless provide an analysis of the action on tricolored bat because the species may become federally listed during the term of a subsequent license.

[42] FWS, *Environmental Conservation Online System Tricolored Bat Species Profile* (Nov. 2022), https://ecos.fws.gov/ecp/species/10515.

[43] FWS, *Status Assessment Report for the Tricolored Bat* (*Perimyotis subflavus*), Version 1.1. (December 2021), https://www.fws.gov/sites/default/files/documents/Tricolored_Bat_SSA.pdf.

[44] EA at app. E-3 – E-4.

HISTORIC AND CULTURAL RESOURCES

A. National Historic Preservation Act

65. Under section 106 of the National Historic Preservation Act (NHPA),[45] and its implementing regulations,[46] federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register, defined as historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. This generally requires the Commission to consult with the SHPO to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

66. GMP and the City initiated consultation with the Maine and New Hampshire SHPOs on December 19, 2016, to identify historic properties, determine the eligibility of cultural resources for listing on the National Register, and assess potential adverse effects on historic properties within the project's area of potential effects (APE).[47] Archaeological evaluations, conducted by GMP and the City in consultation with the SHPOs, concluded that three archaeological sites in the APE are eligible for listing on the National Register, including the remnants of a mid to late 19th century stone water tower, the remnants of a 19th century sawmill complex, and a Middle to Late Ceramic period site.[48] In addition, the north abutment of the project dam and the area surrounding the low-level outlet gates consist of stone masonry and structural remains that were originally constructed in 1825. In the EA, staff concluded that these features could be eligible for listing on the National Register.[49]

67. In the EA,[50] Commission staff concluded that relicensing the project as proposed could have an adverse effect on the historic properties. Adverse effects could occur if repairs are needed to maintain the structure and function of the north abutment of the dam or the low-level outlet gates, or to fix structural damage to the north abutment of the dam

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[45] 54 U.S.C. § 306108.

[46] 36 C.F.R. pt. 800 (2022).

[47] On March 3, 2017, the Commission initiated informal consultation with the SHPOs and designated GMP and the City as the non-federal representatives for carrying out informal consultation pursuant to section 106 of the NHPA.

[48] EA at 76 – 77.

[49] *Id*. at 79.

[50] *Id*. at 77 – 80 & app. I-11 – I-12.

or the low-level outlet gates that occurs over the course of project operation. Adverse effects could also occur if the fish and eel passage facilities prescribed by Interior are installed on the historic properties. It is also possible that unknown historic resources may be discovered during project operation or other project-related activities within the APE.

68. Commission staff issued a draft Programmatic Agreement (PA) for the project on July 11, 2022, that included stipulations for developing an HPMP to ensure that project-related adverse effects on historic properties or previously undiscovered archaeological resources would be adequately addressed over the term of a subsequent license. On July 22, 2022, the New Hampshire SHPO filed a letter concurring with the draft PA. On August 5, 2022, the Maine SHPO filed a letter acknowledging receipt of the draft PA and stating that it did not have any comments on the draft PA.

69. On August 29, 2022, staff issued a final PA. The Maine and New Hampshire SHPOs signed the PA on September 8, 2022, and October 13, 2022, respectively. GMP and the City concurred on September 9, 2022. The PA requires the licensees to prepare an HPMP for the project, and upon Commission approval, implement the HPMP for the term of the subsequent license. Execution of the PA demonstrates the Commission's compliance with section 106 of the NHPA. Article 407 requires the licensees to implement the PA and to file its HPMP for approval with the Commission within one year of license issuance.

B. Tribal Consultation

70. Commission staff invited consultation with the Penobscot Indian Nation, Aroostook Band of Micmacs, Houlton Band of Maliseet Indians, and the Passamaquoddy Tribe (federally recognized Tribes) on April 21, 2016. The federally recognized Tribes did not respond to the initial consultation letter or file any comments in the record of the proceeding.

71. GMP and the City provided the pre-application document and the license application to the above federally recognized Tribes, and to the Abenaki Nation of New Hampshire and the Cowasuck Band of the Pennacook Abenaki People for review and comment.[51] On May 14, 2020, the Commission issued a public notice of the license application and solicited for additional study requests. Then, on November 30, 2020, the Commission issued a notice soliciting scoping comments. None of the federally recognized Tribes or other consulted Tribes filed comments or requested studies.

[51] The Abenaki Nation of New Hampshire and the Cowasuck Band of the Pennacook Abenaki People are not federally recognized Tribes.

72. The draft PA was sent to the federally recognized Tribes on July 11, 2022. None of the federally recognized Tribes filed comments on the draft PA. The final PA was sent to the federally recognized Tribes on August 29, 2022, and the federally recognized Tribes were invited to be concurring parties to the PA. None of them filed a response with the Commission or elected to be a concurring party to the PA.

73. The final PA was executed on October 28, 2022, with the New Hampshire and Maine SHPOs as signatories, and GMP and the City as concurring parties. None of the Tribes filed a response with the Commission on the executed PA.

ENVIRONMENTAL JUSTICE

74. In conducting NEPA reviews of proposed hydropower projects, the Commission follows the instruction of Executive Order 12898, which directs federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of their actions on minority and low-income populations (i.e., environmental justice communities).[52] Executive Order 14008 also directs agencies to develop "programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."[53] Environmental justice is "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[54]

[52] Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 16, 1994). While the Commission is not one of the specified agencies in Executive Order 12898, the Commission nonetheless addresses environmental justice in its analysis, in accordance with our statutory duties.

[53] Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021). The term "environmental justice community" includes disadvantaged communities that have been historically marginalized and overburdened by pollution. *Id.* The term also includes, but may not be limited to, minority populations, low-income populations, or indigenous peoples. *See* EPA, *EJ 2020 Glossary* (Aug. 18, 2022), https://www.epa.gov/environmentaljustice/ej-2020-glossary.

[54] EPA, *Learn About Environmental Justice* (Sept. 6, 2022), https://www.epa.gov/environmentaljustice/learn-about-environmental-justice#:~:text=Environmental%20justice%20(EJ)%20is%20the,environmental%20laws%2C%20regulations%20and%20policies.

75. In the EA, Commission staff identified five environmental justice communities within a one mile radius of the project boundary and considered how relicensing the project could affect the communities.[55] None of the identified environmental justice communities are adjacent to the project impoundment, dam, or other project facilities. The EA concluded that because the environmental justice communities are not adjacent to where the fishway construction activities would occur (approximately 0.4 mile between the construction and the nearest community) and because the staff-recommended environmental measures would enhance aquatic, recreation, and aesthetic resources at the project, relicensing the project would not result in disproportionately high and adverse impacts on the identified environmental justice populations. Therefore, we find the project as licensed herein, which includes staff's recommended measures, will not result in disproportionately high and adverse impacts on the identified environmental justice communities.

RECOMMENDATIONS OF FEDERAL AND STATE FISH AND WILDLIFE AGENCIES PURSUANT TO SECTION 10(J) OF THE FPA

76. Section 10(j)(1) of the FPA[56] requires the Commission, when issuing a license, to include conditions based on recommendations submitted by federal and state fish and wildlife agencies pursuant to the Fish and Wildlife Coordination Act,[57] to "adequately and equitably protect, mitigate damages to, and enhance fish and wildlife (including related spawning grounds and habitat)" affected by the project.

77. On April 14, 2021, in response to the February 10, 2021 public notice that the project was ready for environmental analysis, Interior filed seven recommendations under section 10(j). Of the seven recommendations, one of Interior's recommendations is outside the scope of section 10(j) and is discussed in the next section.

78. The license includes five of the six recommendations that fall within the scope of section 10(j): (1) operate the project in an instantaneous run-of-river mode, whereby outflow from the project equals inflow to the project at all times (Appendix B, condition E-10a); (2) release a year-round minimum flow of 37 cfs to the bypassed reach, or inflow, whichever is less (Appendix B, condition E-10b); (3) implement an impoundment refill procedure after the impoundment is drawn down for emergencies and maintenance, whereby 90% of inflow is passed downstream, and the impoundment is refilled using the remaining 10% of inflow to the project (Appendix B, condition E-10d); (4) develop an operation compliance monitoring plan (Appendix B, condition E-12); and

[55] EA at 80 – 82.

[56] 16 U.S.C. § 803(j)(1).

[57] 16 U.S.C. §§ 661 *et seq*.

(5) survey for small whorled pogonia prior to any ground disturbing activities (Article 406).

79. In the EA,[58] Commission staff made a preliminary determination that the following section 10(j) recommendations are inconsistent with the comprehensive planning standard of section 10(a)(1) and the public interest standard of section 4(e) of the FPA because the benefits of the recommended measures do not justify their costs: (1) operate the project in an instantaneous run-of-river mode, whereby project outflow equals inflow to the impoundment; (2) release a year-round minimum flow of 37 cfs to the bypassed reach, or inflow, whichever is less; and (3) implement a seasonal tree-clearing limitation from April 1 through October 31, during which time trees can only be removed after determining through the use of "protocol-level surveys" that the northern long-eared bat is not present.

80. If the Commission believes that any section 10(j) recommendation may be inconsistent with the purposes and requirements of Part I of the FPA or other applicable law, section 10(j)(2) requires the Commission and the agencies to attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agencies.[59] If the Commission still does not adopt a recommendation, it must explain how the recommendation is inconsistent with Part I of the FPA or other applicable law and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources.

81. By letter dated July 7, 2022, Commission staff advised Interior of the preliminary determinations of inconsistency, asked whether the agency was satisfied with the alternative conditions set forth in the EA, and offered a meeting to attempt to resolve the apparent inconsistencies. On August 18, 2022, FWS requested a meeting to attempt to resolve Commission staff's preliminary determination of inconsistency for the 37-cfs minimum flow recommendation. By conference call on September 15, 2022, Commission staff attempted to resolve the inconsistency for the 37-cfs minimum flow recommendation, pursuant to section 10(j)(2) of the FPA.[60] The issue was not resolved during the meeting. In addition, FWS did not request a meeting on the other two recommendations involving run-of-river operation and northern long-eared bat protection. However, New Hampshire DES's certification condition E-10a requires Interior's section 10(j) recommendation for run-of-river operation (i.e., that the project be

[58] EA at app. I-10 – I-14, app. J-1 & J-3.

[59] 16 U.S.C. § 803(j)(2).

[60] *Id*. *See* August 31, 2022 Notification of FPA Section 10(j) Meeting and October 3, 2022 Summary of Section 10(j) Meeting.

operated in an instantaneous run-of-river mode) whereby outflow from the project equals inflow to the project at all times.[61] In addition, New Hampshire DES's certification condition E-10b requires Interior's section 10(j) recommendation for minimum bypassed reach flows (i.e., that a minimum flow of 37 cfs be released to the bypassed reach or inflow, whichever is less).[62] Therefore, these measures are mandatory under section 401 of the CWA and are included in Appendix B of this license. Because these recommendations are included in this license, the section 10(j) inconsistencies for run-of-river operation and minimum bypassed reach flows are moot.

82. With respect to the northern long-eared bat, in the EA, Commission staff recommended a seasonal clearing restriction for trees greater than or equal to three inches in diameter at breast height from April 1 through October 31.[63] Staff concluded that implementing a seasonal tree-clearing restriction would protect northern long-eared bats at no substantial cost to GMP and the City. Although protocol-level surveys could be used to determine the presence of northern long-eared bats at the project at an estimated levelized annual cost of $810, staff concluded that its recommendation to restrict tree removal activities from April 1 through October 31, would provide a similar level of protection for the species at no cost. Therefore, staff concluded that Interior's recommendation to protect bats by allowing tree clearing from April 1 through October 31 to proceed only after GMP first conducts surveys and finds no bats is not worth the cost.[64]

83. For the above reasons, in accordance with FPA section 10(j)(2)(A), we find that Interior's recommendation is inconsistent with the FPA. We further find, in accordance with section 10(j)(2)(B) of the FPA, that the seasonal clearing restriction required by this license (Article 405) will adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources affected by the project.

SECTION 10(A)(1) OF THE FPA

84. Section 10(a)(1) of the FPA[65] requires that any project for which the Commission issues a license be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the

[61] *See supra* PP 38 – 40.

[62] *See supra* PP 41 – 43.

[63] EA at app. I-10 – I-11.

[64] *Id*. at 119.

[65] 16 U.S.C. § 803(a)(1).

improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.

A. Post-licensing Consultation

85. Interior filed one recommendation under section 10(j) that is not a specific measure to protect, mitigate damages to, or enhance fish and wildlife.[66] Consequently, this recommendation is not considered under section 10(j) of the FPA. Instead, this recommendation is considered under the broad public-interest standard of section 10(a)(1) of the FPA.

86. Interior recommends that GMP and the City notify the resource agencies and Commission of any activity that may affect a federally listed species in a manner not considered in the subsequent license.[67] In addition, Interior recommends that GMP and the City be required to notify Interior if the licensees file an amendment or appeal of any fish and wildlife-related license conditions or a request for an extension of time to implement the articles.[68]

87. In its August 18, 2022 comments on the EA, Interior explained that a licensee is granted significant authority and discretion in its maintenance and operation of a project.[69] Interior asserts that a license issued for a 30- to 50-year term cannot adequately predict how project maintenance or operation will affect a species or designated critical habitat so far into the future and states that its recommendation is intended to require the licensees to evaluate potential activities and how an activity may affect a listed species or designated critical habitat. If, upon conclusion of that evaluation, the licensees determine the activity may affect listed species or designated critical habitat in a manner not previously considered, then Interior's recommendation would require the licensees to provide that information to the Commission and FWS for consideration and potential initiation of the procedures outlined in the Interagency Task Force Report.[70]

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[66] Recommendations under section 10(j) must be specific measures. *See*, e.g.*, Ala. Power. Co.*, 153 FERC ¶ 61,298, at PP 70-71 (2015) (rejecting a 10(j) recommendation as unduly vague), *order on reh'g*, 157 FERC ¶ 61,100 (2016).

[67] *See* Interior's April 14, 2021 Comments at 8.

[68] *Id*.

[69] *See* Interior's August 18, 2022 Comments at 5.

[70] *Id*. at 5 – 6.

88. Once a license is issued, the ESA does not require additional consultation during the term of the license, absent a subsequent federal agency action.[71] If issues related to federally listed species arise during the term of a license, either based on new listings or availability of new information, post-licensing procedures developed by the Commission and resource agencies provide a framework for identifying issues, information gaps, and the need for protection measures.[72] The Interagency Task Force Report published in 2000 specifically sets forth a process for resolving post-licensing ESA issues.[73] Appendix II of the report recognizes that the Commission may receive new information from licensees, non-governmental organizations, or Interior regarding project effects on listed species (including newly-listed species) or critical habitat after a project is licensed and operational, after which the Commission, the licensees, and Interior will "consult to identify the information that would be needed to determine potential project effects."[74]

89. In addition, standard license Article 11[75] requires the licensee to construct, maintain, and operate facilities, and modify project structures and operation for the conservation and development of fish and wildlife resources, if ordered by the Commission upon its own motion, or upon the recommendation of the Secretary of the Interior or the fish and wildlife agencies of any state in which the project is located, after

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[71] *See Cal. Sportfishing Prot. All. v. FERC*, 472 F.3d 593, 595, 599 (9th Cir. 2006) (holding that the continued operation of a hydroelectric project does not require additional section 7 consultation regardless of whether new information becomes available after issuance of the license, in the absence of a subsequent federal action).

[72] *See* Interagency Task Force Report on Improving Coordination of ESA Section 7 Consultation with the FERC Licensing Process, *Work Group on the Coordination of Federal Mandates* (Dec. 8, 2000) (ITFR), https://www.ferc.gov/sites/default/files/2020-04/ImprovingCoordinationofEndangeredSpeciesActSection7ConsultationwiththeFERCLicensingProcess.pdf (accessed September 2, 2022); *The Town of Rollinsford, N.H.*, 180 FERC ¶ 61,176, at PP 11-12 (2022); *Brookfield White Pine Hydro LLC*, 180 FERC ¶ 61,185, at P 66 (2022).

[73] *See id*. at 2 ("[The ITFR] describes procedures to coordinate and integrate the ESA consultation process with the FPA licensing process, *and provides a means of addressing post-licensing consideration of ESA issues*.") (emphasis added).

[74] *Id.* at 17.

[75] *See Standardized Conditions for Inclusion in Preliminary Permits & Licenses Issued Under Part I of the Fed. Power Act*, Order No. 540, 54 FPC 1792 (1975) (providing Form L-9, Article 11). As explained in ordering paragraph (G), this license is subject to the articles in Form L-9, which is reproduced at the end of this order.

notice and opportunity for hearing.[76] The licensee is also required to file an application to amend the license and receive Commission authorization before substantially modifying project works or operation.[77] Before filing an amendment application, the licensee must consult with any resource agency whose interests would be affected by the amendment,[78] such as the FWS if federally listed species would be affected by the amendment.

90. Article 11 and the Commission's regulations, coupled with the interagency report referenced above, already provide post-license ESA procedures, thus obviating the need for Interior's proposed measure.[79]

B. Water Quality Plan

91. GMP and the City propose a water quality plan[80] to increase DO conditions in the impoundment during low flow periods. The plan includes: (1) drawing down the

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[76] *See The Town of Rollinsford, N.H.*, 180 FERC ¶ 61,176 at P 12; *Brookfield White Pine Hydro LLC*, 180 FERC ¶ 61,185 at P 67.

[77] *See id.* at Article 3; *see also The Town of Rollinsford, N.H.*, 180 FERC ¶ 61,176 at P 15 n.35; *Brookfield White Pine Hydro LLC*, 180 FERC ¶ 61,185 at P 67.

[78] *See* 18 C.F.R. §§ 4.38(a)(6), 4.201 (2021).

[79] *The Town of Rollinsford, N.H.*, 180 FERC ¶ 61,176, at PP 10-16; *Brookfield White Pine Hydro LLC*, 180 FERC ¶ 61,185, at PP 66-68. This license order includes several conditions to ensure adequate information flows from the licensees to the Commission during the term of the license. Article 401(c) – (e) require the licensees to notify the Commission of planned and unplanned deviations from run-of-river, impoundment level, and minimum flow requirements related to the project's operation. Article 401(f) requires the licensees to file an application to amend the license and receive Commission authorization prior to implementing any changes to the project for the purpose of mitigating environmental impacts. Standard Article 2 of the license states that "[n]o substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission." Lastly, Standard Article 4 requires the licensees to "cooperate fully with [the Commission's Regional Engineer or his designee] and shall furnish him such information as he may require concerning the operation and maintenance of the project, and any such alterations thereto." This information would all be in the Commission's public record and thus available to Interior.

[80] *See* GMP's and the City's May 19, 2022 Additional Information Filing.

impoundment by 3 feet within 48 hours by releasing flow for project generation during "critical low flow periods"[81] to "flush stagnant water from the impoundment;" (2) refilling the impoundment by retaining all inflow except for the proposed 30-cfs bypassed reach minimum flow; and (3) monitoring water temperature and DO concentrations in the impoundment, bypassed reach, and tailrace from July through September for three years after license issuance to determine the effectiveness of the impoundment drawdown procedures.

92. Maine DEP's certification requires GMP and the City to implement the proposed water quality plan after any license issued (condition A) and to review the effectiveness of the plan within five years after implementation (condition B). If the plan does not result in compliance with Maine DEP's surface water quality standards for DO, GMP and the City must revise the plan and submit it to Maine DEP for review and approval.

93. As discussed in the EA, GMP and the City observed low DO concentrations in the impoundment (i.e., below 5.0 milligrams per liter) that may not be adequate to sustain aquatic life.[82] In the EA, Commission staff concluded that because the project operates in a run-of-river mode and does not store water for generation, DO concentrations in the impoundment appear to be the result of natural biochemical processes occurring in the impoundment during periods of low inflow during the summer.[83]

94. Commission staff also concluded that although the proposed plan could increase DO in the impoundment by pulling water with low DO from the impoundment and releasing it downstream, these benefits would not be worth the adverse effects on aquatic resources in the downstream reach. During impoundment drawdowns, freshwater mussels in the impoundment could be stranded and exposed to desiccation, and low DO water would be released into the Salmon Falls River downstream of the powerhouse for 48 hours, which would degrade aquatic habitat and adversely affect aquatic organisms in the downstream reach. The drawdown and refill process would also reduce attraction and conveyance flows for fish and eel passage because the facilities that release these flows from the dam would not be able to operate at their full capacity when the impoundment elevation is below 106.4 feet NGVD 29, which would delay migration through the project area for American shad, river herring, and American eels. Therefore, staff did not recommend the proposed plan for water quality in the impoundment. For the same reasons, staff did not recommend Maine DEP's requirement to implement the proposed

[81] GMP and the City define "critical low flow periods" as when total inflow to the project has been less than 60 cfs for seven consecutive days during the months of July through September.

[82] EA at 20 – 21.

[83] *Id*. at 27 – 28.

plan and test the effectiveness of the plan.[84] However, Maine DEP's certification conditions A and B are included in Appendix A of this license as mandatory under section 401 of the CWA.

C. Upstream Eel Passage

95. American eels have been documented upstream and downstream of the project. To migrate upstream past the project, juvenile eels must climb over or around the Lower Great Falls Dam. Climbing over or around dams is a well-documented behavior for juvenile eels but can cause passage delay and increase the risk of predation.

96. GMP and the City propose to conduct a two-season upstream eel passage facility siting survey, beginning the first full passage season after the effective date of any subsequent license, to determine where to install an upstream eel passage facility at the project. GMP and the City propose to install an eel ramp within four years of license issuance, and operate the facility annually from May 1 through September 15.

97. Interior's fishway prescription conditions 11.3 and 11.9 require GMP and the City to conduct an upstream eel passage facility siting survey from May 1 through October 31 for two years, starting the first full passage season after any license issued. Interior's prescription also requires GMP and the City to install eel passage facility by May 1 of the second calendar year after the siting survey is completed, and to operate the facility from May 1 through October 31 each year thereafter. New Hampshire DES's certification condition E-13 requires GMP and the City to provide upstream eel passage consistent with Interior's prescription.

98. In the EA,[85] staff recommended GMP's and the City's proposal and Interior's prescription to conduct the siting survey for two passage seasons and install the facilities within four years after any license issued. Staff concluded that providing upstream passage from May 1 through October 31, as required by Interior, would reduce passage delay throughout the entire passage season.[86] In comparison, GMP's and the City's proposed operating period of May 1 through September 15, would provide upstream passage for the majority of the migration season, but would not provide passage for juvenile eels migrating upstream from September 16 through October 31 (a total of 46 days).

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[84] *Id*. at app. I-16.

[85] *Id*. at 84.

[86] *Id*. at app. I-4.

99. The levelized annual cost of operating the permanent upstream eel passage facility from May 1 through October 31, as prescribed by Interior, would be $6,910. In comparison, the levelized annual cost of operating the permanent upstream eel passage facility from May 1 through September 15, as proposed by GMP and the City, would be $5,180. Staff concluded that the incremental benefits of the longer season prescribed by Interior (i.e., provide passage for juvenile eels for an additional 46 days) would be worth the incremental additional cost of $1,730, and recommended Interior's prescribed operating period. This license includes Interior's prescribed operating season of May 1 through October 31, as mandatory under section 18 of the FPA (Appendix C, condition 11.3).

D. Downstream American Eel and Anadromous Fish Passage

1. Downstream Passage Facilities

100. As discussed in the EA, American eels have been documented upstream and downstream of the project, and downstream migrating eels could be adversely affected by project operation through turbine entrainment mortality.[87] Similarly, following the installation of the upstream fish passage facilities required by this license, shad and river herring would have access to the Salmon Falls River upstream of the project for spawning. Afterwards, downstream migrating juvenile and adult shad and river herring could be adversely affected by project operation through turbine entrainment mortality.[88]

101. GMP and the City did not propose any downstream anadromous fish passage measures. However, GMP and the City propose to install and operate a downstream eel passage facility within four years of license issuance, including a two-foot-high flume fixed to the crest of the spillway that conveys 35 cfs over the dam to a new 5.25-foot-deep plunge pool downstream of the dam.

102. Interior's prescription conditions 11.10 and 11.11 require GMP and the City to develop plans to provide downstream eel and anadromous fish passage within three years of license issuance. Interior's prescriptions require the licensees to construct, operate, and maintain downstream eel and anadromous fish passage facilities that are designed in a manner that is consistent with FWS's Design Criteria Manual and operate the passage facilities from August 15 to November 15 for eels, and from June 1 to November 15 for anadromous fish (condition 11.3). Additionally, New Hampshire DES's certification condition E-13 requires downstream passage facilities to be constructed and operated as prescribed by Interior. However, Interior's prescription does not include any specific design measures regarding the passage facilities, including where the facilities would be

[87] *Id*. at 46 – 49, app. I-5 – I-7.

[88] *Id.* at app. I-7 – I-8.

located and what type of facility is to be installed. In the EA, staff noted that without more specifics, staff was not able to assess the costs verses benefits of Interior's prescribed facility.[89]

103. In the EA,[90] staff concluded that GMP's and the City's proposed downstream eel passage facility could be used to pass downstream migrating eel, American shad, and river herring. The proposed depths of the flume and plunge pool, and the proposed conveyance flow are consistent with the recommendations in the FWS's Design Criteria Manual, as prescribed by Interior. Commission staff concluded that there would be no additional capital cost associated with providing downstream shad and river herring passage through the downstream eel passage facility and recommended it. Article 403 requires GMP and the City to file a plan for installing and operating the staff-recommended downstream eel and anadromous fish passage facility. The plan must be consistent with the requirements specified by Interior's prescription conditions 11.10 and 11.11.

2. Downstream Eel Passage Implementation and Operation Schedule

104. GMP and the City propose to install the downstream eel passage facility within four years of license issuance and operate the facility from September 1 through October 31 annually. Interior's prescription requires GMP and the City to provide downstream passage within three years of license issuance and implement the measures from August 15 through November 15 annually. In the EA,[91] staff concluded that implementing downstream passage measures within three years of license issuance would provide protection and downstream passage for downstream migrating eels, while still providing sufficient time for agency consultation and the completion of design plans prior to the initiation of construction. Implementing downstream passage measures within four years of any license issued would provide sufficient time for construction but would continue the existing adverse effects associated with turbine entrainment for an additional year relative to Interior's prescribed implementation date.

105. Interior's prescribed operating period is consistent with the reported downstream eel migration season. Providing passage through the proposed downstream passage facility for the entire migration season would protect eels from injury and mortality associated with passage over the spillway. GMP's and the City's proposal to provide downstream passage from September 1 through October 31 would protect eels from

[89] *Id.* at app. I-6.

[90] *Id.* at app. I-6 & I-8.

[91] *Id.* at app. I-6.

injury and mortality for most of the downstream passage season, but eels would be susceptible to injury and mortality for 32 days of the passage season (i.e., 17 days in August and 15 days in November) when downstream passage would not be provided through the proposed facilities.

106. The levelized annual cost of installing the proposed facilities within four years and operating the facility from September 1 through October 31, as proposed by GMP and the City, would be $18,430. The levelized annual cost of installing the proposed facility within three years of any license issued and operating the facility from August 15 through November 15, as prescribed by Interior, would be $24,220. In the EA, staff concluded that the additional benefits of installing the facility within three years of any license issued and operating the facility from August 15 through November 15, would outweigh the additional annual cost of $5,790 relative to GMP's and the City's proposed implementation and operation schedule, and recommended it. This license includes Interior's prescribed dates for installing and operating the downstream eel passage facility as mandatory under section 18 of the FPA (Appendix C, conditions 11.3 and 11.10).

3. Timing of Downstream Fish Passage Installation

107. Interior's prescription would require a downstream anadromous fish passage facility to be operational within three years of a new license being issued. As discussed above, shad and river herring do not currently have access to the Salmon Falls River upstream of the project.[92] In the EA,[93] staff concluded that shad and river herring would have access to the Salmon Falls River upstream of the project by March 15, 2030, following the installation of upstream fish passage facilities at the Rollinsford Project (by March 15, 2026)[94] and the installation of the upstream fish passage facilities required herein for the Lower Great Falls Project (by March 15, 2030).[95] Once shad and river herring access spawning habitat upstream of the project, adult and juvenile shad and river herring would be outmigrating and susceptible to injury and mortality at the Lower Great

[92] *See supra* P 32.

[93] EA at app. I-8.

[94] *See The Town of Rollinsford, N.H.*, 179 FERC ¶ 61,203 at app. C, condition 10.8.1 (requiring installation of upstream fish passage facilities by March 15 of the fourth passage season after license issuance).

[95] *See infra* app. C, condition 11.8 (requiring the upstream fish passage facility to be constructed and operational by March 15 of the fourth calendar year after permanent volitional upstream fishways for American shad and river herring become operational at the Rollinsford Project).

Falls Project. Since there is not a reasonably foreseeable action that would result in shad and river herring outmigration until 2030, staff concluded that there was no basis for recommending Interior's prescription to provide downstream anadromous fish passage within three years of any license issued. Based on the timeline above, staff recommended operating the downstream fish passage facilities within eight years of license issuance (i.e., by March 15, 2030) to provide downstream passage and reduce the potential of injury and mortality that would be associated with turbine entrainment or passage over the spillway.

108. In its August 18, 2022 comments on the EA, Interior states the EA did not fully consider its fishway prescription in the June 16, 2022 license order for the Rollinsford Project, which includes provisions for the installation of a trap and truck facility at the South Berwick Project No. 11163 (located approximately 1 mile downstream of the Rollinsford Project), and the transport of American shad and river herring upstream (including to the Lower Great Falls Project's impoundment) within three years of license issuance (i.e., by March 15, 2025).[96] Interior contends that this provision in the prescription for the Rollinsford Project makes the need for downstream passage at the Lower Great Falls Project reasonably foreseeable within three years of license issuance. Interior requests that the Commission reassess the need for downstream anadromous fish passage measures with three years of license issuance.

109. As explained in the June 16, 2022 license order for the Rollinsford Project,[97] Interior's prescription for the Rollinsford Project does not require a trap and truck facility to be installed at the South Berwick Project or for an amendment to be filed by the licensee of the South Berwick Project. Because the licensee of the South Berwick Project has not actually submitted a request to amend the license for the South Berwick Project to install a trap and truck facility, there is unlikely to be a need for downstream anadromous fish passage at the Lower Great Falls Project within three years of license issuance. Nonetheless, this license includes Interior's prescription condition to install a downstream anadromous fish passage facility at the Lower Great Falls Project within three years of license issuance, as mandatory under section 18 of the FPA.

4. Downstream Fish Passage Facility Operation Period

110. Interior's prescription condition 11.3 requires GMP and the City to provide downstream anadromous fish passage from June 1 to November 15. However, based on studies conducted at the South Berwick Project, located downstream of the Lower Great Falls Project, and the Vernon Project No. 1904, located on the Connecticut River,

[96] *See The Town of Rollinsford, N.H.*, 179 FERC ¶ 61,203 at app. C, condition 10.8.2.

[97] *See id*. P 127.

downstream passage for post-spawning adult shad and river herring could start as early as May 15.[98] Interior's prescribed operating period for downstream shad and river herring passage would protect adults beginning June 1, but would not protect adults migrating downstream from May 15 to May 31. Operating the downstream passage facility annually from May 15 through November 15 would protect alosines for an extra 17 days relative to Interior's prescribed June 1 through November 15 operating period.

111. The estimated levelized annual cost of operating the passage facility from May 15 through November 15 would be $2,620, and the cost of operating the facility from June 1 through November 15 would be $2,350.[99] Although the cost of operating the facility beginning May 15 would be $270 greater than the cost of beginning operation on June 1, the 17 additional days of downstream passage for shad and river herring is worth the cost. Article 403 requires the downstream fish passage facilities to be operated annually from May 15 through November 15.

5. Protection Measures for Downstream Migrating Anadromous Fish and American Eel

112. In its April 14, 2021 comments, Interior recommends that GMP and the City replace the existing trashrack having a clear bar spacing of 2.0 inches with a trashrack that has a clear bar spacing of 0.75 inch to protect fish from turbine entrainment and mortality. GMP and the City propose nighttime turbine shutdowns for the duration of any license in lieu of replacing the trashrack.

113. In the EA,[100] Commission staff concluded that replacing the current two-inch trashrack with a 0.75-inch trashrack, as recommended by Interior, or shutting down the turbines at night for the duration of any subsequent license, as proposed by GMP and the City, would protect eels during downstream passage by either excluding them from the turbine intake or reducing attraction to the turbine intake, respectively. However, shutting down the turbines at night from September 1 through October 31, as proposed by GMP and the City, would not protect shad and river herring from turbine entrainment, as these species migrate during the day and begin their downstream migration earlier in year, from May 15 through November 15. As discussed in the EA, a 0.75-inch trashrack

[98] EA at 59 – 60 & app. I-8 – I-9.

[99] As discussed above, the cost of the facility prescribed by Interior are unknown. Staff developed a cost for Interior's prescribed operational period by estimating the cost of operating the staff-recommended downstream passage facility, assuming the facility would be used beginning the third year after any license issuance.

[100] EA at app. I-9 – I-10.

would physically exclude adult shad and river herring from turbine entrainment and mortality but would not exclude juvenile shad and river herring.

114. Staff estimated that installing a trashrack with a 0.75-inch clear bar spacing would have a levelized annual cost of $23,430. In comparison, the levelized annual cost of the proposed nightly shutdowns would be $8,820. Staff concluded that the additional cost of replacing the trashrack is outweighed by the additional benefit of protecting downstream migrating American shad and river herring and recommended it. Article 404 of this license requires GMP and the City to replace the current trashrack with a trashrack that has a clear bar spacing of 0.75 inch by May 15 of the third calendar year after license issuance.

115. In comments filed on August 22, 2022, GMP and the City requested that the Commission analyze the costs and benefits of two alternative measures for entrainment protection for migratory fish: (1) installation of a diversionary guidance boom at the project, similar to the diversionary guidance boom required in the June 16, 2022 license order for the Rollinsford Project; and (2) seasonal installation of the 0.75-inch trashrack, from May 15 through November 15.

116. Neither the licensees nor any stakeholders in the relicensing proceeding actually proposed or recommended, respectively, the two measures contemplated that the licensees asked the Commission to analyze. Moreover, as discussed above, the EA analyzed and considered the licensee's actual proposed fish protection measure and the recommended agency alternative measures. Therefore, there is no need for an analysis of the additional measures contemplated but not actually proposed by the licensees or recommended by anyone else.

E. Project Boundary

117. Project boundaries enclose the project works that are to be licensed and are to include "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources."[101]

118. Regarding the land that GMP and the City propose to remove from the project boundary, staff concluded in the EA that revising the project boundary upstream of the dam to follow a contour elevation of 106.4 feet NGVD and removing 0.2 acre of land adjacent to the impoundment would not affect project uses or substantially affect land use. Similarly, the 0.56 acre associated with Olde Mill Road and 0.04 acre occupied by the non-project apartment building adjacent to the south abutment of the dam, which

[101] 18 C.F.R. § 4.41(h)(2) (2021).

GMP and the City are proposing to remove, are not necessary for project purposes.[102] In addition, approximately 0.1 acre of land occupied by the non-project apartment building located on the shoreline downstream of the project dam is not necessary for project purposes. Therefore, in total, 0.9 acre should be removed from the project boundary.

119. In the EA, staff concluded that the 0.2 acre of land associated with the access road is necessary to access the powerhouse for project operation and maintenance.[103] Similarly, the 0.1 acre of land associated with a portion of the parking lot and land adjacent to the apartment buildings is needed for project purposes because the project penstocks are partially located underneath the 0.1 acre, and access to the land could be necessary for project maintenance. Therefore, this 0.3 acre of land should remain in the project boundary, and should not be removed as proposed by GMP and the City.[104]

120. Regarding the land that GMP and the City are proposing to add to the project boundary, staff concluded in the EA that the 0.07 acre of land that is associated with the north abutment of the dam and the low-level outlet pipes is necessary for maintaining and controlling the impoundment water surface elevation, and therefore should be included in the project boundary. Also, the existing transmission line, in its entirety, is necessary for operation and maintenance of the project and should be included in the project boundary, as proposed.

121. Article 205 of this license requires GMP and the City to file a revised Exhibit G drawing that: (1) includes the 0.2 acre of land associated with the access road to the powerhouse; (2) includes the 0.1 acre of land adjacent to the apartment buildings; and (3) does not include the 0.1 acre of land associated with the apartment building on the shoreline downstream of the dam.

F. Recreation Resources

122. There are no project recreation facilities. Recreational activities that occur at the project include flatwater boating, swimming in the impoundment, and hiking, picnicking, and fishing along the shoreline and downstream of the project.[105]

123. The City owns, operates, and maintains the Riverwalk Park, which is located along the New Hampshire shoreline of the project impoundment. The Riverwalk Park is

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[102] EA at 72.

[103] *Id*.

[104] *Id*.

[105] *Id.* at 70.

a 10-acre recreation area with a 12-vehicle capacity dirt parking lot, river overlooks, dirt trail, and several shoreline locations providing put-in access to the impoundment for non-motorized boaters.[106]

124. Great Baxter Mills, LLC owns a private picnic area and car-top boat launch along the impoundment shoreline in New Hampshire, approximately 0.08 mile upstream of the project dam. Use of the picnic area and boat launch is limited to tenants of the apartment building located along Olde Mill Road, approximately 0.03 mile upstream of the project dam.[107]

125. GMP and the City are not proposing any recreation-related measures, and no stakeholders have provided comments on recreation resources at the project. The City's Riverwalk provides public access to the impoundment for boating, swimming, and fishing, and provides a hiking trail for walking along the impoundment. There is no indication that access to the impoundment would cease over the term of a subsequent license for the project. Given the abundance of recreational opportunities in the immediate project vicinity, additional recreation facilities do not appear to be necessary to meet recreation demand in the vicinity of the project.[108] Therefore, this license does not include any measures related to recreation resources at the project. However, to ensure recreational opportunities remain throughout the term of the license, Article 409 of this license requires GMP and the City to notify the Commission if any of the previously-discussed recreation facilities cease operation, and reserves the Commission's right to impose additional recreation measures in the future.

ADMINISTRATIVE PROVISIONS

A. Annual Charges

126. The Commission collects annual charges from licensees for administration of the FPA. Article 201 provides for the collection of these funds for administration of the FPA. Under the regulations currently in effect,[109] projects with an authorized installed capacity of less than or equal to 1.5 MW, like this project, are not assessed an annual charge.

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[106] *Id.*

[107] *Id*. at 71.

[108] *Id*. at 72.

[109] 18 C.F.R. § 11.1(b) (2022).

B. Reservation of Authority to Require Financial Assurance Measures

127. To confirm the importance of licensees maintaining sufficient financial reserves, Article 202 reserves the Commission's authority to require future measures to ensure that the licensees maintain sufficient financial reserves to carry out the terms of the license and Commission orders pertaining thereto.

C. Project Financing

128. To ensure that there are sufficient funds available for project construction, operation, and maintenance (including for the installation of fish and eel passage facilities), Article 203 requires the licensees to file for Commission approval documentation of project financing for the construction, operation, and maintenance of the project at least 90 days before starting any construction associated with the project.

D. Exhibit F and G Drawings

129. The Exhibit F drawings filed on October 13, 2020, are approved, and made a part of the license (ordering paragraph (C)). Commission regulations require that licensees file sets of approved drawings in electronic format. Article 204 requires the filing of these Exhibit F drawings.

130. The Exhibit G drawing filed on October 13, 2020, does not conform to section 4.41 of the Commission's regulations, which requires licensees to file an Exhibit G map showing a project boundary that encloses all project works and other features necessary for the operation and maintenance of the project, or for other project purposes, such as recreation, shoreline control, or protection of environmental resources. The Exhibit G drawing includes the current and proposed project boundaries. Also, the project boundary shown on the Exhibit G drawing does not include: (1) 0.2 acre of land associated with the access road to the powerhouse; and (2) 0.1 acre of land adjacent to the apartment building located immediately downstream of the dam. In addition, the project boundary includes 0.1 acre of land occupied by the apartment building downstream of the dam that is not necessary for project purposes.

131. Article 205 requires the licensees to file a revised Exhibit G drawing that shows only a project boundary that includes all licensed project facilities, including: (1) the 0.2 acre of land associated with the access road to the powerhouse; and (2) the 0.1 acre of land associated with a portion of the parking lot and land south of the apartment building located immediately downstream of the dam. In addition, Article 205 requires the licensees to file a revised Exhibit G drawing that does not include the 0.1 acre of land occupied by the apartment building downstream of the dam. The Exhibit G drawing must be in conformance with sections 4.39 and 4.41 of the Commission's regulations.

E. As-Built Exhibits

132. Where new construction or modifications to the project are involved (e.g., new fish and eel passage facilities), the Commission requires licensees to file revised exhibits of project features as-built. Article 206 provides for the filing of these exhibits.

F. Review of Final Plans and Specifications

133. Article 301 requires the licensees to provide the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer with final design documents prior to construction, including plans and specifications, a supporting design report, a quality control and inspection program, a temporary construction emergency action plan, and a soil erosion and sediment control plan.

134. Article 302 requires the licensees to provide the Commission's D2SI – New York Regional Engineer with cofferdam and deep excavation construction drawings prior to the start of any construction requiring cofferdams or deep excavations.

135. Article 303 requires the licensees to consult with the Commission's D2SI – New York Regional Engineer on any proposed modifications resulting from environmental requirements.

G. Commission Approval of Resource Plans, Notification, and Filing of Amendments

136. In Appendices A, B, and C of this order, there are certain certification conditions and section 18 fishway prescription conditions that do not require the licensees to file certain plans or reports with the Commission, or that contemplate future changes to project facilities or operations without the opportunity for prior Commission review. Article 401 requires the licensees to file the plans and reports with the Commission for approval, notify the Commission of planned and unplanned deviations from the license requirements, and file amendment applications prior to making changes to project facilities or operations, as appropriate.

H. Use and Occupancy of Project Lands and Waters

137. Requiring a licensee to obtain prior Commission approval for every use or occupancy of project land would be unduly burdensome. Therefore, Article 408 allows the licensees to grant permission, without prior Commission approval, for the use and occupancy of project lands for such minor activities as landscape planting. Such uses must be consistent with the purposes of protecting and enhancing the scenic, recreational, and environmental values of the project.

STATE AND FEDERAL COMPREHENSIVE PLANS

138. Section 10(a)(2)(A) of the FPA,[110] requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.[111] Under section 10(a)(2)(A), Commission staff identified and reviewed 21 comprehensive plans relevant to this project.[112] No conflicts were found.

APPLICANT'S PLANS AND CAPABILITIES

139. In accordance with section 10 of the FPA[113] and the Commission's regulations, Commission staff evaluated GMP's and the City's record as licensees with respect to the following: (A) need for power; (B) safe management, operation, and maintenance of the project; and (C) conservation efforts.[114] We adopt staff's findings in each of the following areas.

A. Need for Power

140. To assess the need for power, staff looked at the needs in the operating region in which the project is located, which is the Northeast Power Coordinating Council's (NPCC) New England region of the North American Electric Reliability Corporation (NERC). NERC annually forecasts electrical supply and demand in the nation and the region for a 10-year period. NERC's most recent report indicates the net internal demand in the NPCC's New England region is projected to increase at an annual rate of 0.1% from 2022 through 2031. Therefore, the project's power will continue to help meet the regional need for power.

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[110] 16 U.S.C. § 803(a)(2)(A).

[111] Comprehensive plans for this purpose are defined at 18 C.F.R. § 2.19 (2022).

[112] The list of applicable plans can be found in Appendix E of the EA.

[113] 16 U.S.C. §§ 803(a)(2)(C), 808(a).

[114] In Order No. 513, we exempted licenses of minor projects, such as the Lower Great Falls Project, whose licenses waive sections 14 and 15 of the FPA, from the information requirements of 18 C.F.R. § 16.10 (2022). *See Hydroelectric Relicensing Reguls. Under the Fed. Power Act,* 54 Fed. Reg. 23,756 (June 2, 1989).

B. Safe Management, Operation, and Maintenance of the Project

141. Commission staff reviewed GMP and the City's record of management, operation, and maintenance of the Lower Great Falls Project pursuant to the requirements of 18 C.F.R. pt. 12 (2021) and the Commission's Engineering Guidelines. We conclude that the dam and other project works are safe, and that there is no reason to believe that GMP and the City cannot continue to safely manage, operate, and maintain these facilities under a subsequent license.

C. Conservation Efforts

142. Section 10(a)(2)(C) of the FPA[115] requires the Commission to consider the electricity consumption improvement program of the applicant, including its plans, performance, and capabilities for encouraging or assisting its customers in conserving electricity cost-effectively, and taking into account the published policies, restrictions, and requirements of state regulatory authorities. GMP and the City sell the project's energy to the wholesale market administered by the Independent System Operator of New England.

143. We conclude that, given the limits of GMP's and the City's ability to influence users of the electricity generated by the project, GMP and the City will operate the project in a manner that is consistent with section 10(a)(2)(C) of the FPA.

PROJECT ECONOMICS

144. In determining whether to issue a subsequent license for an existing hydroelectric project, the Commission considers a number of public interest factors, including the economic benefits of project power. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corporation, Publishing Paper Division*,[116] the Commission uses current costs to compare the costs of the project with the costs of the likely alternative source of power with no forecasts concerning potential future inflation, escalation, or deflation beyond the license issuance date. The basic purpose of the Commission's economic analysis is to provide a general estimate of the potential power benefits and the costs of a project, and of reasonable alternatives to project power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

[115] 16 U.S.C. § 803(a)(2)(C).

[116] 72 FERC ¶ 61,027 (1995).

145. In applying this analysis to the Lower Great Falls Project, Commission staff considered three options: a no-action alternative, GMP's and the City's proposal, and the project as licensed herein.[117]

146. Under the no-action alternative, the project would continue to operate as it does now. The project has an installed capacity of 1.28 MW, a capacity benefit of 0.6 MW, and generates an average of 3,916.8 MWh of electricity annually.[118] The average annual project cost is about $231,196. The alternative source of power's annual cost to produce the same amount of energy and provide the same capacity benefit is $340,236, in 2022 dollars.[119] To determine whether the proposed project is currently economically beneficial, the project's annual cost is subtracted from the alternative source of power's cost. Therefore, the project costs $109,040 less than the alternative source of power's cost.

147. As proposed by GMP and the City, the levelized annual cost of operating the project is $369,789. The proposed project would generate an average of 3,441 MWh of energy annually and have a capacity benefit of 0.6 MW. The alternative source of power's cost to produce the same amount of energy and provide the same capacity benefit is $310,130, in 2022 dollars. Therefore, project power would cost $59,659 more than the alternative source of power's cost.

148. As licensed herein with mandatory conditions and Commission staff's measures, the levelized annual cost of operating the project is $431,044. The proposed project would generate an average of 3,450.2 MWh of energy annually and have a capacity benefit of 0.6 MW. The alternative source of power's cost to produce the same amount of energy and provide the same capacity benefit is $310,717, in 2022 dollars. Therefore, the project would cost $120,327 more than the alternative source of power's cost.

149. In considering public interest factors, the Commission takes into account that hydroelectric projects offer unique operational benefits to the electric utility system

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[117] Details of Commission staff's economic analysis for the project as licensed herein, and for the other two alternatives, are included in Appendix G of the EA.

[118] The term "capacity benefit" is used to describe the benefit a project receives for providing capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

[119] The energy portion of the power cost is $63.27/MWh and is based on natural gas energy prices from the *Annual Energy Outlook 2022* published by the Energy Information Administration in March 2022. The capacity portion of the power cost is based on the annual cost of the hydro-equivalent natural gas-fired combined-cycle capacity, which staff estimates to be about $162.14/kilowatt-year.

(ancillary service benefits). These benefits include the ability to help maintain the stability of a power system, such as by quickly adjusting power output to respond to rapid changes in system load; and to respond rapidly to a major utility system or regional blackout by providing a source of power to help restart fossil fuel-based generating stations and put them back on line. Additionally, although staff's analysis does not explicitly account for the effects inflation may have on the future cost of electricity, the fact that hydropower generation is a renewable resource and relatively insensitive to inflation compared to fossil-fueled generators is an important economic consideration for power producers and the consumers they serve. This is one reason project economics is only one of the many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

150. Commission staff's analysis shows that the project as licensed herein would cost more to operate than the likely alternative source of power. It is the applicant who must decide whether to accept the license and any financial risk that it entails.

COMPREHENSIVE DEVELOPMENT

151. Sections 4(e) and 10(a)(1) of the FPA[120] require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued must be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to license this project, and the terms and conditions included herein, reflect such consideration.

152. The EA for the project contains background information, analysis of effects, and support for related license articles. Based on the record of this proceeding, including the EA and the comments thereon, licensing the Lower Great Falls Project as described in this order will not constitute a major federal action significantly affecting the quality of the human environment. The project will be safe if operated and maintained in accordance with the requirements of the license.

153. Based on our independent review and evaluation of the Lower Great Falls Project, recommendations from the resource agencies and other stakeholders, and the no-action alternative, as documented in the EA, we have selected the project as licensed herein, and find that it is best adapted to a comprehensive plan for improving or developing the Salmon Falls River.

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[120] 16 U.S.C. §§ 797(e), 803(a)(1).

154. We select this alternative because: (1) issuance of a subsequent license will serve to maintain a beneficial and dependable source of electric energy; (2) the required environmental measures will protect and enhance aquatic resources, water quality, federally listed species, and cultural resources; and (3) the 1.28 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution.

LICENSE TERM

155. On October 19, 2017, the Commission established a 40-year default license term policy for licenses, effective as of October 26, 2017.[121] The Policy Statement provides for exceptions to the 40-year default license term under certain circumstances: (1) establishing a shorter or longer license term if necessary to coordinate license terms for projects located in the same river basin; (2) deferring to a shorter or longer license term explicitly agreed to in a generally-supported comprehensive settlement agreement; and (3) establishing a longer license term upon a showing by the license applicant that substantial voluntary measures were either previously implemented during the prior license term, or substantial new measures are expected to be implemented under the subsequent license.

156. Because none of the above exceptions apply in this case, a 40-year license for the Lower Great Falls Project is appropriate.

The Commission orders:

(A) The license is issued to Green Mountain Power Corporation and the City of Somersworth, New Hampshire (licensees) to operate and maintain the Lower Great Falls Hydroelectric Project for a period of 40 years, effective the first day of the month in which this order is issued. The license is subject to the terms and conditions of the Federal Power Act (FPA), which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the FPA.

(B) The project consists of:

(1) All lands, to the extent of the licensees' interests in those lands, described in the project description and the project boundary discussion of this order.

(2) Project works consisting of: (1) a 297-foot-long, 32-foot-high stone masonry and concrete dam that consists of the following sections:

[121] *Pol'y Statement on Establishing License Terms for Hydroelectric Projects*, 161 FERC ¶ 61,078 (2017) (Policy Statement).

(a) a 50-foot-long north abutment section with two eight-foot-wide, eight-foot-high low-level outlet gates that control flow into two seven-foot-diameter, 40-foot-long outlet pipes; (b) a 176-foot-long spillway section with a 5.25-foot-wide, 4-foot-high debris sluice gate; four-foot-high flashboards; and a crest elevation of 106.4 feet National Geodetic Vertical Datum of 1929 (NGVD 29) at the top of the flashboards; and (c) a 71-foot-long south abutment section with a 40.5-foot-wide, 20 foot-high intake structure equipped with four five-foot-wide, 10.5-foot-high steel frame gates and a trashrack with two-inch clear bar spacing; (2) an impoundment that has a surface area of 40.2 acres at an elevation of 106.4 feet NGVD 29; (3) an 8.5-foot-diameter, 120-foot-long steel penstock that bifurcates into a 5.3-foot-diameter, 85-foot-long section and a 7.6-foot-diameter, 85-foot-long section; (4) an 8.5-foot-diameter, 140-foot-long steel penstock that bifurcates into a seven-foot-diameter, 85-foot-long section and a 7.6-foot-diameter, 85-foot-long section; (5) a 46-foot-long, 30-foot-wide concrete and brick masonry powerhouse containing two 260-kilowatt (kW) F-type Francis turbine-generator units and two 380-kW F-type Francis turbine-generator units with a total installed capacity of 1.28 megawatts; (6) a 55-foot-long, 30-foot-wide tailrace; (7) a 4.16- kilovolt, 260-foot-long underground transmission line that connects the turbine-generator units to the local distribution grid; and (8) appurtenant facilities.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F shown below:

Exhibit A: Sections A.1.0 through A.1.9 of Exhibit A filed on October 13, 2020.

Exhibit F: The following Exhibit F drawings filed on October 13, 2020:

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Title[122]
F-1	4451-1001	Site Plan	Site Plan
F-2	4451-1002	Dam Plan, Section, and Downstream Elevation	Project Dam
F-3	4451-1003	Headworks Intake and Section	Headworks Intake and Section

[122] These exact drawing titles must be used in the filename when filing the electronic file format drawings required in ordering paragraph (B). Commission staff shortened the drawing titles due to filename character limits. Do not modify the titles as they appear on the drawings.

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Title[122]
F-4	4451-1004	Powerhouse Floor and Sections	Powerhouse Floor and Sections
F-5	4451-1005	North Abutment Plan, Elevation, and Section	North Abutment

(3) All of the structures, fixtures, equipment, or facilities used to operate or maintain the project, all portable property that may be employed in connection with the project, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) The Exhibits A and F described above are approved and made part of the license. Exhibit G filed as part of the application for license does not conform to Commission regulations and is not approved.

(D) The following sections of the FPA are waived and excluded from the license for this minor project:

Sections 4(b), except the second sentence; 4(e), insofar as it relates to approval of plans by the Chief of Engineers and the Secretary of the Army; 6, insofar as it relates to public notice and to the acceptance and expression in the license of terms and conditions of the FPA that are waived here; 10(c), insofar as it relates to depreciation reserves; 10(d); 10(f); 14, except insofar as the power of condemnation is reserved; 15; 16; 19; 20; and 22.

(E) This license is subject to the conditions submitted by the Maine Department of Environmental Protection and the New Hampshire Department of Environmental Services under section 401(a)(1) of the Clean Water Act, 33 U.S.C. § 1341(a)(1), as those conditions are set forth in Appendices A and B to this order, respectively.

(F) This license is subject to the conditions submitted by the Secretary of the U.S. Department of the Interior under section 18 of the FPA, as those conditions are set forth in Appendix C to this order.

(G) The license is also subject to the articles set forth in Form L-9 (Oct. 1975), entitled, "Terms and Conditions of License for Constructed Minor Project Affecting Navigable Waters of the United States" (*see* 54 F.P.C. 1792, *et seq.*), as reproduced at the end of this order, and the following additional articles:

Article 201. *Administrative Annual Charges*. The licensees must pay the United States annual charges, effective the first day of the month in which the license is issued, and as determined in accordance with the provisions of the Commission's

regulations in effect from time to time, for the purposes of reimbursing the United States for the cost of administration of Part I of the Federal Power Act. The authorized installed capacity for that purpose is 1.28 megawatts (MW). Under the regulations currently in effect, projects with an authorized installed capacity of less than or equal to 1.5 MW will not be assessed an annual charge.

Article 202. *Reservation of Authority to Require Financial Assurance Measures*. The Commission reserves the right to require future measures to ensure that the licensees maintain sufficient financial reserves to carry out the terms of the license and Commission orders pertaining thereto.

Article 203. *Documentation of Project Financing.* At least 90 days before starting construction authorized by this license, the licensees must file with the Commission, for approval, the licensees' documentation for project financing. The documentation must show that the licensees have acquired the funds, or commitment for funds, necessary to construct, operate, and maintain the project in accordance with the license. The documentation must include, at a minimum, financial statements, including a balance sheet, income statement, and a statement of actual or estimated cash flows over the license term, which provide evidence that the licensees have sufficient assets, credit and projected revenues to cover project construction, operation and maintenance expenses, and any other estimated project liabilities and expenses.

The financial statements must be prepared in accordance with generally accepted accounting principles and signed by an independent certified public accountant. The licensees must not commence project construction associated with the project before the filing is approved.

Article 204. *Exhibit F Drawings*. Within 45 days of the effective date of this license, as directed below, the licensees must file the approved exhibit drawings in electronic file format.

(1) The licensees must prepare digital images of the approved exhibit drawings in electronic format. Prior to preparing each digital image, the licensees must add the FERC Project-Drawing Number (i.e., P-4451-1001 through P-4451-1005) in the margin below the title block of the corresponding approved drawing. The licensees must separate the Exhibit F drawings from the other project exhibits, and **label and file them as Critical Energy Infrastructure Information (CEII) material under 18 CFR § 388.113.** The submission should consist of: (1) a public portion consisting of a cover letter; and (2) a CEII portion containing only the Exhibit F drawings. Each drawing must be a separate electronic file, and the file name must include: FERC Project-Drawing Number, FERC Exhibit Number, Filename Title, date of this order, and file extension in the following format [P-4451-1001, F-1, Site Plan, MM-DD-YYYY.TIFF]. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY:	black and white raster file
FILE TYPE:	Tagged Image File Format (TIFF), CCITT Group 4 (also known as T.6 coding scheme)
RESOLUTION:	300 dots per inch (dpi) desired, (200 dpi minimum)
DRAWING SIZE:	22” x 34” (minimum), 24” x 36” (maximum)
FILE SIZE:	less than 1 megabyte desired

Article 205. *Exhibit G Drawings*. Within 90 days of the issuance date of the license, the licensees must file, for Commission approval, a revised Exhibit G drawing enclosing within the project boundary all principal project works necessary for operation and maintenance of the project. The Exhibit G drawing should not include the previously licensed project boundary. The Exhibit G drawing should only include the project boundary described in the project description and the project boundary discussion of this order. The Exhibit G drawing should also include: (1) 0.2 acre of land associated with the access road to the powerhouse; and (2) 0.1 acre of land associated with a portion of the parking lot and land south of the apartment building located on the shoreline immediately downstream of the dam. The Exhibit G drawing should not include the 0.1 acre of land occupied by the apartment building located on the shoreline immediately downstream of the dam. The Exhibit G drawing must comply with sections 4.39 and 4.41(h) of the Commission’s regulations.

Article 206. *As-built Exhibits*. Within 90 days of completion of construction of the facilities authorized by this license (e.g., eel and fish passage facilities), the licensees must file for Commission approval, revised Exhibits A, F, and G, as applicable, to describe and show those project facilities as built.

Article 301. *Contract Plans and Specifications*. At least 60 days prior to the start of any construction, the licensees must file final design documents with the Secretary of the Commission, preferably through eFiling. The licensees must also submit two hard copies of the documents to the Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer. The design documents must include: final plans and specifications, supporting design report, Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensees may not begin construction until the D2SI – New York Regional Engineer has reviewed and commented on the documents, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

Article 302. *Cofferdam and Deep Excavation Construction Drawings*. Should construction require cofferdams or deep excavations, the licensees must: (1) have a Professional Engineer who is independent from the construction contractor, review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction; and (2) ensure that construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of any cofferdams or deep excavations, the licensees must file the approved cofferdam and

deep excavation construction drawings and specifications, and the letters of approval with the Secretary of the Commission, preferably through eFiling. The licensees must also submit two hard copies of the documents to the Commission's Division of Dam Safety and Inspections – New York Regional Engineer.

Article 303. *Project Modification Resulting from Environmental Requirements.* If environmental requirements under this license require modification that may affect the project works or operations, the licensees must consult with the Commission's Division of Dam Safety and Inspections – New York Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the proposed work does not adversely affect the project works, dam safety, or project operation.

Article 401. Commission Approval, Reporting, Notification, and Filing of Amendments.

(a) *Requirements to File Plans for Commission Approval*

Various conditions of this license found in New Hampshire Department of Environmental Services' (New Hampshire DES) section 401 water quality certification (certification) (Appendix B) and the U.S. Department of the Interior's (Interior) section 18 fishway prescription (Appendix C) require the licensees to prepare plans in consultation with other entities for approval, and to implement specific measures without prior Commission approval. The following plans must be submitted to the Commission for approval by the deadlines specified below:

New Hampshire DES Certification Condition No.	Interior Section 18 Prescription Condition No.	Plan Name	Commission Due Date
E-14		Water Quality Improvement Plan	July 18, 2023
E-12		Operation Compliance Monitoring Plan	July 18, 2023
	11.4	Final Fishway Operation and Maintenance Plan	April 18, 2024
E-15		Long Term Water Quality Monitoring Plan	November 17, 2027, and every five years thereafter

New Hampshire DES Certification Condition No.	Interior Section 18 Prescription Condition No.	Plan Name	Commission Due Date
	11.7.1	Fish Passage Effectiveness Testing Plans	September 15, 2029

With each plan filed with the Commission, the licensees must include documentation that it developed the plan in consultation with the U.S. Fish and Wildlife Service (FWS), the Maine Department of Environmental Protection (Maine DEP), the Maine Department of Inland Fisheries and Wildlife (Maine DIFW), the Maine Department of Marine Resources (Maine DMR), New Hampshire DES, the New Hampshire Fish and Game Department (New Hampshire FGD), and the National Marine Fisheries Service (NMFS), and provide copies of any comments received, as well as its response to each comment. The Commission reserves the right to make changes to any plan filed. Upon Commission approval, the plan becomes a requirement of the license, and the licensees must implement the plan, including any changes required by the Commission. Any changes to the above schedule or plans require approval by the Commission before implementing the proposed change.

(b) *Requirements to File Reports and Schedules*

Certain conditions of the New Hampshire DES's certification (Appendix B) and Interior's section 18 fishway prescription (Appendix C) require the licensees to file reports and schedules related to compliance with the requirements of the license. Each such report and schedule must be filed with the Commission to ensure compliance with the license. These reports and schedules are listed in the following table:

New Hampshire DES Certification Condition No.	Interior Section 18 Prescription Condition No.	Report Name	Commission Due Date
E-11c		Flow and Impoundment Management Report	June 1 each year of license term
	11.9.2	Upstream Eel Siting Survey Results	November 30, 2024

New Hampshire DES Certification Condition No.	Interior Section 18 Prescription Condition No.	Report Name	Commission Due Date
	11.7.1	Interim Upstream Eel Passageway Effectiveness Monitoring Report	April 15, 2028
	11.7.1	Interim Downstream Eel Passageway Effectiveness Monitoring Report	April 15, 2028
	11.7.1	Interim Downstream Anadromous Fishway Effectiveness Monitoring Report	April 15, 2028
	11.7.1	Final Downstream Eel Passageway Effectiveness Monitoring Report	July 15, 2028
E-15		Long Term Water Quality Monitoring Report	February 28, 2029, and every five years thereafter
	11.7.1	Final Upstream Eel Passageway Effectiveness Monitoring Report	June 30, 2029
	11.7.1	Final Downstream Anadromous Fishway Effectiveness Monitoring Report	July 15, 2029
	11.7.1	Interim Upstream Anadromous Fishway Effectiveness Monitoring Reports	April 15, 2032

New Hampshire DES Certification Condition No.	Interior Section 18 Prescription Condition No.	Report Name	Commission Due Date
	11.7.1	Final Upstream Anadromous Fishway Effectiveness Monitoring Reports	March 15, 2033

With each report filed with the Commission, the licensees must file documentation of any consultation with the FWS, Maine DEP, Maine DIFW, Maine DMR, New Hampshire DES, New Hampshire FGD, and NMFS, and provide copies of any comments received, as well as its response to each comment. The Commission reserves the right to require changes to project operation, facilities, or reporting requirements based on the information contained in the reports, agency comments, or any other available information.

(c) *Requirement to Notify the Commission of Planned, Temporary Modifications to Mandatory Condition Requirements*

The licensees may deviate from the mandatory conditions related to operation for short periods of time, of up to three weeks, without prior Commission approval after concurrence from the conditioning agencies. The licensees must file a report with the Secretary of the Commission as soon as possible, but no later than 14 calendar days after the onset of the deviation. Each report must include: (1) the reasons for the deviation and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any environmental effects; and (4) documentation of approval from the conditioning agencies. For deviations from the mandatory conditions exceeding three weeks, the licensees must file an application and receive Commission approval prior to implementation.

(d) *Requirement to Notify the Commission of Unplanned Deviations from Mandatory Condition Requirement(s) Lasting More than Three Hours or Resulting in Environmental Effects*

If there is any unplanned deviation from the mandatory conditions that lasts longer than three hours ***or*** results in visible environmental effects such as a fish kill, the licensees must file a report with the Secretary of the Commission as soon as possible, but no later than 14 calendar days after the incident. Each report must describe the incident, including: (1) the cause; (2) the duration and magnitude; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensees' response; (5) any

environmental effects; (6) documentation that the respective conditioning agencies were notified and any comments received, or, affirmation that no comments were received; and (7) any measures to be implemented to prevent similar incidents in the future.

(e) *Requirement to Notify the Commission of Unplanned Deviations from Mandatory Condition Requirement(s) Lasting Three Hours or Less with No Environmental Effects*

For unplanned deviations lasting three hours or less that do not result in environment effects, the licensees must file an annual report by January 31, describing each incident up to one month prior to the reporting date, including: (1) the cause of the event; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensees' response; (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the resource agencies; and (6) a description of measures implemented to prevent similar deviations in the future. Any deviations that occur within the month prior to the reporting date should be included in the following year's report.

(f) *Requirement to File Amendment Applications*

Certain Maine DEP and New Hampshire DES certification conditions in Appendices A and B, and Interior fishway prescription conditions in Appendix C contemplate unspecified or conditional long-term changes to project operation or facilities for the purpose of mitigating environmental impacts. These changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license. In any amendment request, the licensees must identify related project requirements and request corresponding amendments or extensions of time as needed to maintain consistency among requirements.

Article 402. *Reservation of Authority to Prescribe Fishways*. Authority is reserved to the Commission to require the licensees to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior or Secretary of Commerce pursuant to section 18 of the Federal Power Act.

Article 403. *Downstream American Eel and Anadromous Fish Passage Facilities*. Within one year of license issuance, the licensees must file, for Commission approval, a downstream eel and fish passage plan that provides for the installation of downstream eel and fish passage facilities at the project for downstream migrating American eels and anadromous fish species. The downstream passage facilities must consist of a two-foot-high flume fixed to the crest of the spillway that would convey 35 cfs over the dam and drop fish approximately 19 feet to a 5.25-foot-deep plunge pool downstream of

the dam. The plan must be consistent with the requirements specified by the U.S. Department of the Interior's prescription conditions 11.10 and 11.11 (Appendix C). In addition, the plan must include an installation schedule for the downstream passage facilities to be operational by May 15 of the third year after license issuance, and must include provisions for operating the facilities annually from May 15 through November 15.

The licensees must prepare the plan after consultation with the U.S. Department of the Interior's Fish and Wildlife Service, the Maine Department of Environmental Protection, the Maine Department of Inland Fisheries and Wildlife, the Maine Department of Marine Resources, the New Hampshire Department of Environmental Services, the New Hampshire Fish and Game Department, and the National Marine Fisheries Service. The licensees must include with the plan, documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensees must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensees do not adopt a recommendation, the filing must include the licensees' reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensees are notified by the Commission that the plan is approved. Upon Commission approval, the licensees must implement the plan, including any changes required by the Commission.

Article 404. *Trashrack Replacement*. By May 15, 2025, the licensees must replace the current trashrack having 2.0-inch clear bar spacing with a trashrack that has 0.75-inch clear bar spacing, to protect downstream migrating fish from turbine entrainment and mortality.

Pursuant to Article 301 of this license, the licensees must provide contract plans and specifications to the Division of Dam Safety and Inspections (D2SI)-New York Regional Engineer, and receive authorization prior to starting construction. Within 90 days of completing the trashrack replacement, the licensees must file as-built exhibits in accordance with Article 206 of this license.

Article 405. *Seasonal Restriction on Tree Removal.* To protect the federally listed northern long-eared bat during its active season (April 1 to October 31), the licensees must limit non-hazardous tree removal to the period of November 1 through March 31. Tree removal is defined herein as cutting down, harvesting, destroying, trimming, or manipulating in any other way the non-hazardous trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats (i.e., woody vegetation greater than or equal to 3 inches diameter at breast height).

Article 406. *Surveys for Small Whorled Pogonia.* To protect the federally listed small whorled pogonia, the licensees must employ a qualified botanist to conduct surveys for the small whorled pogonia prior to any ground-disturbing activities. If the species is not present, the licensees must file the results of the survey with the U.S. Fish and Wildlife Service (FWS) and the Commission, and can proceed with the ground-disturbing activities in a manner consistent with other terms and conditions of this license, including but not limited to Articles 301, 302, and 303.

If the species is present, the licensees must consult with the FWS to determine the need for any measures to protect the species. The licensees must file with the Commission documentation of their consultation with the FWS, including any measures proposed by the licensees and/or recommended by the FWS. The licensees must not conduct ground-disturbing activities until informed by the Commission that the requirements of this article have been fulfilled.

Article 407. *Programmatic Agreement and Historic Properties Management Plan*. The licensees must implement the "Programmatic Agreement Among the Federal Energy Regulatory Commission, the New Hampshire State Historic Preservation Office, and the Maine State Historic Preservation Office for Managing Historic Properties that May be Affected by Issuing a Subsequent License to Green Mountain Power Corporation and the City of Somersworth, New Hampshire for the Continued Operation of the Lower Great Falls Hydroelectric Project in Strafford County, New Hampshire and York County, Maine (FERC No. 4551-024)," executed on October 28, 2022, and including but not limited to the Historic Properties Management Plan (HPMP) for the project. Pursuant to the requirements of this Programmatic Agreement, the licensees must file, for Commission approval, a HPMP within one year of issuance of this order. The Commission reserves the authority to require changes to the HPMP at any time during the term of the license. If the Programmatic Agreement is terminated prior to Commission approval of the HPMP, the licensees must obtain approval from the Commission and the New Hampshire and Maine State Historic Preservation Officers, before engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the project's areas of potential effects.

Article 408. *Use and Occupancy*. (a) In accordance with the provisions of this article, the licensees must have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensees may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensees must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other

condition imposed by the licensees for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensees must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensees may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensees must require multiple use and occupancy of facilities for access to project lands or waters. The licensees must also ensure that, to the satisfaction of the Commission's authorized representative, the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensees must: (1) inspect the site of the proposed construction; (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site; and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensees may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensees' costs of administering the permit program. The Commission reserves the right to require the licensees to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensees may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kilovolts or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project

impoundment. No later than January 31 of each year, the licensees must file with the Commission a copy of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. No report filing is required if no conveyances were made under paragraph (c) during the previous calendar year.

(d) The licensees may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensees must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensees to file an application for prior approval, the licensees may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensees must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensees must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an

approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project lands and waters.

(4) The Commission reserves the right to require the licensees to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensees under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

Article 409. *Recreation*. The licensees must notify the Commission if the City's Riverwalk Park or Great Baxter Mills, LLC's private picnic area and car-top boat launch cease operation. Authority is reserved to the Commission to require the licensees to implement additional recreation measures if in the public interest.

(H) The licensees must serve copies of any Commission filing required by this order on any entity specified in the order to be consulted on matters relating to that filing. Proof of service on these entities must accompany the filing with the Commission.

(I) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 825*l*, and section 385.713 of the Commission's regulations, 18 C.F.R. § 385.713 (2021). The filing of a request for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this order. The licensees' failure to file a request for rehearing constitutes acceptance of this order.

By the Commission. Commissioner Danly is concurring with a separate statement attached.

(S E A L)

Kimberly D. Bose,
Secretary.

Form L-9
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED MINOR PROJECT AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project area and project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Article 4. The project, including its operation and maintenance and any work incidental to additions or alterations authorized by the Commission, whether or not conducted upon lands of the United States, shall be subject to the inspection and

supervision of the Regional Engineer, Federal Energy Regulatory Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him such information as he may require concerning the operation and maintenance of the project, and any such alterations thereto, and shall notify him of the date upon which work with respect to any alteration will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall submit to said representative a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of any such alterations to the project. Construction of said alterations or any feature thereof shall not be initiated until the program of inspection for the alterations or any feature thereof has been approved by said representative. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights or occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of

such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 7. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 8. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 9. The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 10. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 11. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 12. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 13. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of

such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 14. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon the request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 15. The Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 16. Material may be dredged or excavated from, or placed as fill in, project lands and/or waters only in the prosecution of work specifically authorized under the license; in the maintenance of the project; or after obtaining Commission approval, as appropriate. Any such material shall be removed and/or deposited in such manner as to reasonably preserve the environmental values of the project and so as not to interfere with traffic on land or water. Dredging and filling in a navigable water of the United States shall also be done to the satisfaction of the District Engineer, Department of the Army, in charge of the locality.

Article 17. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other

obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 18. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 19. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.

APPENDIX A

Water Quality Certificate Conditions
Issued by the Maine Department of Environmental Protection
Filed April 6, 2022

The Applicants have provided sufficient evidence and the Department finds and determines that as the Applicants propose to operate the Project the DO concentrations in the Salmon Falls River downstream of the Lower Great Falls dam, specifically in the bypass reach and tailrace, will meet or exceed five ppm standard 30-day average concentration standard of 6.5 ppm at 22 degrees centigrade. Therefore, the Salmon Falls River downstream of the dam meets Class C numeric water quality standards for DO. Further, the Applicants have provided sufficient evidence and the Department finds and determines that as the Applicants propose to operate the Project the DO concentrations in the Lower Great Falls impoundment can reasonably be expected to meet or exceed state water quality standards for DO, provided the Applicants comply with the following Conditions, in addition to the Standard Conditions attached to this approval:

A. Upon issuance of a new FERC license, the Applicants shall implement the Water Quality Mitigation and Enhancement Plan.

B. Five years after implementation of the Water Quality Mitigation and Enhancement Plan, the Applicants shall consult with the Department and review the effectiveness of the Plan. If implementation of the Plan has not resulted in compliance with the State's water quality standards for dissolved oxygen, the Applicants shall submit a revised Plan to the Department for review and approval, and then implement the revised Plan to bring operation of the Project into compliance with these water quality standards.

Therefore, the Department approves the water quality certification of the City of Somersworth and Green Mountain Power Corporation and certifies, pursuant to Section 401 of the Clean Water Act, that there is a reasonable assurance that the continued operation of the Lower Great Falls Hydroelectric Project, as described above, will comply with the applicable Class C water quality standard for dissolved oxygen.

Standard Conditions

1. Noncompliance. Should the project be found, at any time, not to be in compliance with any of the conditions of this approval, or should the project be operated in any way other than specified in the application or supporting documents, as

modified by the conditions of this approval, then the terms of this approval shall be considered to have been violated.

2. Inspection and Compliance. Authorized representatives of the Commissioner or the Attorney General shall be granted access to the project at any reasonable time for the purpose of inspecting the operation of the project and assuring compliance with the conditions of this approval.

3. Assignment of Transfer of Approval. This approval shall expire upon the assignment or transfer of the property covered by this approval unless written consent to transfer this approval is obtained from the Commissioner. To obtain approval of transfer, the licensee shall notify the Commissioner 30 days prior to assignment or transfer of property which is subject to this approval. Pending Commissioner determination on the application for a transfer or assignment of ownership of this approval, the person(s) to whom such property is assigned or transferred shall abide by all of the terms and conditions of this approval. To obtain the or Commissioner's approval of transfer, the proposed assignee or transferee must demonstrate the financial capacity and technical ability to: (1) comply with all terms and conditions of this approval; and (2) satisfy all other applicable statutory criteria.

   A "transfer" is defined as the sale or lease of property which is the subject of this approval or the sale of 50% or more of the stock of or interest in a corporation or a change in a general partner of a partnership which owns the property subject to this approval.

APPENDIX B

Water Quality Certificate Conditions
Issued by the New Hampshire Department of Environmental Service
Filed April 4, 2022

CERTIFICATION CONDITIONS

Unless otherwise authorized or directed by NHDES, the following conditions shall apply:

E-1. **Effective Date and Expiration of Certification:** This certification shall become effective on the date of issuance and shall remain effective for the term of the federal license permit. Should the federal authority deny a license or permit, the certification become null and void.

E.2. **Conditions in Federal License or Permit:** Conditions of this certification shall become conditions of the federal license or permit (U.S.C. § 1314(d)).

(For an explanation and citations, see Fact C-2 and Finding D-1.)

E.3 **Compliance with Water Quality Standards:** The Activity shall not cause or contribute to a violation of New Hampshire surface water quality standards.

(For an explanation and citations, see Facts Fact C-2, C-55, and Finding D-14.)

E.4. **Proposed Modifications to the Activity:** The Applicant shall consult with and receive prior written approval from NHDES regarding any proposed modifications to the Activity that could have a significant or material effect on the findings or conditions of this certification, including any changes to operation of the Activity. If necessary, to assure compliance with New Hampshire surface water quality standards and associated management objectives, NHDES may alter or amend this certification in accordance with condition E-5.

(For an explanation and citations, see Fact C-2 and Finding D-11.)

E.5. **Modification of Certification**: The conditions of this certification may be altered or amended at any time by NHDES to assure compliance with New Hampshire surface water quality standards and associated management objectives, when authorized by law, and, if necessary, after notice and opportunity for hearing.

(For an explanation and citations, see Fact C-2 and Finding D-11.)

E.6. **Reopening of License**: NHDES reserves the right to request, at any time, that FERC reopen the license to consider modifications to the license to assure compliance with New Hampshire surface water quality standards.

E-7. **Compliance Inspections:** In accordance with applicable laws, the Applicant shall allow NHDES to inspect the Activity and affected surface waters to monitor compliance with the conditions of this certification.

(For an explanation and citations, see Fact C-2 and Finding D-11.)

E.8. **Transfer of Certification:** Should this certification be transferred to a new owner, contact information for the new owner (including name, address, phone number and email) shall be provided to NHDES within 30 days of the transfer.

E.9 **NHDES Water Use Registration and Reporting:** The Applicant shall register, measure, and report all withdrawals and discharges with the NHDES Water Use Registration and Reporting Program (WURRP) in accordance with RSA 488:3 and its supporting regulations in Env-Wq 2102 and submit, if necessary, a water conservation plan in accordance with Env-Wq 2101.24.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-47.)

E.10 **Flow / Impoundment Management:** The following requirements (items a. through e.) may be temporarily modified if required by operating emergencies beyond the control of the Applicant, as specified below, or as allowed in the approved Flow/Impoundment Compliance Monitoring Plan (FICMP) that is required by Condition E-12 of this Certification.

a. **Instantaneous Run-of-River Flow:** The Applicant shall operate the Activity in an instantaneous run-of- river mode whereby inflow to the Project equals outflow from the Project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Applicant or for short periods upon mutual agreement between NHDES, the New Hampshire Fish and Game Department (NHFGD), the U.S. fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the Maine Department of Environmental Protection (MEDEP), the Maine Department of Marine Resources (MDMR) and the Maine Department of Inland Fisheries and Wildlife (MEDIFW).

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-41.)

b. Bypass Reach Conservation Flows: The Applicant shall comply with the following bypass reach conservation flow requirements.

1. The Applicant shall provide a minimum continuous conservation flow in the bypass reach of 37 cfs, or inflow, whichever is less. Subject to approval by NHDES and NHFGD, this criterion may be modified as part of the USFWS's Fish Passage Prescription (see Condition E-13) in order to conform to the USFWS's fish passage design guidelines[1], or other guidelines acceptable to the USFWS.

2. The manner in which the bypass flow is released to the bypass reach shall be acceptable to NHDES, NHFGD and USFWS. The Applicant shall provide evidence within 60 days of receiving a written request from NHDES (or other date acceptable to NHDES), that demonstrates, to the satisfaction of NHDES and NHFGD, that the bypass reach conservation flow is being provided. Such evidence may include, but is not limited to, hydraulic calculations and instream flow measurements.

3. The method and supporting information for passing the bypass conservation flows into the bypass reach, including any future modifications, shall be included in the Flow / Impoundment Compliance Monitoring Plan (see Condition E-12).

4. Flow in the bypass reach shall comply with New Hampshire surface water quality criteria, including, but not limited to, dissolved oxygen (Env-Wq 1703.07 – see Fact C-30).

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-45.)

c. Impoundment Water Level: The target impoundment water elevation under normal operating conditions shall be the top of the flashboards (elevation 106.4 feet NGVD 29) plus any additional elevation required to pass the bypass reach conservation flow. The Applicant shall minimize the magnitude and frequency of fluctuations in the impoundment to the maximum extent practicable and shall not draw the water level in the impoundment down for the purpose of generating power. This requirement may be modified upon mutual agreement between NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW. If requested by NHDES, the

[1] USFWS (U.S. Fish and Wildlife Service). 2019. Fish Passage Engineering Design Criteria. USFWS, Northwest Region R5, Hadley, Massachusetts. 135 pages + Appendices.

Applicant shall submit a plan for NHDES approval to minimize the magnitude and frequency of impoundment fluctuations to the maximum extent practicable, due to factors that may include, but are not limited to, Project power generation and flashboard failure. The plan shall be submitted to NHDES within 90 days (or other date acceptable to NHDES) of when the NHDES issues the written request. The Applicant shall then implement the NHDES approved plan.

(For an explanation and citations, see Fact C-2 and Findings D-5, D-11 and D-42.)

d. **Impoundment Refill Procedure:** When refilling the impoundment after drawdown for maintenance or emergencies, the Applicant shall release 90% of the inflow downstream to the Salmon Falls River and utilize the remaining 10% of inflow to refill the impoundment. During impoundment refill, the bypass reach conservation flow specified in Condition E-10b shall be maintained. This refill procedure may be modified upon mutual agreement between NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-43.)

e. **Drawdown Procedure for Scheduled Maintenance:** When drawing the water level in the impoundment down for scheduled maintenance, the Applicant shall lower the impoundment water level no more than six inches per day. During impoundment drawdown, the bypass reach conservation flow specified in Condition E-10b shall be maintained. This drawdown procedure may be modified upon mutual agreement between NHDES and NHFGD

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-44.)

E.11. **Flow/Impoundment – Notification and Annual Report:** The Applicant shall comply with the following notification and reporting requirements:

a. If the Activity causes a deviation from the flow/ impoundment management requirements in Condition E-10, the Applicant shall notify NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW no later than 24 hours after each such incident. The notification shall include, to the extent known, an explanation as to why the deviations occurred, a description of

corrective actions taken, and how long it will take until operations will comply with Condition E-10.

b. Within 45 days after each incident, the Applicant shall submit a report to NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW that contains, to the extent possible, the cause, severity, and duration of the incident, any observed or reported adverse environmental impacts from the incident, pertinent data and a description of corrective measures.

c. By April 1 of each year (beginning the first April after the date the FERC license is reissued), the Applicant shall submit to NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW a summary report for the previous calendar year with appropriate tables, graphs, text and supporting documentation that demonstrates compliance with the flow/ impoundment management requirements in Condition E-10. Where excursions occurred, the summary shall indicate when the excursion occurred, the duration of the excursion and a description of corrective actions taken to prevent such excursions from reoccurring.

(For an explanation and citations, see Fact C-2 and Finding D-11)

E.12 **Flow/Impoundment Compliance Monitoring Plan (FICMP):** Within 90 days of license issuance (or other date acceptable to NHDES) the Applicant shall develop, file and implement a flow and impoundment level monitoring and compliance plan (FICMP) that, as a minimum, includes the following:

a. a description of the level of manual, automatic, on-site and remote operation;

b. a detailed description of how the Project will be operated under all conditions (i.e., under normal operating conditions as well as during low flow, high flow, maintenance and emergency conditions) to maintain compliance with the flow and impoundment level management requirements in Condition E-10;

c. a description of how the bypass conservation flow will be maintained during scheduled drawdowns and the minimum impoundment level that will pass the conservation flows (including calculations);

d. a description of the mechanisms and structures (i.e., type, location and accuracy of all flow and impoundment elevation monitoring equipment and gages) to be used for maintaining compliance with operational requirements;

e. set point elevations for turning turbines on and off;[2]

f. procedures for maintaining and calibrating monitoring equipment;

g. rating curves and calculations for all methods of releasing flow downstream (including a working excel spreadsheet);

h. procedures for collecting and recording continuous data (i.e., no less frequent than hourly and preferably every 15 minutes) on inflow, flow releases at the Project (i.e., conservation flows in the bypass reach, spillage and turbine discharge), and impoundment levels.

The FICMP, including any proposed revisions, shall be developed in consultation with NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW, and submitted to NHDES for review and approval. The FICMP shall be kept up-to-date so that it reflects current operation. When revisions are made, the Applicant shall submit the updated FICMP to NHDES for approval within 10 days (or other date acceptable to NHDES) of making the revisions. If NHDES requests the FICMP to be updated, the Applicant shall submit the updated FICMP to NHDES for approval within 30 days (or other date acceptable to NHDES) of receiving a written request from NHDES to update the FICMP. The Applicant shall implement the approved FICMP.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-46.)

E-13. **Fish Passage:** The Applicant shall comply with the USFWS' "Preliminary Prescription for Fishways" (which includes prescriptions for upstream and downstream passage for anadromous fish and American eel - see Finding C-59), and any modifications made to the preliminary prescriptions that are acceptable to the USFWS, NHFGD and NHDES. Unless modifications are made that are acceptable to USFWS, NHFGD and NHDES, upstream and downstream fish passage protective measures shall be operational during the periods shown in the following table.

[2] Set point elevations for providing conservation flows should account for the accuracy of the pond level sensor equipment. For example, if the accuracy is +/- 0.01 feet, the sensor should be set 0.01 feet above the elevation determined.

Species	Upstream Migration Period	Downstream Migration Period
Alosines, American shad, river herring	April 15 – July 15	June 1 – November 15
American eel	May 1 – October 31	August 15 – November 15

(For an explanation and citations, see Fact C-2, and Findings D-11, and D-48 through D-54.)

E-14. **Water Quality Improvement Plan (WQIP):** Within 90 days of License issuance by FERC (or other date acceptable to NHDES) the Applicant shall submit a WQIP to NHDES for approval. The goal of the WQIP is for Project influenced waters (i.e., the Project impoundment, bypass reach and tailrace) to comply with New Hampshire surface water quality standards for parameters that can be influenced by the Project. If the riverine segment immediately upstream (and beyond the influence) of the Project impoundment is not meeting water quality standards for any of those parameters, the goal is for water quality in the Project influenced waters to not be any worse than in the upstream riverine segment. Parameters that can be influenced by the Project include, but are not limited to, DO, temperature, pH, nutrients, chlorophyll-a and secchi disk. The WQIP shall include proposed measures to achieve the goals, a plan to monitor the effectiveness of the improvement measures and a schedule for measure implementation, monitoring to determine the effectiveness of the implemented measures, and submittal of reports to NHDES for approval that includes a summary of the implementation measures, monitoring results (with supporting information including a working spreadsheet if requested by NHDES) and recommendations for next steps. The Applicant shall then implement the approved WQIP. NHDES reserves the right to require a new or updated WQIP should improvement measures not prove to be effective and/or new water quality issues arise. In such cases, the Applicant shall submit a new or updated WQIP within 90 days (or other date acceptable to NHDES) of when the Applicant receives a written request from NHDES to submit a new or updated WQIP for NHDES approval. The Applicant shall incorporate any changes to Project operation included in the approved WQIP, in the Flow/Impoundment Compliance Monitoring Plan (FICMP) and submit the updated FICMP to NHDES for approval as specified in Condition E-12.

(For an explanation and citations, see Fact C-2 and Findings D-11, D-14 and D-38.)

E-15. **Long Term Water Quality Monitoring and Reporting:** Unless otherwise authorized by NHDES, the Applicant shall conduct water quality monitoring in the Salmon Falls River every five years beginning the fifth year after issuance of the

FERC license and ending five years prior to the expiration of the issued license. The purpose of the monitoring is to: 1) determine the future effects of Project operation during the duration of the issued license, both spatially and temporally (in terms of flow, impoundment elevation and power generation) on water temperature and dissolved oxygen (mg/L and percent saturation); 2) to compare results to New Hampshire surface water quality standards; and 3) to determine if additional changes in Project operation are necessary to comply with surface water quality standards.

At least 90 days prior to monitoring in each year monitoring is conducted, the Applicant shall submit a monitoring and reporting plan to NHDES for review and approval that describes, in detail, how, when and where monitoring will be conducted, and results reported. The Applicant shall then implement the NHDES approved plan. Unless otherwise authorized or directed by NHDES, the plan shall specify that monitoring that year shall last for at least five weeks and include periods of relatively low flows and high temperatures as well as times when the Project is, and is not, generating power. Continuous (i.e., every 15 minutes) monitoring of temperature and dissolved oxygen (mg/L and percent saturation) shall be conducted in the riverine reach just upstream of the Project impoundment, at the deep spot of the Project impoundment, the Project tailrace and the Project bypass reach and vertical profiles for temperature and dissolved oxygen shall be conducted each week at the deep spot of the impoundment. Continuous (i.e., every 15 minutes) estimates of impoundment elevation, inflow, tailrace flow, bypass reach flow and generation shall also be provided.

By December 31st of each year that monitoring is conducted, the Applicant shall submit a report and supplemental information that clearly demonstrates via text, tables and plots, the spatial and temporal effect of Project operation (in terms of inflow and flow in the bypass reach and tailrace, impoundment elevation and power generation) on surface water quality and if New Hampshire surface water quality standards are met. Results of quality assurance/quality control checks (calibration, hand-held meter checks, duplicates, etc.) and identification of any deviations from the monitoring and reporting plan shall be clearly identified. In addition to the report, water quality (including uncorrected and any corrected data), continuous impoundment elevation, and continuous flow data (including calculations) should be provided in a working MS Excel workbook or other database acceptable to NHDES. The Applicant shall also enter all data into the NHDES Environmental Monitoring Database (EMD) within 120 days of when monitoring is completed in each year monitoring is conducted.

Should monitoring indicate that water quality standard excursions persist, the Applicant shall consult with NHDES and, if requested by NHDES in writing,

submit a new or updated Water Quality Improvements Plan (WQIP) in accordance with Condition E-14.

(For an explanation and citations, see Fact C-2, and Findings D-11, D-14, D-38 and D-39)

E-16. **Invasive Species Control**: If NHDES notifies the Applicant in writing that invasive species control efforts are needed in the river segments impacted by Project operation, the Applicant shall assist by seeking funding for implementation of control efforts and by temporarily modifying Project operation as necessary to facilitate those control efforts.

(For an explanation and citations, see Fact C-2, and Findings D-11 and D-55.)

APPENDIX C

U.S. Department of the Interior
Section 18 Fishway Prescription
Filed April 16, 2021

10 RESERVATION OF AUTHORITY TO PRESCRIBE FISHWAYS

In order to allow for the timely implementation of fishways, including effectiveness measures, and pursuant to Section 18 of the Federal Power Act, as amended, the Secretary of the Interior, reserves their authority to prescribe the construction, operation, and maintenance of fishways at the Lower Great Falls Hydroelectric Project, FERC Project No. 4451, as appropriate, including, but not limited to, measures to determine, ensure, or improve the effectiveness of such fishways prescribed in section 11 below.

11 PRELIMINARY PRESCRIPTION FOR FISHWAYS

Pursuant to Section 18 of the FPA, as amended, the Secretary of the Interior, as delegated to the Service, hereby exercises her authority to prescribe the construction, operation and maintenance of such fishways as deemed necessary, subject to the procedural provisions contained above.

The Department's Preliminary Prescription for Fishways is the result of consultation among the Service, NHFGD, MEDIFW, MDMR, and the Licensees. Fishways shall be constructed, operated, and maintained to provide safe, timely, and effective passage for river herring (alewife and blueback herring), American shad, and American eel at the Licensees' expense.

11.1 UPSTREAM AND DOWNSTREAM PASSAGE

The Licensees shall construct, operate, maintain, and periodically test the effectiveness of fishways for river herring, American shad, and American eel (collectively, the "target species") as described below. The fishways will be designed, constructed, maintained, and operated (which includes project operations) to safely, timely, and effectively pass the target species upstream and downstream of the Project.

11.2 DESIGN POPULATIONS

The American eel is a panmictic species; therefore, there are no subpopulations. All individuals are genetically, behaviorally, and physically representative of the entire worldwide population, and offspring spawned in the Sargasso Sea have the same random chance of ending up in any watershed between Florida and Maine. Based on monitoring data at the downstream South Berwick eelway, we expect thousands of juvenile eel to use

upstream facilities at the Project. The type of eelway(s) likely to be used at the site has been shown to be capable of passing nearly 20,000 eels;[1] therefore, the Service expects it can accommodate the annual movement of eels on the Salmon Falls River.

As noted in Section 4.4.2, the anticipated alosine population for the Project's impoundment is approximately 1.595 American shad and 12,425 river herring. A standard 4-foot-wide Denil fish ladder has an annual biological capacity of approximately 25,000 adult American shad, 12,000 Atlantic salmon, or 200,000 adult river herring (USFWS 2019). Given these capacities, a single 4-foot Denil ladder (or equivalent), installed at a slope of 1:8 (vertical: horizontal) or milder, should be sufficient to pass the design populations of the target species for the foreseeable future.

11.3 FISH PASSAGE OPERATING PERIODS

Fishways shall be operational during the migration windows for target species present. The migratory season for diadromous fish has been studied for the major rivers of the Northeast (Facey and Van Den Avyle 1987, page 7; Mullen et al. 1986; Weiss-Glanz et al. 1986; Loesch 1987; ASMFC 2000, page 8; Saunders et al. 2006, page 539; ASMFC 2009, page 9; Shepard 2015; Eyler et al. 2016). The season depends on geographic location, water temperature, river flow, and other habitat cues. These dates may change based on new information, evaluation of new literature, and agency consultation. Based on data from nearby watersheds, approved fish passage protective measures shall be operational during the migration windows identified in Table 1 (below).

Table 1. Summary of migration periods for which fish passage will be provided.

Species	**Upstream Migration Period**	**Downstream Migration Period**
Alosines: American shad, river herring	April 15 – July 15	June 1 – November 15
American eel	May 1 – October 31	August 15 – November 15

11.4 FISHWAY OPERATION AND MAINTENANCE PLAN

Within 12 months of license issuance, the Licensees will prepare and provide to the Service, NHFGD, MEDIFW, MDMR, and the National Marine Fisheries Service, a Fishway Operation and Maintenance Plan (FOMP) covering all operations and maintenance of the upstream and downstream fish passage facilities in operation at the time. The FOMP shall include:

[1] In 2016, over 18,000 juvenile eels were counted passing an eel ramp at the Holyoke Project (FERC No. 2004).

a. a schedule for routine fishway maintenance to ensure the fishways are ready for operation at the start of the migration season;
b. procedures for routine upstream and downstream fishway operations; and
c. procedures for monitoring and reporting on the operation and maintenance of the facilities as they affect fish passage.

The FOMP shall be submitted to the Service for review and approval prior to submitting the FOMP to the Commission for its approval. Thereafter, the Licensees will keep the FOMP updated on an annual basis, to reflect any changes in fishway operation and maintenance planned for the year. If the Service requests a modification of the FOMP, the Licensee shall amend the FOMP within 30 days of the request and send a copy of the revised FOMP to the Service. Any modifications to the FOMP by the Licensees will require the approval of the Service prior to implementation and prior to submitting the revised FOMP to the Commission for its approval.

The Licensees shall provide information on fish passage operations and project generating operations that may affect fish passage, upon written request from the Service or other resource agencies. Such information shall be provided within 10 calendar days of the request, or upon a mutually agreed upon schedule.

11.5 INSPECTION

The Licensees shall provide access to the project site and to pertinent project records to Service personnel and its designated representatives, for the purpose of inspecting the fish passage facilities and to determine compliance with the Prescription.

11.6 SCHEDULING

Timely construction, operation, maintenance, and measures for upstream and downstream fish passage, including studies and evaluations, are necessary to ensure their effectiveness and to achieve restoration goals. Therefore, the Licensees shall notify, and obtain approval from, the Service for any extension to comply with prescribed conditions.

11.6.1 IMPLEMENTATION

The Licensees shall develop design plans for fishways and submit these plans to the Service and other resource agencies for review and approval during conceptual, 30%, and 90% design stages. This will ensure safe, timely, and effective fishway passage is designed and constructed on a timely schedule to meet the implementation dates indicated below. Designs shall be consistent with the 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated version.

The Licensees shall adhere to the following dates for installing fishways:

a. The upstream anadromous fish systems are to be operational no later than March 15 of the fourth calendar year after permanent volitional upstream fishways for American shad and river herring become operational at the downstream Rollinsford Hydroelectric Project (FERC No. 3777).

b. The downstream anadromous fish and downstream eel passage system is to be operational within three years of license issuance.

c. The upstream eel passage systems are to be operational after the upstream anadromous fish systems are installed, within four years of license issuance.

For upstream and downstream anadromous fish and downstream eel passage systems, the Licensees shall adhere to the following design milestone schedule:

a. conceptual designs 15 months prior to the start of construction;

b. 30% design 12 months prior to the start of construction; and

c. 90% design and Basis of Design Report three months prior to the start of construction.

The Licensees shall adhere to the following design milestone schedule for the upstream eel passage system(s):

a. 30% designs four months prior to the start of construction, and following delivery of the eelway siting survey report; and

b. 90% designs two months prior to the start of construction.

Following approval by the Service and other resource agencies, the Licensees shall submit final design plans to the Commission for its approval and prior to the commencement of fishway construction activities. Once the fishways are constructed, final as-built drawings that accurately reflect the Project as constructed shall be filed with the Service, the other resource agencies, and the Commission.

11.7 FISH PASSAGE EFFECTIVENESS MEASURES

Effectiveness testing of both upstream and downstream American eel and anadromous fish passage is critical to evaluating passage success, diagnosing problems, determining when fish passage modifications are needed, and what modifications are most likely to be effective over the term of the license.

11.7.1 FISHWAY EFFECTIVENESS MONITORING PLAN

The Licensees must develop a Fishway Effectiveness Monitoring Plan (FEMP) in consultation with, and requiring approval by, the Service. The FEMP will contain plans for ensuring: (1) the effectiveness of upstream anadromous, upstream eel, downstream anadromous, and downstream eel passage measures required pursuant to Section 11.8 through 11.11; and (2) that the minimum bypass flow that provides safe, timely, and effective downstream passage to emigrating diadromous species (i.e., does not strand fish). The FEMP shall be submitted to FERC for approval six months prior to the implementation dates for installing upstream anadromous fish systems specified in Section 11.6.1.

The Licensees shall begin implementing effectiveness testing measures at the start of the first migratory season after a fishway(s) are operational and shall conduct quantitative fish passage effectiveness testing and evaluation for a minimum of two years. If the Service requests a modification of the FEMP, the Licensees shall amend the FEMP within 30 days of the request and send a copy of the revised FEMP to the Service and resource agencies. Any modifications to the FEMP by the Licensee will require approval by the Service prior to implementation.

The Licensee will submit yearly interim study reports to the Service following the conclusion of each study year. The interim reports for upstream passage studies will be submitted to the Service by February 15 following each study year. The final study report will be submitted to the Service within six months after the completion of the study. The final study report will include methods, data analysis, results, an assessment of any factors or potential problems hindering passage effectiveness, and provide recommended modifications to achieve safe, timely and effective passage. In conjunction with submitting the final study report, the Licensee will also provide electronic copies of all data collected from studies to the Service.

The Licensees shall meet annually, in the late fall, with the Service and the other resource agencies to report on the occurrence of fish passage maintenance and operations, monitoring results, and review of the operating plan. Any changes and planned maintenance must be completed prior to the start of the next migratory season.

11.8 UPSTREAM ANADROMOUS PASSAGE

1. The Licensees shall construct, operate, and maintain upstream fish passage facilities that pass anadromous fish species in a safe, timely and effective manner. Based on the best scientific information available at this time, these fishways could satisfy the standard of safe, timely, and effective: a technical fishway from the Project's tailrace, a technical fishway at the Project's dam, or a nature-like

fishway (NLF) at the Project's dam.[2] At the lowest end of its operating range, any NLF should be designed to meet Service criteria for depth, velocity, and pool size (USFWS 2019) while passing the minimum required flows in the bypass; additional bedrock modifications may be necessary to extend the operating range during periods of moderate spill.

2. The size of the fishway shall accommodate the anticipated production potential of the Lower Great Falls impoundment: 12,425 river herring, 1,595 shad, and approximately 500 resident or target species. A standard 4-foot-wide Denil fish ladder is estimated to have an annual biological capacity of 25,000 adult American shad, 12,000 Atlantic salmon, or 200,000 adult river herring (USFWS 2019). Given these capacities, a single 4-foot Denil ladder (or equivalent), installed at a slope of 1:8 (vertical:horizontal) or milder, should be sufficient to pass the design populations of target species.

3. The design elements (e.g., slope, pool/slot size, attraction water) of the fishway shall ensure successful passage of river herring and American shad. The fishway shall operate for the full range of design flows based on the migratory season for each species in accordance with provisions of Section 11.3.

4. The fishway shall be constructed and operational by March 15 of the fourth calendar year after permanent volitional upstream fishways for American shad and river herring become operational at the downstream Rollinsford Hydroelectric Project (FERC No. 3777).

5. Fishway design shall be consistent with the Service's 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated version.

Justification

The Salmon Falls River, in the vicinity of the Project, once supported runs of diadromous species including alosines (Odell et al. 2006; Old Berwick Historical Society 2020) and existing FMPs call for restoring access to historical spawning and rearing habitat. Currently, alosines are provided freshwater access to the Salmon Falls River via the South Berwick Dam at the head-of-tide. Approximately 16,418 river herring passed South Berwick in 2019, and 24,571 river herring passed South Berwick in 2018 (M. Dionne, NHFGD, personal communication, May 22, 2020).

The Offer of Settlement for the downstream Rollinsford Hydroelectric Project includes provisions for interim upstream passage for alosines via trap and track and the future

[2] Nature-like fishways (NLF) are structures designed to mimic the natural functions and/or aesthetics of a river; NLF can include, but are not limited to, simple bedrock modification, weir placement, rock ramps, etc.

installation of volitional passage facilities.[3] The Lower Great Fall Project will impede migratory movement of river herring and American shad in the Salmon Falls River. Fish passage at the Lower Great Falls Project, along with the implementation of passage measures at the downstream Rollinsford Project will provide approximately 4.1 river miles of available habitat to anadromous fish in the Salmon Falls River.

11.9 UPSTREAM AMERICAN EEL PASSAGE

1. The Licensees shall construct, operate, and maintain upstream fish passage facilities that provide safe, timely, and effective upstream passage for American eel.
2. In order to determine proper siting of the upstream eelway(s), the Licensees shall conduct a two-season upstream eel ramp siting survey beginning the first full passage season after license issuance. Based on results of that survey, the Licensees shall, in consultation with the Service and other resource agencies, determine optimal locations for siting permanent upstream eelway(s).
3. Permanent eelway(s) shall be operational no later than May 1 of the second calendar year after the siting surveys are complete.
4. The upstream facilities shall be designed in consultation with the resource agencies, and the resource agencies shall review the 30% and 90% drawings.
5. The designs shall be consistent with the Service's 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated version.

Justification

Dedicated upstream eel passage is necessary to provide access to rearing habitat upstream of the Project throughout the migratory eel passage season. Count data at South Berwick, as well as a study performed as part of the Rollinsford Project's licensing proceeding (Gomez and Sullivan 2019), and Appendix D of the Project's FLA, document eel are downstream of the Lower Great Falls Dam. Upstream migrating juvenile eel can be effectively passed at hydroelectric projects (Solomon and Beach 2004, entire).

Because the Project includes a bypass reach that will have a continuous flow, there are two potential areas of attraction for up-migrating eel: in the vicinity of the powerhouse; and at the base of the dam. Therefore, more than one eelway may be needed to provide effective passage. The most suitable location(s) for permanent eelway(s) should rely on empirical data which will be collected during the siting surveys.

[3] Accession Number: 20210305-5218.

11.10 DOWNSTREAM AMERICAN EEL PASSAGE

1. The Licensees shall construct, operate, and maintain a downstream eel passage and protection system that provides safe, timely, and effective downstream passage for American eel.
2. The Licensees shall implement, as an interim measure, targeted nighttime turbine shutdowns to protect emigrating eel during the first year of license issuance. Turbine shutdowns shall occur from dusk to dawn for three consecutive nights following rain accumulations of 0.50 inch or more, as measured at the Project, over a 24-hour period. Turbine shutdowns should occur during the duration of the downstream eel passage season in accordance with provisions of Section 11.3.
3. The Licensees shall implement permanent downstream eel passage and protection measures within three years of license issuance.
4. Pursuant to the conditions provided herein, the Licensee shall develop a plan to provide permanent downstream eel passage and protection, in conformance with the Downstream Implementation Schedule specified in 11.6.1. The plan, including the design of permanent eel passage facilities and/or operational measures and permanent downstream alosine passage, shall be developed in consultation with, and require approval by, the Service

Justification

Dedicated downstream fish passage facilities are necessary to protect diadromous species emigrating past the Project. State-led fisheries surveys as well as an upstream eel passage assessment performed at Lower Great Falls in 2020 (Gomez and Sullivan 2020) indicate eel are present upstream of the Project's dam. The eel population inhabiting the river upstream of the Project will increase over time as upstream eelway(s) become operational. Absent passage and protection measures, outmigrating silver eel are be susceptible to impingement and/or entrainment. Estimated project-specific survival rates indicate eel would sustain high mortality rates should they pass through the Project's turbines. 14 Facilities and/or measures to provide safe downstream passage for eel are needed as they migrate through the Project on their spawning migration to the Sargasso Sea. Downstream migrating adults and juvenile diadromous fish can effectively be protected from project operation impacts that result in injury and mortality (NMFS 2012; USFWS 2019).

11.11 DOWNSTREAM ANADROMOUS FISH PASSAGE

1. The Licensees shall construct, operate, and maintain a downstream passage and protection system that provides safe, timely, and effective downstream passage for both spent juvenile and adult anadromous fish.
2. The Licensees shall implement permanent downstream alosine passage and protection measures within three years of license issuance.
3. Pursuant to the conditions provided herein, the Licensees shall develop a plan to provide permanent downstream alosine passage and protection, in conformance with the Downstream Implementation Schedule specified in 11.6.1. The plan, including the design of permanent downstream alosine passage and permanent eel passage facilities and/or operational measures, shall be developed in consultation with, and require approval by, the Service.

Justification

Dedicated fish passage facilities are necessary to protect diadromous species emigrating past the Project. Downstream migrating adult and juvenile alosines are exposed to project-related impacts (Franke et al. 1997). Estimated project-specific survival rates indicate alosines would sustain a high level of entrainment and mortality should they pass through the Project's turbines. 15 Unless river flows are being spilled at the Project, or fish utilize the minimum flow cutout in the flashboards as a means of passage, there is no alternative downstream route of passage. Therefore, facilities to provide safe downstream passage for alosines are needed as they emigrate through the Project on their way back out to sea. Downstream emigrating adults and juvenile diadromous fish can effectively be protected from project operation impacts that result in injury and mortality (NMFS 2012; USFWS 2019).

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Green Mountain Power Corporation Project No. 4451-024
City of Somersworth, New Hampshire

(Issued January 20, 2023)

DANLY, Commissioner, *concurring*:

1. I concur with today's order[1] issuing Green Mountain Power Corporation and City of Somersworth a subsequent license to continue to operate and maintain the Lower Great Falls Hydroelectric Project. I write separately to express a few concerns.

2. *First*, it occurs to me that perhaps Maine Department of Environmental Protection (Maine DEP) waived certification by failing to act on the licensees' request within one year. Maine DEP received the licensees' request on April 6, 2021. Historical recitations in opinions by two circuit courts suggest that the last day of the one-year deadline would have been April 5, 2022.[2] Maine DEP issued its water quality certification one day later, on April 6, 2022. If Maine DEP did indeed waive certification, the Commission could not have accepted its terms as mandatory, and instead, would have had to consider whether the license, with Maine DEP's water quality terms, would be best adapted to a comprehensive plan for improving or developing a waterway under section 10(a) of the Federal Power Act (FPA).[3]

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[1] *Green Mountain Power Corp.*, 182 FERC ¶ 61,024 (2023) (*GMP*).

[2] *See Alcoa Power Generating Inc. v. FERC*, 643 F.3d 963, 966 (D.C. Cir. 2011) ("Alcoa Power . . . on May 8, 2008 . . . . re-fil[ed] its [water quality certification] request. . . . The Division of Water Quality issued a new certification on May 7, 2009, the last day of the one-year period."); *FPL Energy Maine Hydro LLC v. FERC*, 551 F.3d 58, 60 (1st Cir. 2008) (in a proceeding where the water quality certification application was dated November 15, 2002, the court stated, "on November 14, 2003 (the last day a decision could be reached before the one-year deadline expired) . . . ."); *see also* FPL Energy Maine Hydro LLC, Copy of Water Quality Certification Request, Project No. 2612-005 (filed December 27, 2002) (Accession No. 20030106-0395).

[3] *See* 16 U.S.C. § 803(a); *S. Feather Water & Power Agency*, 171 FERC ¶ 61,242 (2020) ("As we have long held, once a state agency has waived its authority to act on a water quality certification application, the water quality conditions are not mandatory and acceptance of the conditions is a matter with the Commission's discretion. Accordingly,

3. *Second*, I note that the Commission finds a certain recommendation filed by the Department of the Interior under section 10(j) of the FPA[4] to be "outside the scope" of that section and instead considers it under FPA section 10(a)(1).[5] As I have previously stated,[6] I have misgivings about this practice.

4. *Finally*, I write to express my concern about Article 202, which reserves authority for the Commission to impose financial assurance mechanisms without any limiting principle.[7] As I have previously stated,[8] this reservation may have the unfortunate effect of reinforcing uncertainty and limiting licensees' access to the very financing we should seek to encourage. It is imperative that the Commission take a hard look at our financial assurance requirements and deliberately determine what, if any, changes or improvements should be adopted.

For these reasons, I respectfully concur.

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James P. Danly
Commissioner

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we will consider all of the November 30, 2018 certification conditions as recommendations under FPA section 10(a)(1) in the relicensing proceeding.") (citations omitted). *See also GMP*, 182 FERC ¶ 61,024 at P 97 (explaining that the Environmental Assessment did not recommend Maine DEP's water quality plan).

[4] 16 U.S.C. § 803(j).

[5] *GMP*, 182 FERC ¶ 61,024 at PP 80, 88-93.

[6] *See, e.g.*, *Cornell Univ.*, 176 FERC ¶ 61,186 (2021) (Danly, Comm'r, concurring in part and dissenting in part at P 2).

[7] *See GMP*, 182 FERC ¶ 61,024 at P 130 & Ordering Para. G (listing additional license articles, including Article 202 which provides "The Commission reserves the right to require future measures to ensure that the licensee maintains sufficient financial reserves *to carry out the terms of the license and Commission orders pertaining thereto*.") (emphasis added).

[8] *See, e.g.*, *Pub. Util. Dist. No. 1 of Pend Oreille Cnty.*, 177 FERC ¶ 61,183 (2021) (Danly, Comm'r, concurring at PP 1-3).

APPENDIX C-NEW HAMPSHIRE WATER QUALITY CERTIFICATION

New Hampshire Department of Environmental Services
WATER QUALITY CERTIFICATION
In Fulfillment of
NH RSA 485-A:12, III

Certification Number	WQC 2021-FERC-002
Activity Name	Lower Great Falls Hydroelectric Project (FERC Project No. 4451)
Activity Location **(of Project Dam)**	Somersworth, New Hampshire (Strafford, County) Berwick, Maine (York County)
Potentially Affected Surface Waters Near the Activity **(other affected surface waters may exist)**	Salmon Falls River: NHIMP600030406-03 (impoundment upstream of Dam) NHRIV600030406-04 (immediately downstream of Dam) Unnamed wetlands
Owner/Applicant	City of Somersworth, New Hampshire and Green Mountain Power are co-licensees and collectively are the Applicant
Agent Filing Application on Behalf of Owner/Applicant	John Greenan, P.E. Green Mountain Power 2152 Post Road Rutland, VT 05701
Applicable Federal License or Permit Requiring Section 401 water quality certification	Federal Energy Regulatory Commission (FERC) - Subsequent License for Minor Water Power Project
Decision (subject to Conditions below)	Approved
Date of Issuance	April 4, 2022

A. INTRODUCTION

Green Mountain Power (GMP), on behalf itself and its co-licensee, the City of Somersworth, New Hampshire (collectively the Applicant), has applied for a license from the Federal Energy Regulatory Commission (FERC) to continue operation and maintenance of the Lower Great Falls Hydroelectric Project (Project or Activity) located on the Salmon Falls River in City of Somersworth, in Strafford County New Hampshire and Town of Berwick in York County Maine. The Project has a total installed generating capacity of 1.28 megawatts (MW) and is proposed to be operated run-of-river. A more complete description of the Activity is provided in Findings D-3 through D-6 of this certification.

In accordance with the Section 401 of the federal Clean Water Act (CWA) and New Hampshire law (RSA 485-A:12, III) the Applicant has applied for a water quality certification (WQC or certification) from the New Hampshire Department of Environmental Services (NHDES). The purpose of the certification is to provide assurance that discharges from the proposed Activity will comply with New Hampshire surface water quality standards (NH RSA 485-A:8 and NH Code of Administrative Rules Env-Wq 1700). Additional details are provided

herein.

This certification includes the following:

Documents cited in this certification that were filed with FERC, can be accessed on the FERC elibrary by date or FERC Accession Number.

B. DECISION

Based on the facts, laws, findings and conditions included herein, NHDES has determined that there is reasonable assurance that construction and operation of the proposed Activity will be conducted in a manner which will not violate New Hampshire surface water quality standards (RSA 485-A:8 and Env-Wq 1700)[1]. NHDES hereby issues this certification in accordance with RSA 485-A:12, III, subject to the conditions in Section E of this certification.

C. FACTS AND LAWS

Federal 401 Certification Laws and Regulations

C-1. Section 401(a)(1) of the federal Clean Water Act (CWA) (33 U.S.C. §1341(a)(1)) requires any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate…that any such discharge will comply with the applicable provisions of the CWA. The CWA provision most applicable for this Project is compliance with state surface water quality standards. CWA section 303 (33 U.S.C § 1313).

C-2. Section 401(d) (33 U.S.C §1341(d)), of the CWA provides that: "Any certification provided under this section [401] shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to ensure that any applicant for a Federal license or permit will comply with [enumerated provisions of the CWA]… and with any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section."

[1] This language is required by federal regulations. See Fact C-5.

C-3. According to a 1994 U.S. Supreme Court decision [2], although §401(a) refers to compliance of the "discharge" with certain provisions of the CWA, §401(d) expands the State's authority in that it provides that any certification shall set forth "any effluent limitations and other limitations … necessary to ensure that any applicant" will comply with various provisions of the Act and appropriate state law requirements. That is "…401(d) is most reasonable read as authorizing additional conditions and limitations on the activity as a whole once the threshold condition, the existence of a discharge, is satisfied".

C-4. Federal regulations regarding Section 401 water quality certification may be found in the Code of Federal Regulations (CFR), Title 40, PART 121 (40 CFR 121) titled "State Certification of Activities Requiring a Federal License or Permit". On July 13, 2020, the U.S. Environmental Protection Agency (EPA) published final revisions to this rule in the Federal Register (Vol. 85, No. 134, pages 42210 to 42287), which became effective on September 11, 2020 (2020 Rule). As indicated on EPA's website, on October 21, 2021, the U.S. District Court for the Northern District of California issued an order[3] remanding and vacating EPA's 2020 Rule. The vacatur is nationwide. The order requires a temporary return to EPA's 1971 Rule until EPA finalizes a new certification rule.

C-5. 40 CFR 121.2(a)(3) through (5)) of EPA's 1971 Rule require the following to be included in certifications:

"(3) A statement that there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards;
(4) A statement of any conditions which the certifying agency deems necessary or desirable with respect to the discharge of the activity; and
(5) Such other information as the certifying agency may determine to be appropriate."

The term "discharge" is not defined in EPA's 1971 Rule.

C-6. 40 CFR 121.2(b) of EPA's 1971 Rule states the following with regards to modification of certifications:

"(b) The certifying agency may modify the certification in such manner as may be agreed upon by the certifying agency, the licensing or permitting agency, and the Regional Administrator[4]."

C-7. The term "discharge," as applied under section 401 of the Clean Water Act means the potential for a discharge. It does not need to be a certainty, only that it may occur should the federal license or permit be granted. Further, the discharge does not need to involve the addition of pollutants (such as water released from the tailrace of a dam). As the U.S. Supreme Court has stated "[w]hen it applies to water, 'discharge' commonly means a 'flowing or issuing out'" and an addition of a pollutant is not "fundamental to any discharge." [5]

C-8. The CWA Section 502(7) (33 U.S.C. §1362(7)) defines "navigable waters," as "waters of the United States".

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[2] *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700, 712 (1994).

[3] In re Clean Water Act Rulemaking, No. 20-cv-4636, et al. (Oct. 21, 2021)

[4] 40 CFR 121.1(d) of EPA's 1971 Rule defines "Regional Administrator" as "…the Regional designee appointed by the Administrator, Environmental Protection Agency".

[5] The Supreme Court case that is referred to is *S.D. Warren Co. v. Maine Board of Environmental Protection et al*, 547 U.S. 370, 126 S. Ct. 1853 (2006).

C-9. Waters of the United States are defined in 40 CFR §122.2.

State 401 Certification Law

C-10. NH RSA 485-A:12, III, states: "No activity, including construction and operation of facilities, that requires certification under section 401 of the Clean Water Act and that may result in a discharge, as that term is applied under section 401 of the Clean Water Act, to surface waters of the state may commence unless the department certifies that any such discharge complies with the state surface water quality standards applicable to the classification for the receiving surface water body. The department shall provide its response to a request for certification to the federal agency or authority responsible for issuing the license, permit, or registration that requires the certification under section 401 of the Clean Water Act. Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards. The department may enforce compliance with any such conditions, modifications, or monitoring requirements as provided in RSA 485-A:22."

State Surface Water Quality Standards [6]

C-11. NH RSA 485-A:8 and Env-Wq 1700 (Surface Water Quality Standards), together fulfill the requirements of Section 303 of the Clean Water Act (CWA) (33 U.S.C 1313) that the State of New Hampshire adopt water quality standards consistent with the provisions of the CWA.

C-12. Env-Wq 1701.01 Purpose. "The purpose of these rules is to establish water quality standards for the state's surface water uses as set forth in RSA 485-A:8, I, II, III and V. These standards are intended to protect public health and welfare, enhance the quality of water and serve the purposes of the federal Clean Water Act, 33 U.S.C. 1251 et seq., and RSA 485-A. These standards provide for the protection and propagation of fish, shellfish, and wildlife, and provide for such uses as recreational activities in and on the surface waters, public water supplies, agricultural and industrial uses, and navigation in accord with RSA 485-A:8, I and II."

C-13. Env-Wq 1701.02, titled "Applicability," states that these rules shall apply to:

"(a) All surface waters; and
(b) Any person who:
(1) Causes any point or nonpoint source discharge of any pollutant to surface waters;
(2) Undertakes hydrologic modifications, such as dam construction or water withdrawals; or
(3) Undertakes any other activity that affects the beneficial uses or the water quality of surface waters."

C-14. Env-Wq 1702.44 defines surface waters as "surface waters of the state" as defined in NH RSA 485-A:2, XIV and waters of the United States as defined in 40 CFR 122.2.

NH RSA 485-A:2, XIV defines "surface waters of the state" as "perennial and seasonal streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial."

[6] All New Hampshire surface water quality standards apply to the Activity. The standards specifically called out in the certification should not be interpreted as the only standards that may apply.

NH RSA 482-A:2, X. defines "Wetlands'' as "[a]n area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

C-15. Env-Wq 1702.07 states that ""Best management practices" means those practices that are determined, after problem assessment and examination of all alternative practices and technological, economic and institutional considerations, to be the most effective practicable means of preventing or reducing the amount of pollution generated by point or nonpoint sources to a level compatible with water quality goals."

C-16. Env-Wq 1702.05 states that ""Benthic community" means the community of plants and animals that live on, over, or in the substrate of the surface water."

C-17. Env-Wq 1702.06 states that ""Benthic deposit" means any sludge, sediment, or other organic or inorganic accumulations on the bottom of the surface water."

C-18. Env-Wq 1702.08 states that ""Biological integrity" means the ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region."

C-19. Env-Wq 1702.26 states that ""Mixing zone" means a defined area or volume of the surface water surrounding or adjacent to a wastewater discharge where the surface water, as a result of the discharge, might not meet all applicable water quality standards."

C-20. Env-Wq 1702.15 states that ""Cultural eutrophication" means the human-induced addition of wastes that contain nutrients to surface waters, resulting in excessive plant growth or a decrease in dissolved oxygen, or both."

C-21. Env-Wq 1702.17 states that ""Designated uses" means those uses specified in water quality standards for each water body or segment whether or not such uses are presently occurring. The term includes the following:

(a) "Swimming and other recreation in and on the water, meaning the surface water is suitable for swimming, wading, boating of all types, fishing, surfing, and similar activities;
(b) Fish consumption, meaning the surface water can support a population of fish free from toxicants and pathogens that could pose a human health risk to consumers;
(c) Shellfish consumption, meaning the tidal surface water can support a population of shellfish free from toxicants and pathogens that could pose a human health risk to consumers;
(d) Aquatic life integrity, meaning the surface water can support aquatic life, including a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of the region;
(e) Wildlife, meaning the surface water can provide habitat capable of supporting any life stage or activity of undomesticated fauna on a regular or periodic basis; and
(f) Potential drinking water supply, meaning the surface water could be suitable for human intake and meet state and federal drinking water requirements after adequate treatment."

C-22. Env-Wq 1702.18 states that ""Discharge" means:

(a) "The addition, introduction, leaking, spilling, or emitting of a pollutant to surface waters,

either directly or indirectly through the groundwater, whether done intentionally, unintentionally, negligently or otherwise; or

(b) The placing of a pollutant in a location where the pollutant is likely to enter surface waters."

C-23. Env-Wq 1702.22 states that ""Existing uses" means those uses, other than assimilation waste transport, that actually occurred in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards."

C-24. Env-Wq 1702.33 states that ""Nuisance species" means any species of flora or fauna living in or near the water whose noxious characteristics or presence in sufficient number or mass prevent or interfere with a designated use of those surface waters."

C-25. Env-Wq 1702.37 states that "Point source" means a discernible, confined, and discrete conveyance from which pollutants are or might be discharged, excluding return flows from irrigated agriculture or agricultural stormwater runoff. The term includes, but is not limited to, a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft.

C-26. Env-Wq 1702.38 states that ""Pollutant" means "pollutant" as defined in 40 CFR 122.2." According to 40 CFR 122.2, "pollutant" means "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water."

C-27. Env-Wq 1703.01 titled "Water Use Classifications; Designated Uses" states the following:

(a) All surface waters shall be classified as provided in RSA 485-A:8, based on the standards established therein for class A and class B waters. Each classification shall identify the most sensitive use it is intended to protect.
(b) All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.
(c) All surface waters shall provide, wherever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters.
(d) Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing uses and designated uses.

C-28. Env-Wq 1703.03 titled "General Water Quality" includes the following:

"(a) The presence of pollutants in the surface waters shall not justify further introduction of pollutants from point or nonpoint sources, alone or in any combination."

(c)(1) "All surface waters shall be free from substances in kind or quantity that:

a. Settle to form harmful benthic deposits;
b. Float as foam, debris, scum or other visible substances;
c. Produce odor, color, taste or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses;
d. Result in the dominance of nuisance species; or
e. Interfere with recreational activities."

C-29. Env-Wq 1703.06 includes water quality criteria for bacteria.

C-30. Env-Wq 1703.07 titled "Dissolved Oxygen" includes the following:

> "(a) Class A waters shall have a dissolved oxygen content of at least 75% saturation, based on a daily average, and an instantaneous minimum of at least 6 mg/l at any place or time except as naturally occurs.
> (b) Except as naturally occurs and subject to (c) and (e), below, class B waters shall have a dissolved oxygen content of:
> (1) At least 75% of saturation, as specified in RSA 485-A:8, II, based on a daily average; and
> (2) An instantaneous minimum dissolved oxygen concentration of at least 5 mg/l.
> (c) In areas identified by the New Hampshire fish and game department (NHF&G) as cold water fish spawning areas of species whose early life stages are buried in the gravel on the bed of the surface water, the 7 day mean dissolved oxygen concentration shall be at least 9.5 mg/l and the instantaneous minimum dissolved oxygen concentration shall be at least 8 mg/l for the period from October 1 of one year to May 14 of the next year, provided that the time period shall be extended to June 30 for a specific discharge to a specific waterbody if modeling done in consultation with the NHF&G determines the extended period is necessary to protect spring spawners or late hatches of fall spawners, or both.
> (d) Unless naturally occurring or subject to (a), above, surface waters within the top 25 percent of depth of thermally unstratified lakes, ponds, impoundments, and reservoirs or within the epilimnion shall contain a dissolved oxygen content of at least 75 percent saturation, based on a daily average and an instantaneous minimum dissolved oxygen content of at least 5 mg/l. Unless naturally occurring, the dissolved oxygen content below those depths shall be consistent with that necessary to maintain and protect existing and designated uses.
> (e) As specified in RSA 485-A:8, III, waters in a temporary partial use area established under RSA 485-A:8, II as a surface water that is receiving a combined sewer overflow discharge shall contain not less than 5 parts per million of dissolved oxygen for the duration of the discharge and up to 3 days following cessation of the discharge."

C-31. Env-Wq 1703.08 titled "Benthic Deposits" states the following:

> "(a) Class A waters shall contain no benthic deposits, unless naturally occurring.
> (b) Class B waters shall contain no benthic deposits that have a detrimental impact on the benthic community, unless naturally occurring."

C-32. Env-Wq, 1703.09, 1703.10 and 1703.12 include water quality criteria for oil and grease, color and slicks, odors, and surface floating solids, respectively.

C-33. Env-Wq 1703.11 titled "Turbidity" states the following:

> "(a) Class A waters shall contain no turbidity, unless naturally occurring.
> (b) Class B waters shall not exceed naturally occurring conditions by more than 10 NTUs.
> (c) Turbidity in waters identified in RSA 485-A:8, III shall comply with the applicable long-term combined sewer overflow plan prepared in accordance with Env-Wq 1703.05(c).
> (d) For purposes of state enforcement actions, if a discharge causes or contributes to an increase in turbidity of 10 NTUs or more above the turbidity of the receiving water upstream of the discharge or otherwise outside of the visible discharge, a violation of the turbidity standard shall be deemed to have occurred."

C-34. Env-Wq 1703.13 titled "Temperature" states the following:

"(a) There shall be no change in temperature in class A waters, unless naturally occurring.
(b) Temperature in class B waters shall be in accordance with RSA 485-A:8, II, and VIII."

NH RSA-A:8, II states the following for Class B waters "Any stream temperature increase associated with the discharge of treated sewage, waste or cooling water, water diversions, or releases shall not be such as to appreciably interfere with the uses assigned to this class."

NH RSA-A:8, VIII states the following: "In prescribing minimum treatment provisions for thermal wastes discharged to interstate waters, the department shall adhere to the water quality requirements and recommendations of the New Hampshire fish and game department, the New England Interstate Water Pollution Control Commission, or the United States Environmental Protection Agency, whichever requirements and recommendations provide the most effective level of thermal pollution control."

C-35. Env-Wq 1703.14, titled "Nutrients" states the following:

"(a) Class A waters shall contain no phosphorous or nitrogen unless naturally occurring.
(b) Class B waters shall contain no phosphorous or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring.
(c) Existing discharges containing either phosphorous or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.
(d) There shall be no new or increased discharge of phosphorous into lakes or ponds.
(e) There shall be no new or increased discharge(s) containing phosphorous or nitrogen to tributaries of lakes or ponds that would contribute to cultural eutrophication or growth of weeds or algae in such lakes and ponds."

C-36. Nutrient Numeric Thresholds: New Hampshire does not currently have numeric surface water quality citeria for nutrients (total phosphorus and total nitrogen) in regulation (i.e., Env-Wq 1700) but has established numeric thresholds for nutrient response parameters such as chlorophyll-a that are used for surface water quality assessments. These numeric thresholds are included in the State's Consolidated Assessment and Listing Methodology or CALM[7]. The CALM states the following regarding the numeric chlorophyll-a threshold established to protect the recreation designated use: "Excessive algal growth (high biomass and high chlorophyll-a values) can impair the public safety and aesthetic enjoyment of surface waters. The General Water Quality Criteria (Env-Wq 1703.03) require that surface waters be free of substances which: produce color or turbidity making the water unsuitable for the designated use or interfere with recreational activities (Env-Wq 1703.03 (c)(1) c & e). For assessment purposes, chlorophyll-a concentrations in excess of 15 µg/L in fresh water and 20 µg/L in salt water are indicators of excessive algal growth that interferes with recreational activities."

C-37. Env-Wq 1703.18, titled "pH" states the following:

"(a) The pH of Class A waters shall be as naturally occurs.
(b) As specified in RSA 485-A:8, II, the pH of Class B waters shall be 6.5 to 8.0, unless due to natural causes.
(c) As specified in RSA 485-A:8, III, the pH of waters in temporary partial use areas shall be 6.0

[7] State of New Hampshire 2018 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology. New Hampshire Department of Environmental Services. R-WD-19-04. 2018 CALM (nh.gov).

to 9.0 unless due to natural causes."

C-38. Env-Wq 1703.19, titled "Biological and Aquatic Community Integrity" states the following:

"(a) All surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
(b) Differences from naturally-occurring conditions shall be limited to non-detrimental differences in community structure and function."

C-39. Env-Wq 1703.21 titled "Water Quality Criteria for Toxic Substances" states the following:

"(a) Unless naturally occurring or allowed under part Env-Wq 1707, all surface waters shall be free from toxic substances or chemical constituents in concentrations or combinations that:

(1) Injure or are inimical to plants, animals, humans or aquatic life; or
(2) Persist in the environment or accumulate in aquatic organisms to levels that result in harmful concentrations in:
    a. Edible portions of fish, shellfish, or other aquatic life; or
    b. Wildlife that might consume aquatic life."

C-40. Antidegradation provisions are included in Env-Wq 1702 and Env-Wq 1708.

a. Env-Wq 1702.03 states that ""Antidegradation" means a provision of the water quality standards that maintains and protects existing water quality and uses."
b. Env-Wq 1708.02 states that "Antidegradation shall apply to: (a) Any proposed new or increased activity, including point source and nonpoint source discharges of pollutants, that would lower water quality or adversely affect the existing or designated uses; (b) Any proposed increase in loadings to a waterbody when the proposal is associated with existing activities; (c) Any increase in flow alteration over an existing alteration; and (d) Any hydrologic modifications, such as dam construction and water withdrawals."
c. Antidegradation applies to all parameters as evidenced by Env-Wq 1708.08 (Assessing Waterbodies) which states "The applicant shall characterize the existing water quality and determine if there is remaining assimilative capacity for each parameter in question."
d. According to Env-Wq 1708.03 (b), "A proposed discharge or activity shall not eliminate any existing uses or the water quality needed to maintain and protect those uses."
e. Env-Wq 1702.04 states that ""Assimilative capacity" means the amount of a pollutant or combination of pollutants that can safely be released to a waterbody without causing violations of applicable water quality criteria or negatively impacting uses."
f. Env-Wq 1708.08 describes the process for assessing waterbodies to determine if there is remaining assimilative capacity for each parameter in question.
g. Env-Wq 1708.09 titled "Significant or Insignificant Determination" states the following: "(a) Any discharge or activity that is projected to use 20% or more of the remaining assimilative capacity for a water quality parameter, in terms of either concentration or mass of pollutants, or volume or flow rate for water quantity, shall be considered a significant lowering of water quality.
(b) The department shall not approve a discharge or activity that will cause a significant lowering of water quality unless the applicant demonstrates, in accordance with Env-Wq

1708.10, that the proposed lowering of water quality is necessary to achieve important economic or social development in the area where the waterbody is located."

h. Env-Wq 1708.01(b)(1), in general, states that: For significant changes in water quality, where the quality of the surface waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the department finds, after full satisfaction of the intergovernmental coordination and public participation provisions and the analysis required by Env-Wq 1708.10, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the surface waters are located. In allowing such degradation or lower water quality, the department shall ensure water quality adequate to fully protect existing uses. Further, the department shall ensure that the highest statutory and regulatory requirements shall be achieved for all new and existing point sources and that all cost effective and reasonable best management practices for nonpoint source control shall be implemented.

i. Env-Wq 1708.01(b)(2) states the following: "The department shall not approve any proposed discharge or activity that might cause degradation or lower water quality, without such conditions as are necessary to ensure that: a. Water quality will be adequate to protect existing uses; b The highest statutory and regulatory requirements will be achieved for all new and existing point sources; and c All cost effective and reasonable best management practices for nonpoint source control will be implemented."

C-41. Env-Wq 1708.04 titled "Protection of Water Quality in ORW" states the following:

"(a) Surface waters of national forests and surface waters designated as natural under NH RSA 483:7-a, I, shall be considered outstanding resource waters (ORW).
(b) Subject to (c), below, water quality shall be maintained and protected in surface waters that constitute ORW.
(c) The department shall allow a limited point or nonpoint source discharge to an ORW only if:
  (1) The discharge will result in no more than temporary and short-term changes in water quality, wherein "temporary and short-term" means that degradation is limited to the shortest possible time;
  (2) The discharge will not permanently degrade water quality or result at any time in water quality lower than that necessary to protect the existing and designated uses in the ORW; and
  (3) All practical means of minimizing water quality degradation are implemented."

C-42. Env-Wq 1708.05 titled "Protection of Class A Waters" states the following:

"(a) As specified in RSA 485-A:8, I, discharges of sewage or waste to class A waters shall be prohibited.
(b) Proposed new or increased activities that the department determines do not involve the discharge of sewage or waste shall be reviewed in accordance with this part."

C-43. Env-Wq 1708.06 titled "Protection of Water Quality in High Quality Waters" states the following:

"(a) Subject to (b) through (d) below, high quality waters shall be maintained and protected.
(b) The department shall evaluate and authorize insignificant changes in water quality as specified in Env-Wq 1708.09.
(c) The department shall allow degradation of significant increments of water quality, as

determined in accordance with Env-Wq 1708.09, in high quality waters only if the applicant can demonstrate to the department, in accordance with Env-Wq 1708.10, that allowing the water quality degradation is necessary to accommodate important economic or social development in the area in which the receiving water is located.

(d) If the waterbody is Class A Water, the requirements of Env-Wq 1708.05 shall also apply."

C-44. Env-Wq 1708.12(a) states the ""transfer" means the intentional conveyance of water from one surface water to another surface water for the purpose of increasing volume of water available for withdrawal from the receiving surface water. The term does not include the transfer of stormwater, for the purpose of managing stormwater during construction, between basins created or otherwise lawfully used for stormwater detention or treatment, or both, and does not include the discharge of stormwater from a detention or treatment basin to a surface water."

C-45. The Salmon Falls River in the vicinity of the Project Activity is Class B. NH Chapter Law 1961, 40:1, X and 1967, 147:15.

Designated River, Water Use Registration and Reporting, and Water Conservation Plans

C-46. A "Designated River" is a river that is managed and protected for its outstanding natural and cultural resources in accordance with the Rivers Management and Protection Act (RSA 483).

C-47. Env-Wq 2102 includes requirements for Water Use Registration and Reporting (WURR).

C-48. NH RSA 485:61 regarding Rules for Water Conservation, states the following:

"I. The department shall adopt rules, pursuant to RSA 541-A, for water conservation practices for water users. These rules shall strike a reasonable balance between environmental, energy, and economic impacts and be consistent with current industry standards and practices for different types of water users.

II. The water conservation rules in paragraph I of this section shall apply to all new permit applicants and applications for water withdrawals subject to the provisions of RSA 485:3, RSA 485:48, RSA 485-C:21 and section 401 of the Clean Water Act.

III. Water conservation rules shall be consistent with applicable state or federal rules and regulations. Water Conservation Rules were adopted May 14, 2005 and currently codified as Env-Wq 2101."

C-49. Env-Wq 2101.24 entitled "Water Conservation Plan Required," states the following:

"(a) The applicants for approval of a source that would be a conservation source shall submit a water conservation plan that demonstrates compliance with the applicable provisions of Env-Wq 2101.05 through Env-Wq 2101.22 in accordance with the following:"

"(5) For a new withdrawal from a surface water associated with a project requiring a 401 Water Quality Certification, the water conservation plan shall be submitted prior to or in conjunction with the application for a 401 Water Quality Certification pursuant to Section 401 of the federal Clean Water Act;

(6) For a new withdrawal from a surface water that requires water quality certification pursuant to RSA 485-A:12, IV, the water conservation plan shall be submitted prior to or in conjunction with the certification request."

Env-Wq 2101.23, entitled Waivers, allows NHDES to grant waivers of certain provisions in Env-Wq 2101 provided the person requesting the waiver submits a written request to NHDES that includes the information specified in Env-Wq 2101.23(d).

Instream Flow Guidance

C-50. In 2010, NHDES published guidance (hereinafter called the 2010 instream flow guidance or 2010 ISF guidance) for estimating instream flow requirements for the protection of aquatic life.

CWA Section 303(d) List, TMDLs and Requirements for Impaired Waters

C-51. Section 303(d) of the Clean Water Act (33 U.S.C. 1313(d)) and the regulations promulgated thereunder (40 C.F.R. 130.0 – 40 C.F.R. 130.11) require states to identify and list surface waters that are violating state water quality standards (i.e., Section 303(d) List) that do not have an approved Total Maximum Daily Load (TMDL) for the pollutants causing impairment. For these water quality-impaired waters, states must establish TMDLs for the pollutants causing the impairments and submit the list of impaired surface waters and TMDLs to the U.S. Environmental Protection Agency (EPA) for approval. TMDLs include source identification, determination of the allowable load and pollutant reductions (by source) necessary to meet the allowable load. Once a TMDL is conducted, the pollutant/surface water is transferred to the list of impaired waters with approved TMDLs (known as Category 4A waters). The Section 303(d) List is, therefore, a subset of all impaired waters. The most recent Section 303(d) list of impaired waters submitted to EPA is the 2018 Section 303(d) List. A list of all impaired waters is available through the NHDES website.

C-52. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters.

C-53. On September 21, 2010, EPA approved the Statewide Bacteria TMDL for 394 surface waters listed as impaired on the 2008 303(d) List of impaired waters.

C-54. On November 22, 1999, EPA approved A Phased TMDL For the Salmon Falls River Watershed Use Attainability Analysis for the Lower Salmon Falls River May 1999 by the Maine Department of Environmental Protection.

C-55. When a surface water does not meet water quality standards (i.e., when it is impaired), Env-Wq 1703.01 (b) (see Fact C-27) states that "All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters." Further, the addition of pollutants causing or contributing to impairment should be avoided as indicated in the following regulation and statute:

> Env-Wq 1703.03 (a) (see Fact C-28) states that "The presence of pollutants in the surface waters shall not justify further introduction of pollutants from point or nonpoint sources, alone or in any combination."
>
> NH RSA 485-A:12 (I) (Enforcement of Classification) states that "After adoption of a given classification for a stream, lake, pond, tidal water, or section of such water, the department shall enforce such classification by appropriate action in the courts of the state, and it shall be unlawful for any person or persons to dispose of any sewage, industrial, or other wastes,

either alone or in conjunction with any other person or persons, in such a manner as will lower the quality of the waters of the stream, lake, pond, tidal water, or section of such water below the minimum requirements of the adopted classification."

Section 401 Water Quality Certification Application and Other Relevant Information

C-56. On April 30, 2020, and pursuant to 18 CFR Section 4.61, the Applicant filed with the Federal Energy Regulatory Commission (FERC) an Application for a Subsequent License for Minor Water Power Project for the Lower Great Falls Hydroelectric Project, FERC No. 4451 (also referred to herein as the Final License Application or FLA) [8].

C-57. On April 6, 2021, the Applicant filed an "Offer of Settlement"[9] with FERC that consisted of the Settlement Agreement for Prescription for Fishways for American Shad and River Herring ("LGF Settlement Agreement"), executed by and between the Applicant and U.S. Department of Interior, Fish and Wildlife Service ("USFWS"), and an accompanying Explanatory Statement.

C-58. On April 14, 2021, the U.S. Department of Interior (USDI) through the U.S. Fish and Wildlife Service (USFWS) filed comments, recommendations and prescriptions [10] for the Activity with FERC to prevent loss of, or damage to, fish and wildlife resources. The document includes the USFWS' Federal Power Act (FPA) Section 10(j) recommendations [11] (16 U.S.C. § 803) and the USFWS' preliminary fishway prescriptions in accordance with the Section 18 of the FPA[12] (16 U.S.C. §811). Section 10(j)

C-59. On April 16, 2021, the U.S. Department of Interior through the U.S. Fish and Wildlife Service (USFWS) filed "Preliminary Prescription for Fishways Pursuant to Section 18 of the Federal Power Act" [13], 16 U.S.C. §811 which states in part "…the Commission shall require the construction, maintenance and operation by a licensee at its own expense of… such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior".

C-60. On April 6, 2021, the New Hampshire Department of Environmental Services (NHDES) received an application for a CWA Section 401 water quality certification (WQC) for the Activity (aka, certification application or certification request)[14]. The certification application included the following:

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[8] Final License Application: FERC Accession No. 20200430-5032.
[9] Offer of Settlement: FERC Accession No. 20210406-6199.
[10] USFWS Section 10(j) recommendations and Section 18 preliminary fishway prescriptions: FERC Accession Number 20200414-5060.
[11] Section 10(j) of the FPA requires FERC to consider federal and state fish and wildlife agency recommendations pursuant to the Fish and Wildlife Coordination Act to protect, mitigate damages to, and enhance fish and wildlife resources. "That in order to adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat) affected by the development, operation, and management of the project, each license issued under this Part shall include conditions for such protection, mitigation, and enhancement. Subject to paragraph (2), such conditions shall be based on recommendations received pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) from the National Marine Fisheries Service, the United States Fish and Wildlife Service, and State fish and wildlife agencies". FERC can alter or reject Section 10(j) recommendations by following prescribed procedures in Section 10(j)(2).
[12] Section 18 of the FPA authorizes the USFWS or NMFS to prescribe upstream and downstream fishway passage requirements. "The Commission shall require the construction, maintenance, and operation by a licensee at its own expense of such lights and signals as may be directed by the Secretary of the Department in which the Coast Guard is operating, and such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate". Section 18 fishway prescriptions are mandatory; FERC cannot alter them.
[13] USFWS FPA Section 18 Preliminary Fishway Prescription: FERC Accession No. 20210416-5084.
[14] 401 WQC Application: FERC Accession No. 20210406-6188.

Attachment 1 - Responses to Additional Submittal Information
Attachment 2 - Names and Addresses of Adjoining Riparian or Littoral Abutters based on Available Tax Mapping
Attachment 3 - Final License Application (Volume 1)
Attachment 4 - Final License Application (Volume 2)
Attachment 5 - Final License Application (Volume 3)
Attachment 6 - Response to FERC Additional Information Request, October 13, 2020
Attachment 7 - Response to NHDES and MDEP Comments on the Water Quality Monitoring Initial Study Report, June 27, 2019
Attachment 8 - WQC Addendum: § 121.5 Certification Request

The record for this certification decision includes the information provided in the certification application as well as information filed with FERC for this relicensing through February 8, 2022.

C-61. On April 21, 2021, FERC issued a "Notice of Waiver Period for Water Quality Certification Application" which stated that if NHDES did not act on the certification application by April 7, 2022, NHDES' certifying authority would be deemed waived pursuant to section 401(a)(1) of the Clean Water Act, 33 U.S.C. § 1341(a)(1) [15].

C-62. Natural Resource Agencies include, but are not limited to, NHDES, NHFGD, USFWS of USDI, NMFS of the NOAA, MEDEP, MDMR and MEDIFW as defined in footnote 16.

C-63. NHDES issued a draft section 401 Water Quality Certification for public comment from February 18, 2022 to 4 p.m. on March 24, 2022.

D. FINDINGS

D-1. The Applicant has submitted an Application for a Subsequent License for Minor Water Power Project for the Lower Great Falls Hydroelectric Project, FERC No. 4451(also referred to herein as the Final License Application or FLA) to the Federal Energy Regulatory Commission (FERC) (see Fact C-56).

D-2. The Applicant has submitted a request to NHDES for a Clean Water Act (CWA) Section 401 water quality certification (aka, WQC or certification) (see Fact C-60).

Existing and Proposed Project Facilities and Operation

D-3. *Background:*

The Lower Great Falls Project is located on the Salmon Falls River in Strafford County, New Hampshire and York County, Maine. The majority of the infrastructure including the intake, penstock and powerhouse is located within the City of Somersworth, New Hampshire. The left abutment is located in the Town of Berwick, Maine. The Project dam is located at approximately river mile 3.1 and is the third dam on the mainstem of the Salmon Falls River. At the Project dam, the total drainage area is

[15] Date to act on certification application: FERC Accession No. 20210421-3010

[16] NHDES means New Hampshire Department of Environmental Services; NHFGD means New Hampshire Fish and Game Department; USFWS means United States Fish and Wildlife Service of the US Department of Interior (USDI); NMFS means National Marine Fisheries Service of the National Oceanic and Atmospheric Administration (NOAA); MEDEP means the Maine Department of Environmental Protection; MDMR means Maine Department of Marine Resources; and MEDIFW means the Maine Department of Inland Fisheries and Wildlife.

approximately 220 square miles, which is about 93.2% of the Salmon Falls watershed which extends into Maine and New Hampshire. The Salmon Falls River begins at Great East Lake and flows south-southwest for approximately 38 miles along the border between Maine and New Hampshire which is the approximate middle of the river. The Salmon Falls River and the Cocheco River join in Dover, New Hampshire, approximately 4.9 miles downstream from the Project, to form the Piscataqua River. The Piscataqua River flows for approximately 10.5 miles before reaching Portsmouth Harbor, which empties into the Gulf of Maine. The median annual inflow at the Project is approximately 214 to 277 cfs depending on the U.S. Geological Survey (USGS) gages used in the analysis (from page A-11 in the FLA - see Fact C-56).

D-4. *Existing Project Facilities (from Fact C-56):*

a. *Dam:* An approximate 32-foot-high stone and masonry dam that has a total length of 297 feet (consisting of a 50-foot long left abutment, a 176-foot long spillway section, and a 71-foot long right abutment), a spillway with a crest elevation of 102.4 feet, NGVD 29 and 4-foot high wooden flashboards with steel pins, resulting in a normal pond elevation of 106.4 feet, NGVD 29, at the top of the flashboards; two 8-foot- wide by 8-foot-high low level outlet gates, one of which is operational, with sill elevations of 84.9 feet, NGVD 1929 that control flow into two 7-foot diameter bypass pipes that are operated manually by a hydraulic unit mounted to the gate structure that is run by a dedicated portable generator; two (12-inch and 4-inch diameter) pipes located at the base of the Project dam at an approximate invert elevation of 75.0 feet, NGVD 29 that are left open and cannot be currently regulated; and a 5.25-feet-wide by 4-feet-high trash gate with a sill elevation of 102.4 feet, NGVD 29 that is located adjacent to the intake structure with a manually operated screw stem operator that is typically used to sluice debris and is also opened when the impoundment level rises approximately 10-inches above the flashboards during high flow periods.
b. *Impoundment:* An impoundment that extends approximately 1.1 miles upstream of the Project dam with a gross volume of 584 acre-feet an approximate surface area of 40 acres at the normal pond elevation of 106.4 feet, NGVD 29 and a maximum depth of approximately 20 feet.
c. *Intake Works*: A 40.5-foot wide by 20-foot-high concrete intake structure with a wooden-deck that includes four (4) steel frame gates with a sloping steel trashrack with 2-inch bar spacing; two (2) pairs of 5-foot-wide by 10.5-foot-high gates with a sill elevation of 92.0 feet that control flow to each penstock and are hand operated with a chain hoist suspended from a monorail.
d. *Penstocks:* Two buried penstocks that extend approximately 200-225 feet from the intake structure to the powerhouse. At the intake structure both penstocks have an 8.5-foot diameter. The left penstock bifurcates approximately 120 feet downstream of the intake structure into a 5-foot-4-inch diameter penstock (Unit 4) and a 7-foot-7-inch penstock (Unit 3), both with lengths of 85 feet. The right penstock bifurcates approximately 140 feet downstream of the intake structure into a 7-foot diameter penstock (Unit 2) and a 7-foot-7-inch diameter penstock (Unit 1), both with lengths of 85 feet.
e. *Powerhouse:* A 30-foot by 46-foot concrete and brick powerhouse with a wood frame superstructure that is located approximately 250 feet downstream of the Project dam and includes the 4 vertical James Leffel Co. Type “F” Francis turbines, generators, controls, and station switchgear. The minimum and maximum hydraulic capacities of turbines are 60 cfs and 199 cfs per unit respectively for turbines 1 and 3 and 60 cfs and 152 cfs per unit respectively for turbines 2 and 4. The full range of hydraulic capacity is therefore 60 cfs to 702 cfs.
f. *Tailrace:* An approximate 55-feet- wide and 30-feet- long tailrace.
g. *Bypass Reach:* An approximate 250-foot-long bypass reach that extends between the dam and the tailrace.
h. *Transmission Line:* a 26-foot-long underground transmission line that stretches to an Eversource

Energy pole-mounted air break.

D-5. *Existing Project Operation (from Fact C-56):*

The Project has a generating capacity of 1.28 MW and is operated in automatic mode as a run-of-river facility with no storage or flood control capacity. A pond level sensor is installed near the intake to monitor and ensure the Project impoundment is maintained at the flashboard crest elevation of 106.4 feet (NGVD 29) and to regulate the turbine operation. When inflow is within the hydraulic capacity of the turbines (60 to 702 cfs), and the Project is generating, the pond level control system limits the impoundment fluctuations to approximately 0.5 feet (see pages A-24 to A-34 in Fact C-56). Based on the annual flow duration curves on pages E-72 and E-77 in Fact C-56*)*, the Project can generate power approximately 65 to 70 percent of the year while passing just the minimum required flow in the bypass reach (discussed next).

The Project maintains a continuous minimum flow of 6.05 cfs or inflow, whichever is less, in the bypass reach. The minimum flow is passed via the two (12-inch and 4-inch diameter) pipes located at the base of the Project dam.

The Project is operated under an average head of 32 feet, which includes 4-foot flashboards. The flashboards on the spillway crest are constructed of wood and held in place with steel pins. Flashboards are typically replaced as-needed after high-flow events. During installation/repair of the spillway flashboards, the Project impoundment is temporarily drawn down by increasing generation flows above inflow rates, during a time when streamflow conditions allow. The impoundment is lowered just below the permanent spillway crest (elevation 102.3 feet, NGVD 29) to allow operations personnel to safely work on the spillway crest. Flashboards and pins are then repaired or replaced as needed. When restoring the elevation of the impoundment, the Applicant typically passes the majority of inflow (approximately 90% of total flow) as generation flow through the Project turbines, allowing the impoundment to slowly rise and prevent dewatering of the river reach below the dam, as the remaining 10% of inflow is used to refill the impoundment. Under normal flow conditions, it typically requires 18 to 24 hours to refill the impoundment. During these temporary drawdowns, the bypass minimum flow is maintained by the aforementioned discharge pipes located at the base of the dam. From 2005 through 2019 (15 years), the flashboards failed one to five times per year for a total of 29 times (an average of approximately two times per year (Table A.1.3.1-1 in *Fact C-56)*. During this period, it took a total of 1241 days (an average and median of approximately 43 and 14 days per year respectively) to repair the flashboards.

When Project inflow exceeds the maximum hydraulic capacity of the Project (702 cfs), the impoundment level is allowed to rise over the flashboard crest to pass the excess inflow, as needed. When water rises to approximately 10-inches above the flashboard crest, the trash sluice and low level outlet gate are operated to help regulate the Project impoundment level, as needed, to avoid damage to the flashboards, if possible.

D-6. *Applicant's Proposed Project Operation and Environmental Measures (from Fact C-56):* The Applicant proposes to do the following:

a. Continue to operate the Project in a run-of-river mode using automatic pond level control and maintain the Project impoundment water level at the flashboard crest elevation of 106.4 feet, NGVD 29, under typical operating and flow conditions;
b. release a minimum flow of 30 cfs or inflow, whichever is less, into the bypass channel below the Project upon the effective date of the subsequent FERC license;

c. except as noted in items (d) and (e) below, continue to pass a portion (10 cfs) of the proposed minimum bypass flow via the two (12-inch and 4-inch diameter) pipes located at the base of the Project dam, while the remaining portion (20 cfs) would be passed via a proposed cut-out in the flashboards on the right side of the spillway;
d. during the downstream migratory fish passage season for American Eel (i.e., September and October), pass the proposed minimum flow through the proposed downstream fish passage facility[17], and additional flow would be provided via the two pipes at the base of the dam, as flow through these pipes cannot be regulated;
e. during flashboard repair, pass the proposed minimum bypass flow via a combination of the two (12-inch and 4-inch diameter) pipes at the base of the dam (10 cfs) and the low level gate (20 cfs), which is described Finding D-4;
f. within 4 years of effective date of the subsequent FERC license, implement nighttime turbine shutdowns to enhance downstream passage of silver stage American eels by shutting turbines down from 8:00 pm to 4:00 am for three (3) consecutive nights following rain accumulations of 0.5 inches or more over a 24-hour period during the months of September and October;
g. conduct a two-season American Eel ramp siting study to be initiated in the first full passage season after the effective date of the subsequent FERC license;
h. install and operate (from May 1 to September 15 annually) an Upstream American Eel ramp within 4 years of the effective date of the subsequent FERC license;
i. install and operate a downstream fish passage structure within 4 years of the effective date of the subsequent FERC license; and
j. consult with the NH and ME State Historic Preservation Officer before beginning any land-disturbing activities or alterations to know historic structures within the Project boundary.

CWA Section 401 WQC Required

D-7. The Salmon Falls River is a water of the United States (see Facts C-8, C-9).

D-8. The Activity may include discharges from upstream of the Project dam to downstream of the dam including, but not limited to, through the turbines, various gates and/or over the dam spillway (see Fact C-7 and Findings D-4, D-5, and D-6).

D-9. Because the Activity may involve discharges (as that term is used in the CWA) to a water of the United States in New Hampshire, and because the Activity requires a federal license or permit, a CWA section 401 water quality certification (aka certification) is required from New Hampshire (see Findings D-1, D-2, D-7, and D-8).

D-10. The New Hampshire Department of Environmental Services (NHDES) is the authority (aka certifying authority) responsible for issuing CWA Section 401 water quality certifications in New Hampshire [18] (see Fact C-10).

State Authority for Certification Conditions, Modifications and Monitoring

D-11. RSA 485-A:12, III (Fact C-10) states the following: “Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the

[17] Based on current USFWS engineering design criteria, the flow through the downstream fish passage facility is reported to be approximately 35 cfs.
[18] Because the Project also discharges to Maine waters, it is NHDES’ understanding that MEDEP will also issue a CWA section 401 water quality certification.

proposed discharge complies with applicable surface water quality standards." Monitoring includes, but is not limited to, the following:

- monitoring to determine compliance with conditions in this certification;
- on-site inspections;
- development, submission and implementation of monitoring plans;
- analysis, preparation and submittal of reports summarizing monitoring results;
- notifying appropriate authorities in a timely manner when excursions from conditions in this certification occur; and
- uploading monitoring data into the NHDES Environmental Database (EMD) so that is readily accessible to the public and useable by NHDES for surface water quality assessments required by section 305(b) and 303(d) of the federal Clean Water Act.

Potential Environmental Impacts of Hydroelectric Projects

D-12. The following description of potential environmental impacts of hydroelectric projects is from a summary report of the 2010 summit meeting on Environmental Mitigation Technology for Hydropower [19]. "Although hydroelectric power plants have many advantages over other energy sources, they also have potential environmental impacts (Table 1). Most of the adverse impacts of dams are caused by habitat alterations. Reservoirs associated with large dams can inundate large areas of terrestrial and river habitat. Diverting water from the stream channel or curtailing reservoir releases in order to store water for future electrical generation can dry out streamside (riparian) vegetation. Insufficient water releases degrade habitat for fish and other aquatic organisms in the river below the dam. Water in a reservoir is stagnant compared to that in a free-flowing river. Consequently, water-borne sediments and nutrients can be trapped, resulting in the undesirable proliferation of algae and aquatic weeds (eutrophication) and a change in water quality in the reservoir and in reservoir releases. In some cases, water spilled from high dams may become supersaturated with nitrogen gas resulting in gas-bubble disease in aquatic organisms inhabiting the tailwaters. Hydropower projects can also affect aquatic organisms directly. The dam can block upstream movements of fish, which can have severe consequences for anadromous fish (e.g., salmon, steelhead, American shad), catadromous fish (e.g., American eels), or riverine fish that make seasonal migrations to spawn (e.g., sturgeon and paddlefish). Fish moving downstream may be drawn into the power plant intake flow (entrained). Entrained fish are exposed to physical stresses (pressure changes, shear, turbulence, strike) as they pass through the turbine that may cause disorientation, physiological stress, injury, or mortality."

Potentially Affected Surface Waters and Applicable Water Quality Standards

D-13. NHDES has assigned Assessment Unit (AU) identification numbers to many, but not all surface water waters in New Hampshire, with many surface waters divided into smaller segments based on their characteristics. AUs (where available) for surface waters located immediately upstream and downstream of the Activity are shown in the table below. Because these surface waters are located closest to the Activity, the designated uses (e.g., aquatic life integrity) in these surface waters have the most potential to be impacted by the Activity. It is possible, however, that other surface waters may also be affected by the Activity (e.g., flow alterations caused by the Activity may also affect aquatic habitat in river reaches further downstream, and lack of adequate fish passage can impact fish communities located further upstream and downstream).

[19] Environmental Mitigation Technology for Hydropower: Summary Report on Summit Meeting Convened by Oak Ridge National Laboratory, the National Hydropower Association, and the Hydropower Research Foundation. Washington, D.C. June 2-3, 2010. EMTSSummit4.pdf (hydro.org)

Assessment Unit ID	Description
NHIMP600030406-03	Salmon Falls River – Lower Great Falls Dam impoundment
NHRIV600030406-03	Salmon Falls River - riverine segment immediately downstream of Lower Great Falls Dam
	Unnamed wetlands along the riverbanks of each of the above Assessment Units.

D-14. New Hampshire surface water quality standards are summarized in Facts C-11 through C-45 and apply to all New Hampshire surface waters as defined in Fact C-14, including the potentially affected surface waters identified in Finding D-13.

D-15. The potentially affected surface waters (see Finding D-13) are classified as Class B (see Fact C-45).

D-16. The goal of Class A and B surface waters is to support the designated uses defined in Env-Wq 1702.17, which include swimming and recreation in and on the water, fish consumption, shellfish consumption (for tidal waters), aquatic life integrity, wildlife, and after adequate treatment as a water supply (see Fact C-21). Designated uses apply "…whether or not such uses are presently occurring" (Env-Wq 1702.17 – see Fact C-21).

D-17. The Activity is not within ¼ mile of a Designated River under the Designated Rivers Program (RSA 483, see Fact C-46). As such, the Activity is not within the jurisdiction of the Designated Rivers Program.

D-18. The surface waters in the vicinity of the Activity are not Outstanding Resource Waters (Env-Wq 1708.04, see Fact C-41)

D-19. The Salmon Falls River is a warmwater fishery with diadromous fish, however, the NHFGD does stock trout upstream of the Milton Three Ponds Dam[20], which is upstream of the Project.

Rare, Threatened and Endangered Species

D-20. Table E.6.1.2-1 beginning on page E-130 of the FLA (see Fact C-56) lists the federal and state rare, threatened and endangered species found in the Project region as well as species of special concern in New Hampshire and Maine.

Federal Rare, Threatened and Endangered Species: Based on the USFWS' ECOS-IPaC website[21], the USFWS reported the following three federally threatened species in its FPA Section 10(j) recommendation letter (see Fact C-58): The northern long-eared bat (NLEB; *Myotis septentrionalis*), red knot (*Calidris canutus rufa*), and the small whorled pogonia (*Isotria medeoloides*). The USFWS's Section 10(j) recommendations include conditions to protect the these federally threatened species (see Fact C-58).

State Rare, Threatened and Endangered Species: The following is from the Applicant's FLA, page E-128 (see Fact C-56).

> "Within the town of Somersworth, NH, five state endangered or threatened plant species have been recorded (NHNHB, 2018). Only one of these species, northern blazing star (*Liatris novae-*

[20] Email from NHFGD staff on April 13, 2020.
[21] USFWS ECOS-IPaC website https://ecos.fws.gov/ipac/

angliae var. novaeangliae) has been documented within the last twenty years. In addition, the New Hampshire Natural Heritage Bureau (NHNHB), upon request, performs data checks on known locations of rare species and exemplary natural communities for use in project planning and permitting. A NHNHB data check (personal correspondence, A. Lamb, October 5, 2016) of the Project's vicinity indicates that one endangered species have been historically recorded in the area, northern beggar ticks (*Bidens hyperborea*), a NH-endangered plant. The species is not federally listed.

NHNHB reported that the only record of northern beggar-ticks in this area was on September 22, 1923. This plant is associated with tidal areas, and the specimen was collected on the tidal shores of the Salmon Falls River. There is no evidence that tidal habitat was historically present within the Project area and tidal habitat is not present now. During consultation with NHNHB regarding the Rollinsford Hydroelectric Project, located downstream, NHNHB determined that their location records for this plant were not accurate and did not request that the Applicant study northern beggar-ticks habitat or occurrence further (personal communication, A. Lamb, January 31, 2017). The NHFGD and MDIFW also provided information on state-listed endangered, threatened, and special concern species in their respective states (G. Normandeau, NHNHB, personal communication, January 27, 2017; J. Maclaine, MDIFW, personal communication, January 17, 2017). Table E.6.1.2-1 details federal and state-listed species that may occur within the Project vicinity, based on agency consultation and available data."

Conditions E-10 through E-16 of this certification and the USFWS's Section 10(j) recommendations are expected to provide adequate protection for all aquatic species, including, but not limited to, federal and state rare, threatened and endangered species.

Water Chemistry

D-21. *Current surface water quality assessment*: According to the 2018 305(b)/303(d) lists of impaired waters (see Fact C-51), the following surface waters in the vicinity of the proposed Activity are listed as impaired. All impairments, with the exception of those highlighted in bold (which have approved TMDLs) and "Non-native Aquatic Plants," are on the Section 303(d) List. It should be noted that this assessment did not account for water quality monitoring conducted in 2018 for the Project (see Findings D-22 through D-33) as Project data was not input into the NHDES Environmental Monitoring Database (EMD) until May, 2021.

Assessment Unit (AU)	**Waterbody Name**	**Cause of Impairment (Designated Use Impaired)**
NHIMP600030406-03	Salmon Falls River – Lower Great Falls Dam impoundment	Non-native Aquatic Plants (AL) **Mercury (FC)** **Escherichia coli (PCR)**
NHRIV600030406-03	Salmon Falls River - riverine segment immediately downstream of Lower Great Falls Dam	Non-native Aquatic Plants (AL) pH (AL) **Mercury (FC)**
Notes: AL = Aquatic Life, PCR = Primary Recreation, SCR = Secondary Recreation, FC = Fish Consumption, SFC = Shellfish Consumption Impairments highlighted in bold have approved TMDLs. All other impairments are on the Section 303(d) List. All fresh surface waters are impaired mercury due to elevated levels of mercury in fish tissue which has resulted in statewide fish consumption advisory.		

When a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment should be avoided (see Fact C-55). As noted in the table above, all fresh surface waters in New Hampshire are impaired for mercury due to concentrations found in fish tissue which have resulted in a statewide fish consumption advisory. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters (see Fact C-52). The primary source of mercury addressed in the TMDL is atmospheric deposition from in-state and out-of-state emissions. Atmospheric deposition from in-state and out-of-state emissions of fossil fuel byproducts can also cause low pH in rain (aka, acid rain) which can contribute to pH violations in surface waters. Other pollutant sources can also impact mercury concentrations and pH in surface waters. For example, excursions of pH criteria (see Fact C-37) can also be caused by excessive algal and/or macrophyte plant growth which can lead to increases in pH due to the uptake of carbon dioxide during photosynthesis and reductions in pH at night due to respiration and the release of carbon dioxide. On September 21, 2010, EPA approved the Statewide Bacteria TMDL for 394 surface waters, which included the Lower Great Falls impoundment (see Fact C-53). Sources of bacteria can be natural (e.g., waterfowl, wildlife) and non-natural (e.g., from anthropogenic sources such as stormwater runoff from agricultural and urbanized land uses). Finding D-34 discusses the Salmon Falls River TMDL that was primarily conducted to address dissolved oxygen and chlorophyll-a impairments in the Salmon Falls River. Finding D-55 discusses the non-native aquatic plants impairments of the surface waters impacted by the Project

D-22. From July 6, 2018 to September 25, 2018, the Applicant conducted a Water Quality Study that was requested by NHDES. The goals of the study were to 1) determine if the Project is impacting water quality in the Salmon Falls River upstream and downstream of the Project dam, and 2) to determine compliance with New Hampshire (and Maine) surface water quality standards. The objectives of the study were to 1) collect water temperature, dissolved oxygen, and pH in the Project impoundment as well as chlorophyll-a, nutrients, vertical temperature and dissolved oxygen profiles and Secchi disk data, and 2) collect continuous water temperature and dissolved oxygen (DO) and discrete samples of pH upstream of the Project impoundment and downstream of the Project dam. All objectives were to be conducted under various river flow, river temperature and Project operation conditions that included, but was not limited to, low flow and relatively high water temperatures.

D-23. Compared to long-term averages from 1981 to 2010, monthly averages in July, August and September 2018 were, respectively, 1.4°C, 2.5°C, and 2.1°C warmer than normal and had, respectively, 0.81, 0.93 and 0.70 more inches of rain than normal. Prorated river flow was predominantly below the long-term median daily flow in July and September and was predominantly above the long-term median flow in August [22].

D-24. Continuous measurements of Total Project inflow (see Figure 3.1.2-1 in the Water Quality (WQ) report included in the FLA (see Fact C-56)) was estimated by combining estimated turbine flow to estimated bypass reach flow. Turbine flow and bypass reach flow were calculated as follows:

- Turbine Flow was determined by relationship between turbine wicket gate opening (%) of each unit, (which is recorded at the Project) and flow. Note that an estimated 10 cfs of leakage was assumed through each of the two turbine units during non-generation periods. [23]

[22] Prorated flow statistics for the Project were determined by multiplying the daily average flows measured at the NHDES/USGS gage on the Salmon Falls River near Milton, NH (No. 01072100) for the period 1968-2005, by the drainage are at the Project (220 square miles) and dividing the result by the gage drainage area (108 square miles)

[23] GMP visually estimated that approximately 10 cfs leaks from the open penstock past the wicket gates of each of the

- Bypass Flow was calculated with rating curves that were developed from water stage recorder data (installed in the bypass reach from 6/21/18 to 10/23/18 to record in 15-minute intervals) and several streamflow measurements.

D-25. During the NHDES requested portion of the water quality study (July 6 to September 25, 2018), the lowest estimated total Project inflow based on the continuous measurements of turbine and bypass flow described above was approximately 22 cfs on September 2, and the highest estimated total Project inflow was approximately 537 cfs on August 5. For comparison, the lowest prorated daily estimated flow from the Milton Salmon Falls River gage was approximately 24 cfs between September 5 and September 8 and the highest prorated flow was approximately 470 cfs on August 5. To put this in perspective with regards to low flow, the 7Q10 low flow[24] in the vicinity of the Activity is estimated to be approximately 28.7 cfs based on the 1999 Salmon Falls River TMDL (Fact C-54). The study therefore captured river flows that were close to the estimated 7Q10 low flow.

D-26. During the water quality study only two of the four turbines were operable. Therefore, the effective maximum turbine hydraulic capacity during the study was 351 cfs, which is 50 percent of the total Project turbine hydraulic capacity of 702 cfs with all four turbines operating. Based on data provided by the Applicant on June 27, 2019, the minimum, maximum, average, median, and the 75th, 80th, 90th and 95th percentile bypass flow, turbine flow, inflow, impoundment elevation and total generation during the study are provided in the table below. As shown, the median turbine flow was 20.4 cfs, the maximum was approximately 325 cfs and 95 percent of the turbine flows were less than 209 cfs which are all well less than the maximum turbine hydraulic capacity of 702 cfs.

Statistic	Bypass Flow (cfs)	Total Turbine Flow (cfs)	Total Estimated Inflow (cfs)	Impoundment Elevation (ft, msl Datum)	Total Generation (kW)
Minimum	2.2	20.0	22.2	103.44	0
Maximum	496.8	325.3	628.4	106.31	612
Average	20.1	80.3	100.4	104.67	113
Median	7.6	20.4	62.8	104.65	17
75th percentile	19.8	138.2	149.3	105.01	211
80th percentile	27.2	139.4	162.2	105.07	216
90th percentile	42.8	156.0	205.6	105.31	241
95th percentile	80.0	209.0	288.5	105.53	401

D-27. Water quality monitoring was conducted in the upstream portion of the impoundment (site LGF-1), at the deep spot in the impoundment (site LGF-2), in the bypass channel (site LGF-3) and in the tailrace (site LGF-4). Monitoring did not occur in the riverine section just upstream of the impoundment[25] in a segment that was not influenced by the Project as originally intended. Consequently, a determination of how the Project impacts the quality of the Salmon Falls River as it enters Project influenced waters could

two functioning units (i.e., approximately 20 cfs leakage total) into the tailrace during periods of non-generation. The second penstock, currently in disrepair, leading to the two remaining units, was completely dewatered and sealed by the intake headgate during the 2018 Water Quality Study; thus, no leakage occurred at those units.

[24] The 7Q10 low flow is the average seven -day low flow that occurs, on average, once every ten years.

[25] Based on Figure 2.1-1 of the Water Quality Study report included in the FLA (see Fact C-56), the riverine section is estimated to begin approximately 800 feet upstream of LGF-1.

be estimated (based on results at LGF-1), but not definitively made.

D-28. Some of the DO and pH results could not be confirmed because records were either not made or not found for handheld meter post calibration verification on several occasions (Table 4.1-1 and 4.1-2 in the WQ report included in the FLA - see Fact C-56).

D-29. Continuous water temperature measurements collected during the Water Quality Study are summarized in the table below. As indicated, the study captured periods of relatively high water temperatures (i.e., generally considered to be water temperatures of 25 degrees Celsius (°C) or higher). Based on Figures 3.2.1.2-1a through Figures 3.2.1.2-1d in the WQ report included in the FLA (see Fact C-56), water temperature generally increased as flow decreased.

Temperature (°C)

Location	Minimum	Maximum	Average
Upper Impoundment (LGF-1)	16.2°C	28.2°C	23.1°C
Lower Impoundment (LGF-2)	17.2°C	27.3°C	22.3°C
Bypass Reach (LGF-3)	16.7°C	29.0°C	23.7°C
Tailrace (LGF-4)	17.1°C	28.8°C	23.5°C

D-30. A total of 10 water temperature and DO vertical profiles were collected during a 5-week period in the deep spot of the lower impoundment (LFG-2) from mid-July to mid-August. Each profile showed conditions of summer stratification, which often coincided with lower DO. Total water depth was approximately 5.5 to 6 meters. DO was greater than 5 mg/L in the upper 2.5 meters and dropped below 1 mg/L at depths below approximately 4 meters (from Figure 3.2.2-1 in the WQ report included in the FLA -see Fact C-56).

D-31. Continuous DO measurements collected during the Water Quality Study are summarized in the table below. As shown, DO occasionally fell below the 5 mg/L instantaneous minimum concentration criterion in the impoundment (LGF-2) and below the minimum 75 percent saturation daily average criterion in the impoundment (LGF-2) and bypass reach (LGF-3). The upper impoundment (LGF-1) and tailrace (LGF-4) did not exhibit any excursions of New Hampshire's DO criterion. All DO excursions occurred when the project was not generating, water temperatures were relatively high and river flows were relatively low (Figures 3.2.1.1-1a through 3.2.1.1-1d and Figures 3.2.1.1-2a through 3.2.1.1-2d in the FLA - see Fact C-56).

The single day when DO was below the 75% daily average criterion in the bypass (LGF-3) occurred on September 10 which was at the end of the September low flow period (September 1 - 10) when inflows was near the 7Q10 low flow and when water temperatures were between approximately 22.5°C to 24°C. After September 10, water temperature dropped to approximately 18°C by September 14. In the impoundment (LGF-2), daily DO averages were less than 75% saturation on September 8-10 (at the end of the 10- day low flow period), and all recorded DO concentrations below the instantaneous water quality standard of 5 mg/L occurred between September 8th and 9th when daily flows were approximately 24 and 25 cfs respectively.

As shown in the tables below, no continuous DO data was collected in July at LGF-2 due to instrument malfunction. According to page 21 of the Water Quality report in the FLA (see Fact C-56), "… although the data collection period was extended beyond the initial time-frame (i.e., July to mid-August) by 5 weeks, through to September 25th, the full extent of NH water quality violations may not have been captured. The 36 days of missing data would have been recorded during warmer summer months, and

as shown in Figure 3.1.2-1, average daily flows were also low for a longer period of time in July than in September (by 5 days). DO violations may have been found to be more significant in the impoundment had the July data been viable."

Dissolved Oxygen (mg/L)

Location	NH Water Quality Criterion	Minimum	Maximum	Excursions of NH Water Quality Criterion
Upper Impoundment (LGF-1)	≥ 5	7.6	10.1	None
Lower Impoundment (LGF-2)		3.6	9.6	24 of 3,824 values or 0.6% (Note: no data was collected on 42 days from 7/6/18-8/1/18 and 8/15/18 to 8/31/18 due to instrument malfunction)
Bypass Reach (LGF-3)		5.5	10.3	None
Tailrace (LGF-4)		6.5	9.8	None

Dissolved Oxygen (Daily Average Percent Saturation)

Location	NH Water Quality Criterion	Minimum	Maximum	Excursions of NH Water Quality Criterion
Upper Impoundment (LGF-1)	≥ 75	94.0	105.9	None
Lower Impoundment (LGF-2)		65.3	99.6	3 out of 38 days (no data was collected on 42 days from 7/6/18-7/31/18 and 8/15/18 to 8/31/18)
Bypass Reach (LGF-3)		71.6	101.0	1 day out of 82 days
Tailrace (LGF-4)		77.9	102.0	None

D-32. Continuous pH measurements at LGF-2 and 13 discrete pH measurements at LGF-1, LGF-3 and LGF-4 during the Water Quality Study are summarized in the table below. As shown in the table below, there were no excursions of the New Hampshire pH water quality criteria.

pH (pH units)

Location	NH Water Quality Criterion	Minimum	Maximum	Excursions of NH Water Quality Criterion
Upper Impoundment (LGF-1)	6.5 to 8.0	7.0	7.6	None
Lower Impoundment (LGF-2)		6.5	7.3	None
Bypass Reach (LGF-3)		6.8	7.5	None
Tailrace (LGF-4)		6.8	7.7	None

D-33. Ten samples of nutrients and chlorophyll-a were taken twice per week for 5 weeks in the impoundment (LGF-2). Secchi disk readings were also taken at the same days. Results are summarized in the table below. There were no excursions of New Hampshire's numeric chlorophyll-a threshold for recreation

(15 ug/L) specified in the NHDES Consolidated Assessment and Listing Methodology for recreation (see Fact C-36).

Statistic	Total Kjeldahl Nitrogen (ug/L)	Nitrite + Nitrate Nitrogen (ug/L)	Total Phosphorus 25% depth or mid-epilimnion (ug/L)	Total Phosphorus Mid-hypolimnion (ug/L)	Chlorphyll-a (ug/L)	Secchi Disk (meters)
Minimum	0.4	0.07	19	4	2	1.7
Maxmum	0.5	0.37	40	81	10	2.8
Average	0.5	0.22	25	26	4	2.3
Mean	0.5	0.20	22	19	4	2.3

D-34. The 1999 Salmon Falls River TMDL (SFR TMDL) (Fact C-54) set allowable loadings for ammonia-nitrogen, biochemical oxygen demand (BOD), and total phosphorus (TP) to address dissolved oxygen impairment and nutrient related issues (e.g., algal blooms) in the river. The TMDL established wastewater treatment plant (WWTP) effluent limits for ammonia-nitrogen, BOD and TP for Milton, Somersworth and Rollinsford New Hampshire, and for Berwick and South Berwick Maine. The Milton WWTP is located approximately 16.6 miles upstream of the Lower Great Falls dam. Both the Berwick and Somersworth WWTPs discharge below the Lower Great Falls dam and into the Rollinsford dam impoundment. The Rollinsford WWTP discharges to the South Berwick dam impoundment and effluent from the South Berwick WWTP discharges below the South Berwick dam (which is the head-of-tide dam).

D-35. The SFR TMDL, which is a phased TMDL, includes the following recommendations regarding re-evaluating the TMDL: “Re-evaluate 1st phase of TMDL after five years. If non-compliance of water quality standards continues to occur, modify TMDL. If compliance of standards occur, the phased TMDL becomes final.” Since 2006, FB Environmental Associates has been conducting seasonal (summer) compliance monitoring for the Phased SFR TMDL on behalf of the municipalities of Somersworth and Rollinsford, New Hampshire, and Berwick and South Berwick, Maine. No revisions to the TMDL have been made.

D-36. The SFR TMDL also includes the following recommendation regarding dam releases to improve DO during summer low flow periods: “It is recommended that dam operational changes be implemented as a method of improving dissolved oxygen in impoundment bottom areas for one round of licensing (five years) as the first phase of the TMDL. During low flow conditions, the lower three impoundments of the Salmon Falls (South Berwick, Rollinsford, and Lower Great Falls) do not generate power and typically spill water. Although the spilling of water improves river dissolved oxygen below each dam, the routing of water over surface layers probably enhances chemical stratification in these impoundments which ultimately results in lower dissolved oxygen levels in bottom areas. It is proposed that a bottom release in addition to a surface release at each dam be implemented. This should result in lower layer dissolved oxygen complying with established criteria. It is not desirable to have entirely bottom releases at each dam, since this could lead to lower dissolved oxygen levels below each dam.”

As reported above, the Project impoundment does stratify in the summer (see Finding D-30) and there have been occasional excursions of New Hampshire’s DO criteria in the Project impoundment and

bypass reach (Finding D-31). The DO excursions occurred during low flows when the Project was not generating power. As reported in Finding D-5, the Project currently releases approximately 6 cfs to the bypass reach through two (12-inch and 4-inch diameter) pipes located at the base of the Project dam.

D-37. The Project has altered the wetted natural river channel (deeper, wider) and associated discharge characteristics (slower, more stagnant) which makes the river more prone to adverse water quality impacts (Finding D-12). These alterations, combined with the effluent discharges containing nutrients and other pollutants from the upstream sources, has contributed to DO excursions of New Hampshire surface water quality standards in the Project impoundment and bypass reach during low flow conditions when the Project is not operating.

D-38. *Water Quality Improvement Plan (WQIP)*: As discussed above, the Project impoundment stratifies in the summer (see Finding D-30) and, based on the 2018 Water Quality Study, has resulted in occasional excursions of New Hampshire's DO criteria for the protection of the aquatic life designated use, in the Project impoundment as well as the bypass reach (Finding D-31). The DO excursions occurred during low flows when the Project was not generating power. Although the Project was not generating when the DO excursions occurred, the Project impoundment formed by the dam has resulted in a deeper, wider and slower moving section of the river that can stratify and is more prone to adverse water quality impacts such as low DO. It is possible that if the dam was not there, there would not have been DO excursions in the Project impoundment and bypass reach. This is supported by the fact that there were no DO excursions in the upper impoundment (LGF-2) (see Finding D-31). This is not to suggest that NHDES is advocating for the dam to removed, rather it is to make the point that the Project, even when not generating, can still be responsible for causing adverse changes in river water quality.

According to Env-Wq 1703.01(b), "[a]ll surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters" (see Fact C-27). Therefore, to address the DO excursions, and any other excursions in the Project influenced waters that may arise in the future, it is appropriate to require the Applicant to prepare and implement a WQIP. The goal of the WQIP would be to ensure Project influenced waters (i.e., the Project impoundment, bypass reach and tailrace) comply with New Hampshire surface water quality standards for parameters that can be influenced by the Project. If the riverine segment immediately upstream (and beyond the influence) of the Project impoundment is not meeting water quality standards, the goal of the WQIP would be to ensure that the water quality associated with those parameters in the Project influenced waters is not any worse than in the upstream riverine segment. Parameters that can be influenced by the Project would include, but not be limited to, DO, temperature, pH, nutrients, chlorophyll-a and secchi disk. The WQIP would include proposed measures to achieve these goals, a plan to monitor the effectiveness of the improvement measures as well as a schedule for implementing the measures, conducting monitoring, and submitting a report that includes a summary of the measures implemented, monitoring results (with supporting information) and recommendations for next steps. RSA 485-A:12, III authorizes water quality monitoring (see Finding D-11). Condition E-14 addresses this Finding.

D-39. *Long-Term Water Quality Monitoring and Reporting:* Results of the 2018 Water Quality Study conducted by the Applicant indicated dissolved oxygen excursions in the Project impoundment. To determine if dissolved oxygen excursions continue in the future, additional monitoring is necessary during the term of the license. This is because FERC licenses are typically issued for 30 to 50 years and, during that time, conditions in the watershed that could affect water quality in the Project impoundment and Project discharges to the tailrace and bypass reach, can change. For example, due to climate change "[w]armer summer temperatures will likely lead to an increase in drought (through increased evaporation, heat

waves, and more frequent and extreme convective precipitation events)."[26] An increase in the frequency and magnitude of lower river flows and higher temperatures could result in an increase in the frequency and magnitude of dissolved oxygen excursions and higher water temperatures. To determine the impact of the Project and Project discharges on these parameters in the future, and if New Hampshire surface water quality standards are met, additional monitoring is needed. Condition E-15 addresses this need. Inclusion of monitoring conditions is authorized by RSA 485-A:12, III (see Fact C-10) which states the following: "Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards" (see Finding D-11).

As indicated in Condition E-15, NHDES is requiring water quality monitoring in the Salmon Falls River be conducted every five years beginning the fifth year after the license for the Project is reissued by FERC and ending five years prior to the expiration of the reissued license. Every five years is considered a reasonable interval between monitoring periods to track water quality changes and is also the maximum age of data for rivers specified in the NHDES Consolidated Assessment and Listing Methodology (see Fact C-51) that can be used by NHDES to affirmatively assess a water as being supportive of a designated use (such as aquatic life integrity). Ending monitoring five years prior to the expiration of the reissued license is proposed because within five years of license expiration, the Applicant will likely be required to conduct additional water quality studies for the next license renewal in accordance with FERC regulations. Initiating long-term monitoring the fifth year after the license is reissued by FERC assumes little to no monitoring is conducted in the first five years. If monitoring is conducted in the first five years, and depending on what it entails, NHDES will consider extending the start date for long-term monitoring.

The purpose of the monitoring is to 1) determine the future effects of Project operation during the duration of the new license, both spatially and temporally (in terms of flow, impoundment elevation and power generation) on water temperature and dissolved oxygen (mg/L and percent saturation), 2) to compare results to New Hampshire surface water quality standards, and 3) to determine if additional changes in Project operation are necessary to comply with surface water quality standards.

In each year that monitoring is conducted, Condition E-15 requires submittal of a monitoring and reporting plan to NHDES for review and approval. This is so the plan can be updated (if necessary) to conform to NHDES' latest monitoring protocols and/or to any changes in dissolved oxygen or temperature surface water quality standards. Condition E-15 also includes some specifics of what the monitoring and reporting plan shall include which are very similar to the monitoring and reporting protocols used to by the Applicant to prepare the 2018 Water Quality Study included in the Final License Application (see Fact C-56). This includes submittal of data in a working spreadsheet and input of all data into the NHDES Environmental Monitoring Database (EMD) so the data is accessible to the public and is available for use by NHDES to conduct surface water quality assessments required every two years by the Sections 305(b) and 303(d) of the federal Clean Water Act.

If results indicate that water quality standard excursions persist, the Applicant is required to submit a new or updated Water Quality Improvements Plan (WQIP) (see Finding D-38 and Condition E-14) and to update the flow and impoundment level monitoring and compliance plan (FICMP) (see Finding D-46 and Condition E-12).

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[26] Wake, Cameron P.; Burakowski, Elizabeth A.; Wilkinson, Peter; Hayhoe, Katharine; Stoner, Anne; Keeley, C.; and LaBranche, Julie, "Climate Change in Southern New Hampshire: Past, Present and Future" (2014). The Sustainability Institute. 2. https://scholars.unh.edu/sustainability/

Flow / Impoundment Management

D-40. *Applicant's Proposal*: As discussed in Finding D-6, the Applicant proposes to (1) continue to operate the Project in a run-of-river mode using an automatic pond level control system, and maintain the impoundment at the flashboard crest elevation of 106.4 feet NGVD 29; and (2) provide a minimum flow release of 30 cfs, or inflow, whichever is less into the bypassed reach.

D-41. *Run-of-River:* In their Section 10(j) recommendations filed with FERC (see Fact C-58) the USFWS recommended "that the Project operate in an instantaneous run-of-river mode whereby inflow to the Project equals outflow from the Project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Licensee, or for short periods upon mutual agreement between the Licensee, the Service, the New Hampshire Department of Environmental Services (NHDES), New Hampshire Fish and Game Department (NHFGD), National Marine Fisheries Service (NMFS), the Maine Department of Environmental Protection (MEDEP), and the Maine Department of Inland Fisheries and Wildlife (MDIFW)."

NHDES concurs with the USFWS' Section 10(j) recommendation to operate the Project in an instantaneous run-of-river mode whereby outflow (i.e., discharges) from the Activity equals inflow on an instantaneous basis except during emergencies beyond the control of the Applicant and for short periods upon mutual agreement with the resource agencies. Operating in this manner will minimize impoundment fluctuations and maintain a more natural flow regime downstream of the tailrace, which will protect habitat for a variety of aquatic and riparian species and help ensure compliance with State surface water quality standards including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – see Fact C-38) and Env-Wq 1703.01(d) regarding maintaining surface water quantity (e.g., flow) at levels that protect existing uses and designated uses (see Fact C-27). Condition E-10.a addresses this Finding.

D-42. *Impoundment Water Level:* When the Project is generating and inflow is within the hydraulic operating range of the turbines (60 cfs to 702 cfs), plus the required minimum bypass flow of 6.05 cfs the Applicant currently maintains a relatively "stable pond" by keeping the impoundment near the top of the flashboards (elevation 106.4 feet NGVD 29). This is accomplished via an automated pond level control system which regulates the flow (discharge) through the turbines so that inflow equals outflow. When inflow is within the hydraulic capacity of the turbines (60 to 702 cfs) plus the minimum bypass flow of 6.05 cfs, and the Project is generating, the time series plots in the FLA (see pages A-24 to A-34 in Fact C-56) showing impoundment water surface elevation indicate the impoundment fluctuates no more than approximately 0.5 feet. Based on the annual flow duration curves on pages E-72 and E-77 of the FLA (see Fact C-56), this situation occurs approximately 65 to 70 percent of the year. When inflow is below the minimum hydraulic turbine capacity (60 cfs) flow is spilled over the dam and through the 12-inch and 4-inch pipes at the base of the dam with a relatively small increase in water level above the top of flashboards. When flow is above the maximum turbine hydraulic capacity (702 cfs) plus the minimum required bypass flow, the impoundment level is allowed to rise as needed, to pass the excess flow over the flashboards until other gates are opened to limit water level rise and damage to the flashboards (see Finding D-5). Flashboard failure can also cause impoundment fluctuations. As indicated in Finding D-5, from 2005 through 2019, the flashboards failed one to five times per year with an average of approximately two times per year. During this period, it took 1241 days (an average of approximately 43 days per year) to repair the flashboards.

NHDES concurs with minimizing the frequency and magnitude of fluctuations in the impoundment by controlling discharges at the Project as much as possible, because it will help protect the flora and fauna in the littoral and riparian zones of the impoundment and help to assure compliance with State surface water quality standards including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – see Fact C-38). Condition E-10.c addresses this Finding.

D-43. *Impoundment Refill Procedures:* Following authorized drawdowns, a refill procedure is required to ensure adequate flow (i.e., discharge) from the Project is maintained downstream of the Project dam and adequate flow is available to refill the impoundment at an appropriate rate to protect aquatic habitat and aquatic life. In their Section 10(j) recommendations filed with FERC (see Fact C-58), the USFWS recommended that "the Licensees implement an impoundment refill protocol whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, a minimum of 90 percent of inflow is passed downstream of the dam and the impoundment is refilled on the remaining 10 percent of inflow to the Project. The Department's minimum bypass flow recommendation in specified in Recommendation 2 should be maintained during impoundment drawdown and refilling period. This refill protocol may be modified on a case-by-case basis with prior approval of the Service, NHDES, NHFGD, NMFS, MEDEP, and MDIFW." As reported in Finding D-5, during refill operations, the Applicant currently passes the approximately 90% of inflow through the Project turbines and uses the remaining 10% of inflow to refill the impoundment.

NHDES concurs with the USFWS' Section 10(j) recommended impoundment refill procedures because it will help to minimize dramatic and sudden reductions in downstream flow (i.e., discharges) due to Project operation (which can adversely impact habitat and aquatic life), while still providing sufficient flow to refill the pond to the normal elevation after impoundment refill. It will also ensure that the minimum bypass flow (or inflow, whichever is less), is provided during impoundment drawdown and refill periods These measures will help to maintain sufficient habitat for aquatic life and help to assure compliance with State surface water quality standards, including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – see Fact C-38) and Env-Wq 1703.01(d) regarding maintaining surface water quantity at levels that protect existing uses and designated uses (see Fact C-27). Condition E-10.d addresses this Finding.

D-44. *Impoundment Drawdown Rate During Scheduled Maintenance:* The NHFGD recommends controlling Project discharges when drawing the impoundment down for maintenance, so that the impoundment level decreases by no more than approximately six (6) inches per day. This is done to allow adequate time for the less mobile aquatic organisms (including, but not limited to mussels), to move and stay sufficiently submerged as the water level gradually recedes. During such impoundment drawdowns it is also important to maintain (as a minimum) the bypass reach conservation flow (see Finding C-39). NHDES also recommends that the Licensee be provided the opportunity to modify these maintenance impoundment drawdown procedures on a case-by-case basis with prior approval from NHFGD.

These measures will help to maintain sufficient habitat for aquatic life and help to assure compliance with State surface water quality standards, including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – see Fact C-38) and Env-Wq 1703.01(d) regarding maintaining surface water quantity at levels that protect existing uses and designated uses (see Fact C-27). Condition E-10.e addresses this Finding.

D-45. *Bypass Reach Conservation Flows:* The Activity includes a 250-foot-long bypass reach which extends between the dam and the tailrace. Currently, the Activity maintains a continuous minimum flow of 6.05 cfs or inflow, whichever is less, in the bypass reach. The minimum flow is passed via two (12-inch and 4-inch diameter) pipes located at the base of the Project dam at an approximate elevation of 75.0 feet,

NGVD 29. Flow affects the quality and quantity of aquatic habitat, and directly impacts aquatic biota (e.g., movement, stranding, spawning and tributary access). In 2018, the Applicant conducted a bypass reach flow study utilizing the Modified Instream Flow Incremental Methodology (IFIM). In the bypass reach, the Applicant mapped habitat, collected physical habitat data along three transects at four test flows (22 cfs, 37 cfs, 69 cfs and 79 cfs) and determined the bypass reach's habitat suitability for various target fish species and life stages. Results indicate that the bypass reach has a moderate gradient dominated by riffle habitat (64% of the total habitat area (which is approximately 44,000 square feet or one acre), followed by pool and run habitats which represented 25% and 11% of the total habitat area, respectively. The predominant substrate in the bypass reach is boulder and cobble.

The Applicant proposed a minimum bypass flow of 30 cfs or inflow, whichever is less (see Finding D-6). However, as shown on the weighted usable are (WUA) versus flow curves in Figures 6.2-1 through 6.2-3 in the Instream Flow report in the FLA (see Fact C-56), the "knee-of-the-curve" or "breakpoint" for the majority of the species and lifes stages evaluated occurred at a flow of 37 cfs and could have been higher if a different flow between 37 cfs and 69 cfs had been measured in the field. The WUA versus flow curves indicate that habitat in the bypass reach is maximized for many of the target species and life stages at a flow of 37 cfs. Further, as shown in the last column of the following table, as flow increases from 30 cfs to 37 cfs, there is a significant increase (4 to 14 percent), in the percent of maximum WUA gained.

Species/Life Stage	Maximum WUA Flow (cfs)	Habitat Area at Maximum WUA Flow (ft^2)	Total Wetted Area at Maximum WUA Flow (ft^2)	% of Total Habitat Available at the Peak WUA (%)	% of Maximum WUA at 30 cfs	% of Maximum WUA at 37 cfs	% Increase in Maximum WUA from 30 cfs to 37 cfs
Brown Trout							
Adult	37	8,739	42,094	21%	92%	100%	8%
American Shad/River Herring							
Spawning & Incubation	79	7,635	44,393	17%	72%	79%	7%
Fry	79	3,305	44,393	7%	88%	95%	7%
Juvenile	69	11,286	43,766	26%	91%	99%	8%
Adult	79	3,395	43,393	8%	84%	88%	4%
Sea Lamprey							
Spawning & Incubation	69	1,157	43,393	3%	41%	45%	4%
Longnose Dace							
Juvenile	37	5,712	42,094	14%	96%	100%	4%
Adult	79	11,609	44,393	26%	82%	93%	11%
Macroinvertebrates							
Ephemoroptera	37	13,498	42,094	32%	89%	100%	11%
Plecoptera	37	6,687	42,094	16%	87%	100%	13%
Trichoptera	37	14,522	42,094	34%	86%	100%	14%

Based the results of the bypass flow study, the USFWS' 10(j) recommendation (Fact C-58) stated the following:

> "To protect fish and aquatic resources in the Project's bypass reach, the Department recommends the Licensees provide a continuous conservation flow of 37 cfs to the bypass reach, or inflow, whichever is less. This criterion may be modified as part of the Department's

> Fish Passage Prescription in order to conform to the Service's fish passage design guidelines (USFWS 2019)."

NHDES concurs with the USFWS' recommended conservation flows in the bypass reach as these measures will help to maintain sufficient habitat for aquatic life and help to assure compliance with State surface water quality standards, including, but not limited to, "Biological and Aquatic Community Integrity" (Env-Wq 1703.19 – see Fact C-38) and Env-Wq 1703.01(d) regarding maintaining surface water quantity at levels that protect existing uses and designated uses (see Fact C-27). Condition E-10.b addresses this Finding.

D-46. *Flow and Impoundment Compliance Monitoring Plan:* The USFWS' 10(j) recommendations (see Fact C-58) included the following:

> The USFWS "…recommends the Licensee develop a plan for maintaining and monitoring run-of-river operation and minimum flow releases at the Project. The plan should include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods used for recording data on run-of-river operation and minimum flow releases, an implementation schedule, and a plan for maintaining the data for inspection by the Service, NHDES, NHFGD, NMFS, MEDEP and MDIFW. The plan should be provided for agency review and comment within 3 months of license issuance. Relevant operational data such as headpond elevation and station generation should be recorded hourly. Records should be maintained digitally for the term of any new license issued for the Project and made available for agency review within 72 hours of receiving a request"

NHDES concurs that development and implementation of a plan describing how flow and impoundment water level will be managed, monitored and reported (as allowed by RSA 485-A:12, III – see Finding D-11) will help determine if discharges from the Project comply with this certification and, therefore, comply with New Hampshire surface water quality standards (RSA 485-A:8 and Env-Wq 1700 – see Finding D-14). Condition E-12 addresses this Finding.

Water Use Registration and Reporting

D-47. *Water Use Registration and Reporting*: Based on discussions in March and April 2021 with staff in the NHDES Water Use Registration and Reporting program (WURRP), the Activity is currently registered with the WURRP and must continue to report under this program in accordance with Env-Wq 2102. The purpose of Env-Wq 2102 is to "…is to implement RSA 488 by establishing requirements relative to documenting the identity and location of water uses and collecting accurate water use data to support management of the state's water resources." Staff also stated that the Applicant should contact them to determine if a water conservation plan (in accordance with Env-Wq 2102.24) is required for the Activity. On February 21, 2022 the Applicant submitted a request to NHDES to waive the requirement under Env-Wq 2101.24(a)(5) to submit a water conservation plan to NHDES. On February 25, 2022, NHDES notified the Applicant in a letter that NHDES approved the waiver request, in accordance with Env-Wq 2101.23, and that the waiver was valid for no more than four years from the date of the approval, and prior to expiration of the waiver, the same waiver may be requested in order to be considered an extension of the original waiver approval.If a water conservation plan is not required, the Applicant will need to request a waiver in accordance with Env-Wq 2101.23 The WURRP provides valuable data for tracking discharges (such as those from the Project) to and withdrawal volumes from surface waters and other sources throughout the state. This water quantity data assists NHDES with managing water resources to help assure surface waters have sufficient water to support the designated uses (see Fact C-27) specified in the New Hampshire surface water quality standards (NH RSA 485-A:8

and Env-Wq 1700, see Finding D-14). Including a condition in this certification to require compliance with WURRP is authorized under RSA 485-A:12, III (see Finding D-11) . Condition E-9 addresses this Finding.

Fish Passage

D-48. *Fish Species:* "The Salmon Falls River, in the vicinity of the Project, is known to support at least 24 species of fish, and representative examples include macrohabitat generalists such as yellow perch (*Perca flavescens*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis machrochirus*), golden shiner (*Notemigonus crysoleucas*), brown bullhead (*Ameiurus nebulosus*), and redfin pickerel (*Esox americanus americanus*); the fluvial dependent white sucker (*Catostomus commersonii*) and fallfish (*Semotilus corporalis*), the catadromous American eel (*Anguilla rostrata*."
(Source: see Fact C-59.)

D-49. *Impact of Dams on Fish Migrations:* "…Dams can impact both upstream and downstream fish migration in rivers (Limburg and Waldman 2009, p. 961). Dams not only block or impede fish migration, but also alter the rivers' hydrology and aquatic habitat availability. Upstream of dams, where water flow is slowed, lake-like conditions, rather than riverine ones, prevail. Water flow downstream of dams, particularly at peaking hydroelectric projects, can be altered significantly (Limburg and Waldman 2009, p. 961) with dramatic changes in water depth and velocity occurring over short time periods. Depending on the severity and location of blockages and changes to hydrology, migratory fish populations can be severely reduced or extirpated due to dams (Limburg and Waldman 2009, p. 960)." (Source: see Fact C-59.)

D-50. *Current Status of Fish Passage Facilities:* There are currently no technical fish passage facilities at the Lower Great Falls Project, which is located at river mile 3.4. The following description of fish passage facilities downstream of the Project is from the USFWS's FPA Section 18 Preliminary Prescription for Fishways (see Finding D-53): "Presently, diadromous fish can ascend the Salmon Falls River up to the Rollinsford Dam (river mile 0.9) via the alosine (American shad, alewife, blueback herring) and eel fish passage facilities located at South Berwick (FERC No. 11163). Similarly, alosines and eel are provided safe egress at South Berwick, via the Project's downstream fish passage facilities. The Rollinsford Hydroelectric Project is currently a barrier to upstream migrating anadromous fish. However, the Service's preliminary section 18 fishway prescription in that project's licensing proceeding requires the development of upstream and downstream fish passage at that Project. Further, on January 31, 2021, the Town of Rollinsford, New Hampshire (Town), Licensee for the Rollinsford Project, GMP, and the U.S. Fish and Wildlife Service entered into a Settlement Agreement in which the Town agreed to provide anadromous fish passage at the Rollinsford Project. The agreed upon upstream fish passage measures include provisions to trap migrating American shad and river herring at the downstream South Berwick Project and distribute the fish upstream of the Rollinsford and Lower Great Falls projects. Therefore, it is likely that anadromous fish will be present upstream and downstream of the Lower Great Falls Project in the reasonably foreseeable future."

D-51. *Applicant's Proposed Fish Passage Measures:* The Applicant's proposed fish passage measures are discussed in Finding D-6.

D-52. *Settlement Agreement. Upstream Anadromous Fish Passage:* On April 6, 2021, the Applicant filed an "Offer of Settlement" with FERC that consisted of the Settlement Agreement for Prescription for Fishways for American Shad and River Herring executed by and between the Applicant and U.S. Department of Interior, Fish and Wildlife Service ("USFWS"), and an accompanying Explanatory Statement (see Fact C-57). The purpose of the Settlement Agreement is to memorialize and enact the

agreements of the Parties concerning the appropriate terms of Prescription for Fishways for American shad and river herring to be included in the Subsequent License for the Project ("Prescription") pursuant to section 18 of the FPA (16 U.S.C. § 811). The Settlement Agreement obligates the Applicant to construct and operate fish passage for American shad and river herring at the Project by March 15 of the fourth calendar year after entry into operation of permanent volitional upstream fishways for American shad and river herring at the Rollinsford Hydroelectric Project (FERC No. 3777) which is the next dam downstream of the Lower Great Falls Hydroelectric Project. The Settlement Agreement also requires USFWS to file a preliminary prescription for the Project consistent with the terms of the Settlement Agreement.

D-53. *USFWS Preliminary Prescription for Fishways:* On April 16, 2021, USFWS filed preliminary prescriptions for fishways (Preliminary Prescription document – see Fact C-59) with FERC in accordance with section 18 [12] of the FPA which authorizes the USFWS or NMFS to prescribe upstream and downstream fishway passage requirements (see footnote 12). Section 18 fishway prescriptions are mandatory, which means FERC must include them in the subsequent FERC license. The Preliminary Prescription document is the result of consultation among the Applicant, USFWS, NHFGD, MEDIFW, and MDMR and requires the Applicant, at its expense, to "…construct, operate, maintain, monitor, and periodically test the effectiveness of fishways for river herring, American shad and American eel (collectively, the "target species")". The Prescription also requires that the "..fishways will be designed, constructed, maintained, and operated (which includes project operations) to safely, timely, and effectively pass the target species upstream and downstream of the Project." Preliminary prescriptions for fishways are provided in section 11 of the Preliminary Prescription document which includes general requirements for upstream and downstream passage (11.1), design populations (11.2), fish passage operating periods (11.3), fishway operation and maintenance (11.4), inspection (11.5), scheduling (11.6), fish passage effectiveness measures (11.7), upstream anadromous fish passage and justification (11.8), upstream American eel passage and justification (11.9), downstream American eel passage and justification (11.10), and downstream anadromous fish passage and justification (11.11). Subject to change based on new information , evaluation of new literature and agency consultation, section 11.3 of Prescription includes the following periods when approved fish passage protective measures will be operational.

Species	**Upstream Migration Period**	**Downstream Migration Period**
Alosines, American shad, river herring	April 15 – July 15	June 1 – November 15
American eel	May 1 – October 31	August 15 – November 15

D-54. Adequate upstream and downstream anadromous fish and American eel passage is required to comply with State surface water quality standards, including, but not limited to, support of the aquatic life designated use (Env-Wq 1707.17(d) – Fact C-21), protection and propagation of fish (Env-Wq 1701.01 – see Fact C-12), and to help assure compliance with the "Biological and Aquatic Community Integrity" surface water quality standard (Env-Wq 1703.19 – see Fact C-38). Because the Project has created conditions and discharge characteristics that prevent adequate fish and eel passage up and downstream, and, therefore, compliance with State surface water quality standards, fish and eel passage conditions are necessary. It is expected that implementation of the fishway prescriptions USFWS's Preliminary Prescription document (Finding D-53), which include upstream and downstream passage for anadromous fish and American eel, and any future modifications to the fishway prescriptions that are acceptable to the USFWS, NHDES and NHFGD will result in compliance with state surface water quality standards relative to fish passage. Condition E-13 addresses this Finding.

Invasive Species

D-55. Water in impoundments created by dams is relatively stagnant compared to that in a free-flowing rivers. Consequently, water-borne sediments and nutrients can be trapped, resulting in the undesirable proliferation of algae and aquatic weeds (eutrophication) and a change in water quality in the impoundment and releases from the impoundment (see Finding D-12). Such slow moving conditions can contribute to the proliferation of invasive plant species. According to the 2018 305(b)/303(d) lists of impaired waters (see Finding D-21), the Project impoundment, the river segment immediately below the Project dam and the next downstream segment which is the impoundment created by the Rollinsford dam are impaired for the Aquatic Life Integrity Designated Use because of "Non-native aquatic plants" (i.e., invasive plant species). The following is from page E-118 of the FLA (see Fact C-56): "MDEP has identified non-native, invasive variable leaf milfoil (*Myriophyllum heterophyllum*) in the Salmon Falls River approximately 2.5 miles downstream of the Project near the Rollinsford Project. It was first identified in this location in 2011 and was last reported in 2016. NHDES identified the Salmon Falls River at the Lower Great Falls Dam as impaired for non-native aquatic plants in its 2018 Water Quality Assessment Report and has categorized it as a 4C water body, meaning that it does not meet standards due to non-pollutants (i.e. exotic weeds) NHDES, 2019a. Notes in the classification state that variable leaf milfoil is at a high density and coverage both upstream and downstream of the site, but that no action has been taken (NHDES, 2017). Variable leaf milfoil grows quickly by fragmentation to form dense mats along the surface of the water, which impairs recreational activities such as boating, fishing, and swimming (MDEP, 2016). NHDES has also observed European naiad *(Najas minor)* in the Salmon Falls River from Milton down through Dover which includes the Project area." If not properly monitored and managed, invasive species can result in detrimental differences in community structure that are not naturally occurring (which is a violation of Env-Wq 1703.19, Biological and Aquatic Community Integrity – see Fact C-38) and result in a dominance of nuisance species (which is a violation of Env-Wq 703(c)(1)(d), General Water Quality criteria – see Fact C-28). Condition E-16 addresses this Finding.

E. CERTIFICATION CONDITIONS

Unless otherwise authorized or directed by NHDES, the following conditions shall apply:

E-1. **Effective Date and Expiration of Certification:** This certification shall become effective on the date of issuance and shall remain effective for the term of the federal license or permit. Should the federal authority deny a license or permit, the certification becomes null and void.

E-2. **Conditions in Federal License or Permit:** Conditions of this certification shall become conditions of the federal license or permit (U.S.C. § 1314(d)).

(For an explanation and citations, see Fact C-2 and Finding D-1.)

E-3. **Compliance with Water Quality Standards:** The Activity shall not cause or contribute to a violation of New Hampshire surface water quality standards.

(For an explanation and citations, see Facts Fact C-2, C-55, and Finding D-14.)

E-4. **Proposed Modifications to the Activity:** The Applicant shall consult with and receive prior written approval from NHDES regarding any proposed modifications to the Activity that could have a significant or material effect on the findings or conditions of this certification, including any changes to operation of the Activity. If necessary, to assure compliance with New Hampshire surface water quality standards and associated management objectives, NHDES may alter or amend this certification in accordance with condition E-5.

(For an explanation and citations, see Fact C-2 and Finding D-11.)

E-5. **Modification of Certification**: The conditions of this certification may be altered or amended at any time by NHDES to assure compliance with New Hampshire surface water quality standards and associated management objectives, when authorized by law, and, if necessary, after notice and opportunity for hearing.

(For an explanation and citations, see Fact C-2 and Finding D-11.)

E-6. **Reopening of License**: NHDES reserves the right to request, at any time, that FERC reopen the license to consider modifications to the license to assure compliance with New Hampshire surface water quality standards.

E-7. **Compliance Inspections:** In accordance with applicable laws, the Applicant shall allow NHDES to inspect the Activity and affected surface waters to monitor compliance with the conditions of this certification.

(For an explanation and citations, see Fact C-2 and Finding D-11.)

E-8. **Transfer of Certification:** Should this certification be transferred to a new owner, contact information for the new owner (including name, address, phone number and email) shall be provided to NHDES within 30 days of the transfer.

E-9. **NHDES Water Use Registration and Reporting:** The Applicant shall register, measure, and report all withdrawals and discharges with the NHDES Water Use Registration and Reporting Program (WURRP) in accordance with RSA 488:3 and its supporting regulations in Env-Wq 2102 and submit, if necessary, a water conservation plan in accordance with Env-Wq 2101.24.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-47.)

E-10. **Flow / Impoundment Management:** The following requirements (items a. through e.) may be temporarily modified if required by operating emergencies beyond the control of the Applicant, as specified below, or as allowed in the approved Flow/Impoundment Compliance Monitoring Plan (FICMP) that is required by Condition E-12 of this Certification.

a. **Instantaneous Run-of-River Flow:** The Applicant shall operate the Activity in an instantaneous run-of-river mode whereby inflow to the Project equals outflow from the Project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Applicant or for short periods upon mutual agreement between NHDES, NHFGD, USFWS, NMFS, MEDEP, MDMR and MEDIFW.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-41.)

b. **Bypass Reach Conservation Flows:** The Applicant shall comply with the following bypass reach conservation flow requirements.

1. The Applicant shall provide a minimum continuous conservation flow in the bypass reach of 37 cfs, or inflow, whichever is less. Subject to approval by NHDES and NHFGD, this criterion may be modified as part of the USFWS's Fish Passage Prescription (see Condition E-13) in order to

conform to the USFWS's fish passage design guidelines [27], or other guidelines acceptable to the USFWS.

2. The manner in which the bypass flow is released to the bypass reach shall be acceptable to NHDES, NHFGD and USFWS. The Applicant shall provide evidence within 60 days of receiving a written request from NHDES (or other date acceptable to NHDES), that demonstrates, to the satisfaction of NHDES and NHFGD, that the bypass reach conservation flow is being provided. Such evidence may include, but is not limited to, hydraulic calculations and instream flow measurements.
3. The method and supporting information for passing the bypass conservation flows into the bypass reach, including any future modifications, shall be included in the Flow / Impoundment Compliance Monitoring Plan (see Condition E-12).
4. Flow in the bypass reach shall comply with New Hampshire surface water quality criteria, including, but not limited to, dissolved oxygen (Env-Wq 1703.07 – see Fact C-30).

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-45.)

c. **Impoundment Water Level:** The target impoundment water elevation under normal operating conditions shall be the top of the flashboards (elevation 106.4 feet NGVD 29) plus any additional elevation required to pass the bypass reach conservation flow. The Applicant shall minimize the magnitude and frequency of fluctuations in the impoundment to the maximum extent practicable and shall not draw the water level in the impoundment down for the purpose of generating power. This requirement may be modified upon mutual agreement between NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW. If requested by NHDES, the Applicant shall submit a plan for NHDES approval to minimize the magnitude and frequency of impoundment fluctuations to the maximum extent practicable, due to factors that may include, but are not limited to, Project power generation and flashboard failure. The plan shall be submitted to NHDES within 90 days (or other date acceptable to NHDES) of when the NHDES issues the written request. The Applicant shall then implement the NHDES approved plan.

(For an explanation and citations, see Fact C-2 and Findings D-5, D-11 and D-42.)

d. **Impoundment Refill Procedure:** When refilling the impoundment after drawdown for maintenance or emergencies, the Applicant shall release 90 percent of the inflow downstream to the Salmon Falls River and utilize the remaining 10 percent of inflow to refill the impoundment. During impoundment refill, the bypass reach conservation flow specified in Condition E-10.b shall be maintained. This refill procedure may be modified upon mutual agreement between NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-43.)

e. **Drawdown Procedure for Scheduled Maintenance:** When drawing the water level in the impoundment down for scheduled maintenance, the Applicant shall lower the impoundment water level no more than six (6) inches per day. During impoundment drawdown, the bypass reach conservation flow specified in Condition E-10.b shall be maintained. This drawdown procedure may be modified upon mutual agreement between NHDES and NHFGD.

[27] USFWS (U.S. Fish and Wildlife Service). 2019. Fish Passage Engineering Design Criteria. USFWS, Northeast Region R5, Hadley, Massachusetts. 135 pages + Appendices.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-44.)

E-11. **Flow/Impoundment – Notification and Annual Report:** The Applicant shall comply with the following notification and reporting requirements:

a. If the Activity causes a deviation from the flow/ impoundment management requirements in Condition E-10, the Applicant shall notify NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW no later than 24 hours after each such incident. The notification shall include, to the extent known, an explanation as to why the deviations occurred, a description of corrective actions taken, and how long it will take until operations will comply with Condition E-10.

b. Within 45 days after each incident, the Applicant shall submit a report to NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW that contains, to the extent possible, the cause, severity, and duration of the incident, any observed or reported adverse environmental impacts from the incident, pertinent data and a description of corrective measures.

c. By April 1 of each year (beginning the first April after the date the FERC license is reissued), the Applicant shall submit to NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW a summary report for the previous calendar year with appropriate tables, graphs, text and supporting documentation that demonstrates compliance with the flow/ impoundment management requirements in Condition E-10. Where excursions occurred, the summary shall indicate when the excursion occurred, the duration of the excursion and a description of corrective actions taken to prevent such excursions from reoccurring.

(For an explanation and citations, see Fact C-2 and Finding D-11)

E-12. F**low/Impoundment Compliance Monitoring Plan (FICMP):** Within 90 days of license issuance (or other date acceptable to NHDES) the Applicant shall develop, file and implement a flow and impoundment level monitoring and compliance plan (FICMP) that, as a minimum, includes the following:

a. a description of the level of manual, automatic, on-site and remote operation;
b. a detailed description of how the Project will be operated under all conditions (i.e., under normal operating conditions as well as during low flow, high flow, maintenance and emergency conditions) to maintain compliance with the flow and impoundment level management requirements in Condition E-10;
c. a description of how the bypass conservation flow will be maintained during scheduled drawdowns and the minimum impoundment level that will pass the conservation flows (including calculations);
d. a description of the mechanisms and structures (i.e., type, location and accuracy of all flow and impoundment elevation monitoring equipment and gages) to be used for maintaining compliance with operational requirements;
e. set point elevations for turning turbines on and off [28];
f. procedures for maintaining and calibrating monitoring equipment;
g. rating curves and calculations for all methods of releasing flow downstream (including a working excel spreadsheet);
h. procedures for collecting and recording continuous data (i.e., no less frequent than hourly and preferably every 15 minutes) on inflow, flow releases at the Project (i.e., conservation flows in the bypass reach, spillage and turbine discharge), and impoundment levels.

[28] Set point elevations for providing conservation flows should account for the accuracy of the pond level sensor equipment. For example, if the accuracy is +/- 0.01 feet, the sensor should be set 0.01 feet above the elevation determined

The FICMP, including any proposed revisions, shall be developed in consultation with NHDES, NHFGD, USFWS, MEDEP, MDMR and MEDIFW, and submitted to NHDES for review and approval. The FICMP shall be kept up-to-date so that it reflects current operation. When revisions are made, the Applicant shall submit the updated FICMP to NHDES for approval within 10 days (or other date acceptable to NHDES) of making the revisions. If NHDES requests the FICMP to be updated, the Applicant shall submit the updated FICMP to NHDES for approval within 30 days (or other date acceptable to NHDES) of receiving a written request from NHDES to update the FICMP. The Applicant shall implement the approved FICMP.

(For an explanation and citations, see Fact C-2 and Findings D-11 and D-46.)

E-13. **Fish Passage:** The Applicant shall comply with the USFWS' "Preliminary Prescription for Fishways" [10] (which includes prescriptions for upstream and downstream passage for anadromous fish and American eel - see Finding C-59), and any modifications made to the preliminary prescriptions that are acceptable to the USFWS, NHFGD and NHDES. Unless modifications are made that are acceptable to USFWS, NHFGD and NHDES, upstream and downstream fish passage protective measures shall be operational during the periods shown in the following table.

Species	Upstream Migration Period	Downstream Migration Period
Alosines, American shad, river herring	April 15 – July 15	June 1 – November 15
American eel	May 1 – October 31	August 15 – November 15

(For an explanation and citations, see Fact C-2, and Findings D-11, and D-48 through D-54.)

E-14. **Water Quality Improvement Plan (WQIP):** Within 90 days of License issuance by FERC (or other date acceptable to NHDES) the Applicant shall submit a WQIP to NHDES for approval. The goal of the WQIP is for Project influenced waters (i.e., the Project impoundment, bypass reach and tailrace) to comply with New Hampshire surface water quality standards for parameters that can be influenced by the Project. If the riverine segment immediately upstream (and beyond the influence) of the Project impoundment is not meeting water quality standards for any of those parameters, the goal is for water quality in the Project influenced waters to not be any worse than in the upstream riverine segment. Parameters that can be influenced by the Project include, but are not limited to, DO, temperature, pH, nutrients, chlorophyll-a and secchi disk. The WQIP shall include proposed measures to achieve the goals, a plan to monitor the effectiveness of the improvement measures and a schedule for measure implementation, monitoring to determine the effectiveness of the implemented measures, and submittal of reports to NHDES for approval that includes a summary of the implementation measures, monitoring results (with supporting information including a working spreadsheet if requested by NHDES) and recommendations for next steps. The Applicant shall then implement the approved WQIP. NHDES reserves the right to require a new or updated WQIP should improvement measures not prove to be effective and/or new water quality issues arise. In such cases, the Applicant shall submit a new or updated WQIP within 90 days (or other date acceptable to NHDES) of when the Applicant receives a written request from NHDES to submit a new or updated WQIP for NHDES approval. The Applicant shall incorporate any changes to Project operation included in the approved WQIP, in the Flow/Impoundment Compliance Monitoring Plan (FICMP) and submit the updated FICMP to NHDES for approval as specified in Condition E-12. `

(For an explanation and citations, see Fact C-2 and Findings D-11, D-14 and D-38.)

E-15. **Long Term Water Quality Monitoring and Reporting:** Unless otherwise authorized by NHDES, the Applicant shall conduct water quality monitoring in the Salmon Falls River every five years beginning the fifth year after issuance of the FERC license and ending five years prior to the expiration of the issued license. The purpose of the monitoring is to 1) determine the future effects of Project operation during the duration of the issued license, both spatially and temporally (in terms of flow, impoundment elevation and power generation) on water temperature and dissolved oxygen (mg/L and percent saturation), 2) to compare results to New Hampshire surface water quality standards, and 3) to determine if additional changes in Project operation are necessary to comply with surface water quality standards.

At least 90 days prior to monitoring in each year monitoring is conducted, the Applicant shall submit a monitoring and reporting plan to NHDES for review and approval that describes, in detail, how, when and where monitoring will be conducted, and results reported. The Applicant shall then implement the NHDES approved plan. Unless otherwise authorized or directed by NHDES, the plan shall specify that monitoring that year shall last for at least five weeks and include periods of relatively low flows and high temperatures as well as times when the Project is, and is not, generating power. Continuous (i.e., every 15 minutes) monitoring of temperature and dissolved oxygen (mg/L and percent saturation) shall be conducted in the riverine reach just upstream of the Project impoundment, at the deep spot of the Project impoundment, the Project tailrace and the Project bypass reach and vertical profiles for temperature and dissolved oxygen shall be conducted each week at the deep spot of the impoundment. Continuous (i.e., every 15 minutes) estimates of impoundment elevation, inflow, tailrace flow, bypass reach flow and generation shall also be provided.

By December 31st of each year that monitoring is conducted, the Applicant shall submit a report and supplemental information that clearly demonstrates via text, tables and plots, the spatial and temporal effect of Project operation (in terms of inflow and flow in the bypass reach and tailrace, impoundment elevation and power generation) on surface water quality and if New Hampshire surface water quality standards are met. Results of quality assurance/quality control checks (calibration, hand-held meter checks, duplicates, etc.) and identification of any deviations from the monitoring and reporting plan shall be clearly identified. In addition to the report, water quality (including uncorrected and any corrected data), continuous impoundment elevation, and continuous flow data (including calculations) should be provided in a working MS Excel workbook or other database acceptable to NHDES. The Applicant shall also enter all data into the NHDES Environmental Monitoring Database (EMD) within 120 days of when monitoring is completed in each year monitoring is conducted.

Should monitoring indicate that water quality standard excursions persist, the Applicant shall consult with NHDES and, if requested by NHDES in writing, submit a new or updated Water Quality Improvements Plan (WQIP) in accordance with Condition E-14.

(For an explanation and citations, see Fact C-2, and Findings D-11, D-14, D-38 and D-39)

E-16. **Invasive Species Control**: If NHDES notifies the Applicant in writing that invasive species control efforts are needed in the river segments impacted by Project operation, the Applicant shall assist by seeking funding for implementation of control efforts and by temporarily modifying Project operation as necessary to facilitate those control efforts.

(For an explanation and citations, see Fact C-2, and Findings D-11 and D-55.)

F. ENFORCEMENT

Certification conditions are subject to enforcement mechanisms available to the federal licensing or permitting agency and to the state of New Hampshire.

G. APPEAL PROCESS

Any person aggrieved by this decision may appeal to the N.H. Water Council ("Council") by filing an appeal that meets the requirements specified in RSA 21-O:14 and the rules adopted by the Council, Env-WC 100-200. The appeal must be filed directly with the Council within 30 days of the date of this decision and must set forth fully every ground upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council. Information about the Council, including a link to the Council's rules, is available on the New Hampshire Environmental Council website (or more directly at the Water Council page). Copies of the rules also are available from the NHDES Public Information Center at (603) 271-2975.

If you have questions regarding this certification, please contact Gregg Comstock at (603) 271-2983 or william.g.comstock@des.nh.gov or James Tilley at (603) 271-0699 or james.tilley@des.nh.gov.

H. SIGNATURE AND DATE

Rene J. Pelletier, P.G., Director
NHDES Water Division

4/4/22
Date

cc via email:
FERC efile
Robert Belmore, City Manager, Somersworth, NH
John Greenan, Green Mountain Power Corporation
James Bellissimo, Town Manager, Berwick, ME
Cheri Patterson, NHFGD
Michael Dionne, NHFGD
Ken Hogan, USFWS
Bjorn Lake, NOAA-NMFS
Kathy Howatt, MEDEP
John Perry, MEDIFW
Chris Williams, NHDES

APPENDIX D-MAINE WATER QUALITY CERTIFICATION

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNOR

MELANIE LOYZIM
COMMISSIONER

April 6, 2022

Via U.S. Mail and E-mail

Mr. John Greenan
Green Mountain Power
2152 Post Road
Rutland, VT 05701

RE: Water Quality Certification L-16881-33-F-N, Lower Great Falls Hydroelectric Project (FERC No. 4451)

Dear Mr. Greenan:

Pursuant to the provisions of 38 M.R.S. §§ 464 *et seq*., Section 401 of the Clean Water Act (CWA), 33 U.S.C. § 1341, the Department of Environmental Protection (Department) has considered the application of Green Mountain Power (GMP) and the City of Somersworth, New Hampshire (together, Applicants) with all supporting data, agency review comments, public review comments, and other related materials in the administrative record. Based on the record evidence and the Department's professional judgment and expertise, the Department makes the following findings of fact, determinations, and conclusions.

I. Background

On April 6, 2021, the Maine Department of Environmental Protection (Department) received a Water Quality Certification application for the Lower Great Falls Hydroelectric Project (Project) (FERC No. 4451), located on the Salmon Falls River. The Project includes a dam that spans the river from the City of Somersworth, in Strafford County, New Hampshire to the Town of Berwick, in York County, Maine.

The existing Lower Great Falls Project consists of a 270-foot-long, 32-foot-high stone masonry and concrete dam with 4-foot-high flashboards. The dam creates a 40-acre impoundment with a gross volume of approximately 584 acre-feet at a normal maximum water elevation of 106.4 feet (NGVD 1929)[1] and average depth of 14.6 feet. Two 8.5-foot-diameter buried steel penstocks direct water to a 30-foot-wide, 48-foot-long powerhouse. The powerhouse contains four turbine-generator units with a total installed capacity of 1,280 kilowatts (kW). The Project's hydraulic

[1] National Geodetic Vertical Datum, 1929. All elevations in this document are expressed relative to the NGVD 1929 unless otherwise noted.

capacity range is 60 to 702 cfs.[2] The bypass reach extends 250 feet from the dam to the tailrace. The Project also includes a 100-foot-long transmission line connected to the regional grid and appurtenant facilities.

The Lower Great Falls Project operates in a run-of-river mode where inflow to the Project impoundment approximately equals outflow downstream of the Project tailrace. The Project maintains a continuous minimum flow of 6.05 cfs or inflow, whichever is less, in the bypass reach, passed via two pipes, measuring 12 inches and 4 inches in diameter, located at the base of the Project dam at an approximate elevation of 75.0 feet. The Project is operated under a normal head of 32 feet, including the 4-foot flashboards. Project features associated with electrical generation are located on the western side of the Salmon Falls River, in Somersworth, New Hampshire; a portion of the Project dam and the waters that flow over the dam at some times of the year discharge to Maine waters.

The Project is an existing run of river hydroelectric facility with an installed generating capacity of 1.28 megawatts (MW); at this time no changes are proposed to the facility or the operation of the Project.

The Applicants propose to continue operating the Project in a run-of-river mode using automatic pond level control. The Project impoundment will be maintained at the flashboard crest elevation of 106.4 feet under typical operating and flow conditions. The Applicants propose to release a minimum flow of 30 cfs or inflow, whichever is less into the bypass reach below the Project dam, including passing 10 cfs of the proposed minimum flow via the two pipes located at the base of the dam and passing 20 cfs via a proposed cut-out in the flashboard on the right side of the spillway, except that during fish passage season for American eel the Applicants propose to pass the proposed minimum flow through the proposed fish passage facility and propose to supply additional flow through the two pipes at the base of the dam, as flow through the pipes cannot be regulated. Further, during flashboard repair the Applicants propose to pass minimum flows through a combination of the two pipes (10 cfs) at the base of the dam and the low-level gate[3] in the left abutment (20 cfs). The Applicants propose operational measures to enhance downstream passage of American eel comprised of nighttime turbine shutdowns targeting shutdown from 8:00pm to 4:00am for three consecutive nights in September and October following rain accumulations of 0.5 inches or more over a 24-hour period, and construction of a downstream fish bypass structure to pass eels into the bypass reach of the Project. Additionally, the Applicants propose to construct an upstream eel ramp, the location of which will be based on a siting study to be conducted for two passage seasons, initiated in the first full passage season after the effective date of a new FERC license and will be operational within four years of the effective date of the new license.

[2] Cubic feet per second, a rate of flow.
[3] The operable low level gate in the left abutment is 8 feet wide by 8 feet high with a sill elevation of 84.9 feet and is manually operated when the impoundment water level rises approximately 10-inches above the flashboards to forestall flashboard failure.

II. Water Quality Certification

A. Framework for Review

The proposed relicensing of the Lower Great Falls Project is subject to water quality certification provisions under CWA Section 401 by both New Hampshire and Maine, due to its location on the Salmon Falls River which forms a border between the states. The Project is being reviewed and certified by New Hampshire Department of Environmental Services (NHDES); the Maine Department of Environmental Protection's review is focused on dissolved oxygen criteria in the impounded waters, which is a criterion not addressed by NHDES. By Executive Order of the Governor of the State of Maine, the Department is the certifying agency for Projects located wholly or partially in organized towns and cities, and as such has jurisdiction over the Project.

The Salmon Falls River from the Route 9 bridge to tidewater, including the reach of the river where the Project is located, is designated as Class C waters. This classification extends and includes the riverine impoundment above the Lower Great Falls dam and the waters discharged over the Project dam. 38 M.R.S. § 467(16)(A)(2).[4]

The Applicants must demonstrate that the Salmon Falls River, including the Lower Great Falls impoundment and the section of the river below the Lower Great Falls dam, meets Class C dissolved oxygen (DO) content as established in 38 M.R.S. § 465(4)(B), and may not be less than 5 parts per million (ppm) or 60% of saturation, whichever is higher, except that in identified salmonid spawning areas where water quality is sufficient to ensure spawning, egg incubation and survival of early life stages, that water quality sufficient for these purposes must be maintained.[5] Additionally, to provide protection for the growth of indigenous fish, the Applicants must demonstrate that the 30-day average DO concentration is 6.5 ppm using a temperature of 22 degrees centigrade or the ambient temperature of the water body, whichever is less. 38 M.R.S. § 465(4)(B)(1). In the Lower Great Falls riverine impoundment, DO must be measured in accordance with 38 M.R.S. § 464(13).

B. Department Analysis

1. Bypass Reach and Tailrace

The Applicants collected dissolved oxygen and temperature data in the bypass reach and tailrace in 2018. Sampling results indicate that water quality condition from Project discharges to the bypass reach and to the tailrace reach met Maine water quality standards at all times during the sample period. Additionally, the monthly average DO concentration remained above 6.5 ppm throughout the Project waters.

[4] Because 38 M.R.S. § 467(16)(A)(2) specifically provides for a riverine classification (Class C) for all waters from the Route 9 bridge to tidewater, including the Project impoundment, the impoundment does not default to Class GPA pursuant to 38 M.R.S. § 465-A.
[5] No salmonid spawning areas have been identified in the Project area.

Based on evidence provided by the Applicant, the Department finds that sample results demonstrate that the water discharged to the bypass and to the tailrace below the Lower Great Falls dam meet applicable Class C DO standards.

2. Riverine Impoundment

The Applicants collected water temperature and dissolved oxygen profiles throughout the water column in the impoundment in 2018. These data showed conditions of summer stratification between June and the end of August, as well as during parts of September and October. Based on the continuous monitoring results, instantaneous DO water quality standards were met except in the impoundment on July 19, 2018 (DO concentration 4 ppm at a depth of 3 meters) and on August 7, 2018 (DO 0.8 ppm at a depth of 4 meters). The minimum percent saturation also was met everywhere except in the impoundment between these same dates.

The monthly average DO concentration remained above 6.5 ppm throughout the Project waters, including in the impoundment.

In response to low DO conditions measured at the Project impoundment, the Applicants propose two measures that will result in increased flow from the impoundment that can be expected to improve dissolved oxygen in the impoundment. One, the Applicants propose to increase the minimum flow to the bypassed reach. Two, they have developed and propose to implement a Water Quality Mitigation and Enhancement Plan (the Plan). The Applicants propose to implement these measures during the term of a new FERC license for the Project.

Increasing the minimum flow to the bypass reach will result in moving a significantly greater volume of water through the impoundment and will reduce stagnation of impoundment water and is expected to reduce or eliminate stratification that contributes to non-attainment of the DO criteria.

The Water Quality Mitigation and Enhancement Plan describes measures that will be undertaken during critical low flow periods designed to achieve compliance with applicable Maine water quality standards in the Project impoundment, while maintaining compliance with applicable Class C water quality standards in the Project bypass reach and tailrace waters. Implementing the Plan will draw water from the entire water column and, compared to increasing minimum flows in the bypass reach, is expected to have a similar, but enhanced, effect on DO in the Project impoundment.

The Plan calls for temporary drawdown of stratified impoundment waters. Impoundment drawdowns will be initiated, in consultation with the Department, whenever total inflow to the Project has been less than 60 cfs for 7 consecutive days during the months of July through September by bringing Project turbines online and passing flow through the turbines in excess of total inflow minus the minimum bypass flow. Impounded water will be drawn down steadily for not more than 48 hours. Minimum flow will be maintained by continuing to pass 10 cfs via the two pipes located at the base of the Project dam and by passing the remaining minimum flow via the low-level outlet gate in the left abutment. Following drawdown, all inflow to the Project in

excess of the minimum bypass flow will be utilized to refill the impoundment. In the event inflow drops below the minimum bypass flow, impoundment refill will cease, and all inflow will be passed to the bypass until such time that inflow increases.

The Applicant proposes to monitor water quality for three years, during the months of July through September, after issuance of a new FERC license and implementation of the Water Quality Mitigation and Enhancement Plan. Impoundment monitoring will include vertical profiles at a location corresponding to location LGF-2 from the 2018 water quality study. DO and temperature profiles will be collected weekly using a handheld DO meter, at 1-meter intervals beginning at 0.1 meters below the surface of the water. The Applicants will collect Secchi disk transparency measurements weekly at location LGF-2, in conjunction with the DO and temperature data. Additionally, they will collect continuous DO and temperature data with meters installed approximately mid-depth in the bypass and tailrace reaches at locations corresponding to locations LGF -3 and LGF-4, respectively. If DO measurements in the tailrace or bypass reach fall below the 5 ppm threshold during impoundment drawdown, the planned drawdown will cease.

The Applicants propose to maintain quality monitoring records and to report the results annually to the Department within 120 days of the conclusion of the monitoring period. The report will include a continuous time series of inflow to the Project during monitoring; continuous time series of Project impoundment elevation during monitoring; continuous time series of Project outflow during monitoring; period of turbine operations and average output (kW and cfs; all Secchi disk transparency measurements; all impoundment DO and temperature profiles recorded; and a continuous time series of DO and temperature in the bypass and tailrace of the Project. The report will describe any violation of water quality standards and will identify, to the extent possible, the cause, duration, and severity of the violation.

Implementation of the Plan and associated monitoring will enable evaluation of the effectiveness of the required drawdown procedures in improving water quality in the impoundment. Five years after the Plan is implemented the Applicants will consult with Department to review its effectiveness.

The Department finds that the measures proposed by the Applicants can reasonably be expected to improve DO concentrations in the impoundment by increasing the hydraulic energy sufficiently to mix the impounded water and eliminate stagnation. These measures are expected to maintain DO concentrations at or above Class C criteria of 5 parts per million and result in attainment of Maine's Class C DO standard.

These measures and the related conditions identified below are necessary to ensure that the Project and its related discharge will comply with state water quality requirements, specifically 38 M.R.S. §465(4)(B). Absent these measures and conditions, the DO levels in the Project area, as a result of its operations and discharge, would be unable to meet statutory requirements for DO in the impoundment.

3. Conclusions

The Applicants have provided sufficient evidence and the Department finds and determines that as the Applicants propose to operate the Project the DO concentrations in the Salmon Falls River downstream of the Lower Great Falls dam, specifically in the bypass reach and tailrace, will meet or exceed 5 ppm standard 30-day average concentration standard of 6.5 ppm at 22 degrees centigrade. Therefore, the Salmon Falls River downstream of the dam meets Class C numeric water quality standards for DO. Further, the Applicants have provided sufficient evidence and the Department finds and determines that as the Applicants propose to operate the Project the DO concentrations in the Lower Great Falls impoundment can reasonably be expected to meet or exceed state water quality standards for DO, provided the Applicants comply with the following Conditions, in addition to the Standard Conditions attached to this approval:

A. Upon issuance of a new FERC license, the Applicants shall implement the Water Quality Mitigation and Enhancement Plan.

B. Five years after implementation of the Water Quality Mitigation and Enhancement Plan, the Applicants shall consult with the Department and review the effectiveness of the Plan. If implementation of the Plan has not resulted in compliance with the State's water quality standards for dissolved oxygen, the Applicants shall submit a revised Plan to the Department for review and approval, and then implement the revised Plan to bring operation of the Project into compliance with these water quality standards.

Therefore, the Department approves the water quality certification of the City of Somersworth and Green Mountain Power Corporation and certifies, pursuant to Section 401 of the Clean Water Act, that there is a reasonable assurance that the continued operation of the Lower Great Falls Hydroelectric Project, as described above, will comply with the applicable Class C water quality standard for dissolved oxygen.

DONE AND DATED AT AUGUSTA, MAINE, THE 6TH DAY OF APRIL, 2022

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____
For Melanie Loyzim, Commissioner

FILED

April 6, 2022

State of Maine
Board of Environmental Protection

STANDARD CONDITIONS

1. Noncompliance. Should the project be found, at any time, not to be in compliance with any of the conditions of this approval, or should the project be operated in any way other than specified in the application or supporting documents, as modified by the conditions of this approval, then the terms of this approval shall be considered to have been violated.

2. Inspection and Compliance. Authorized representatives of the Commissioner or the Attorney General shall be granted access to the project at any reasonable time for the purpose of inspecting the operation of the project and assuring compliance with the conditions of this approval.

3. Assignment of Transfer of Approval. This approval shall expire upon the assignment or transfer of the property covered by this approval unless written consent to transfer this approval is obtained from the Commissioner. To obtain approval of transfer, the licensee shall notify the Commissioner 30 days prior to assignment or transfer of property which is subject to this approval. Pending Commissioner determination on the application for a transfer or assignment of ownership of this approval, the person(s) to whom such property is assigned or transferred shall abide by all of the terms and conditions of this approval. To obtain the or Commissioner's approval of transfer, the proposed assignee or transferee must demonstrate the financial capacity and technical ability to (1) comply with all terms and conditions of this approval and (2) satisfy all other applicable statutory criteria.

   A "transfer" is defined as the sale or lease of property which is the subject of this approval or the sale of 50 percent or more of the stock of or interest in a corporation or a change in a general partner of a partnership which owns the property subject to this approval.

DEP INFORMATION SHEET

Appealing a Department Licensing Decision

Dated: August 2021 **Contact: (207) 314-1458**

SUMMARY

This document provides information regarding a person's rights and obligations in filing an administrative or judicial appeal of a licensing decision made by the Department of Environmental Protection's (DEP) Commissioner.

Except as provided below, there are two methods available to an aggrieved person seeking to appeal a licensing decision made by the DEP Commissioner: (1) an administrative process before the Board of Environmental Protection (Board); or (2) a judicial process before Maine's Superior Court. An aggrieved person seeking review of a licensing decision over which the Board had original jurisdiction may seek judicial review in Maine's Superior Court.

A judicial appeal of final action by the Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S. § 3451(4)) or a general permit for an offshore wind energy demonstration project (38 M.R.S. § 480-HH(1)) or a general permit for a tidal energy demonstration project (38 M.R.S. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

A person filing an appeal with the Board should review Organization and Powers, 38 M.R.S. §§ 341-D(4) and 346; the Maine Administrative Procedure Act, 5 M.R.S. § 11001; and the DEP's *Rule Concerning the Processing of Applications and Other Administrative Matters* (Chapter 2), 06-096 C.M.R. ch. 2.

DEADLINE TO SUBMIT AN APPEAL TO THE BOARD

Not more than 30 days following the filing of a license decision by the Commissioner with the Board, an aggrieved person may appeal to the Board for review of the Commissioner's decision. The filing of an appeal with the Board, in care of the Board Clerk, is complete when the Board receives the submission by the close of business on the due date (5:00 p.m. on the 30th calendar day from which the Commissioner's decision was filed with the Board, as determined by the received time stamp on the document or electronic mail). Appeals filed after 5:00 p.m. on the 30th calendar day from which the Commissioner's decision was filed with the Board will be dismissed as untimely, absent a showing of good cause.

HOW TO SUBMIT AN APPEAL TO THE BOARD

An appeal to the Board may be submitted via postal mail or electronic mail and must contain all signatures and required appeal contents. An electronic filing must contain the scanned original signature of the appellant(s). The appeal documents must be sent to the following address.

Chair, Board of Environmental Protection
c/o Board Clerk
17 State House Station
Augusta, ME 04333-0017
ruth.a.burke@maine.gov

The DEP may also request the submittal of the original signed paper appeal documents when the appeal is filed electronically. The risk of material not being received in a timely manner is on the sender, regardless of the method used.

At the time an appeal is filed with the Board, the appellant must send a copy of the appeal to: (1) the Commissioner of the DEP (Maine Department of Environmental Protection, 17 State House Station, Augusta, Maine 04333-0017); (2) the licensee; and if a hearing was held on the application, (3) any intervenors in that hearing proceeding. **Please contact the DEP at 207-287-7688 with questions or for contact information regarding a specific licensing decision.**

REQUIRED APPEAL CONTENTS

A complete appeal must contain the following information at the time the appeal is submitted.

1. *Aggrieved status*. The appeal must explain how the appellant has standing to bring the appeal. This requires an explanation of how the appellant may suffer a particularized injury as a result of the Commissioner's decision.
2. *The findings, conclusions, or conditions objected to or believed to be in error*. The appeal must identify the specific findings of fact, conclusions of law, license conditions, or other aspects of the written license decision or of the license review process that the appellant objects to or believes to be in error.
3. *The basis of the objections or challenge.* For the objections identified in Item #2, the appeal must state why the appellant believes that the license decision is incorrect and should be modified or reversed. If possible, the appeal should cite specific evidence in the record or specific licensing criteria that the appellant believes were not properly considered or fully addressed.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license to changes in specific license conditions.
5. *All the matters to be contested*. The Board will limit its consideration to those matters specifically raised in the written notice of appeal.
6. *Request for hearing.* If the appellant wishes the Board to hold a public hearing on the appeal, a request for hearing must be filed as part of the notice of appeal, and it must include an offer of proof regarding the testimony and other evidence that would be presented at the hearing. The offer of proof must consist of a statement of the substance of the evidence, its relevance to the issues on appeal, and whether any witnesses would testify. The Board will hear the arguments in favor of and in opposition to a hearing on the appeal and the presentations on the merits of an appeal at a regularly scheduled meeting. If the Board decides to hold a public hearing on an appeal, that hearing will then be scheduled for a later date.
7. *New or additional evidence to be offered.* If an appellant wants to provide evidence not previously provided to DEP staff during the DEP's review of the application, the request and the proposed supplemental evidence must be submitted with the appeal. The Board may allow new or additional evidence to be considered in an appeal only under limited circumstances. The proposed supplemental evidence must be relevant and material, and (a) the person seeking to add information to the record must show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process; or (b) the evidence itself must be newly discovered and therefore unable to have been presented earlier in the process. Requirements for supplemental evidence are set forth in Chapter 2 § 24.

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license application file is public information, subject to any applicable statutory exceptions, and is made accessible by the DEP. Upon request, the DEP will make application materials available to review and photocopy during normal working hours. There may be a charge for copies or copying services.

2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing the appeal.* DEP staff will provide this information upon request and answer general questions regarding the appeal process.

3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed, the license normally remains in effect pending the processing of the appeal. Unless a stay of the decision is requested and granted, a licensee may proceed with a project pending the outcome of an appeal, but the licensee runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will acknowledge receipt of an appeal, and it will provide the name of the DEP project manager assigned to the specific appeal. The notice of appeal, any materials admitted by the Board as supplementary evidence, any materials admitted in response to the appeal, relevant excerpts from the DEP's administrative record for the application, and the DEP staff's recommendation, in the form of a proposed Board Order, will be provided to Board members. The appellant, the licensee, and parties of record are notified in advance of the date set for the Board's consideration of an appeal or request for a hearing. The appellant and the licensee will have an opportunity to address the Board at the Board meeting. The Board will decide whether to hold a hearing on appeal when one is requested before deciding the merits of the appeal. The Board's decision on appeal may be to affirm all or part, affirm with conditions, order a hearing to be held as expeditiously as possible, reverse all or part of the decision of the Commissioner, or remand the matter to the Commissioner for further proceedings. The Board will notify the appellant, the licensee, and parties of record of its decision on appeal.

II. JUDICIAL APPEALS

Maine law generally allows aggrieved persons to appeal final Commissioner or Board licensing decisions to Maine's Superior Court (see 38 M.R.S. § 346(1); 06-096 C.M.R. ch. 2; 5 M.R.S. § 11001; and M.R. Civ. P. 80C). A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other person, an appeal must be filed within 40 days of the date the decision was rendered. An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. See 38 M.R.S. § 346(4).

Maine's Administrative Procedure Act, DEP statutes governing a particular matter, and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, for administrative appeals contact the Board Clerk at 207-287-2811 or the Board Executive Analyst at 207-314-1458 bill.hinkel@maine.gov, or for judicial appeals contact the court clerk's office in which the appeal will be filed.

Note: This information sheet, in conjunction with a review of the statutory and regulatory provisions referred to herein, is provided to help a person to understand their rights and obligations in filing an administrative or judicial appeal. The DEP provides this information sheet for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.

APPENDIX E-DEPARTMENT OF INTERIOR MODIFIED FISHWAY PRESCRIPTION

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
https://www.fws.gov/office/new-england-ecological-services

January 27, 2023

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: Section 18 Modified Fishway Prescription, Lower Great Falls Hydroelectric Project, FERC No. 4451-024, Salmon Falls River, Strafford County, NH, and York County, ME

Dear Secretary Bose:

On April 16, 2021, pursuant to the Federal Power Act, as amended (16 U.S.C. 791a-828c), the Department of the Interior (Interior) filed with the Federal Energy Regulatory Commission (Commission), a preliminary fishway prescription (Preliminary Prescription) for the Lower Great Falls Hydroelectric Project (Project) (P-4451-024).[1] On October 12, 2022, the U.S. Fish and Wildlife Service (Service) notified the Commission that a modified fishway prescription for the Project would be provided by February 28, 2023.[2] On January 20, 2023, the Commission issued a subsequent license order (Order) for the Project.[3] Footnote 28 of the Order states that "Any requirements that Interior submits with its modified fishway prescription will become conditions of the license after the license is issued." In the interim, Ordering Paragraph (f) of the Order, requires the fish passage measures specified in the Preliminary Prescription.

The Service did not receive any comments on the Preliminary Prescription. Therefore, the Preliminary Prescription will serve as the modified fishway prescription.

[1] Accession Number: 20210416-5084.
[2] Accession Number: 20221012-5160.
[3] 182 FERC ¶ 61,024.

If you have any questions regarding this letter, please contact Ken Hogan of this office at kenneth_hogan@fws.gov.

Sincerely yours,

Audrey Mayer
Supervisor
New England Field Office

cc: Service List
GMP, John Tedesco
Town, Caroline Kendall
FERC, Secretary (e-filed)
NPS, Kevin Mendik (via e-mail)
NHFGD, Cheri Patterson (via e-mail)
NHDES, James Tilley (via e-mail)
MEDEP, Kyle Olcott (via e-mail)
MEDIFW, John Perry (via e-mail)
MEDIFW, James Pellerin (via e-mail)
Reading File
ES: KHogan:jd:01-27-23:603-223-2541

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
5 Post Office Square, Suite 18011
Boston, Massachusetts 02109

April 16, 2021

9043.1
ER21/0057

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: Preliminary Section 18 Fishway Prescription
Lower Great Falls Hydroelectric Project, FERC No. 4451-024
Salmon Falls River, Strafford County, New Hampshire, and York County, Maine

Dear Secretary Bose:

The attached U.S. Department of the Interior's preliminary fishway prescription (Prescription) for the Lower Great Falls Hydroelectric Project (Project) (P-4451-024) is being filed in response to the Federal Energy Regulatory Commission's Notice of Application Ready for Environmental Analysis, issued February 10, 2021[1], and pursuant to the Federal Power Act, as amended (16 U.S.C. 791a-828c). The licensees are Green Mountain Power and the City of Somersworth, New Hampshire. The Project is located on the Salmon Falls River in Strafford County, New Hampshire, and York County, Maine.

Thank you for the opportunity to provide this Prescription. If you have questions, please contact Kenneth Hogan at kenneth_hogan@fws.gov. Please contact me at (617) 223-8565 if I can be of further assistance.

Sincerely,

Andrew L. Raddant
Regional Environmental Officer

Attachment – United States Department of the Interior Decision Document Preliminary Prescription for Fishways Pursuant to Section 18 of the Federal Power Act

[1] Accession Number: 20210210-3007.

ATTACHMENT A

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

City of Somersworth, New Hampshire	**) Lower Great Falls Project**
Green Mountain Power, LLC	**) FERC No. 4451-024**

UNITED STATES DEPARTMENT OF THE INTERIOR
DECISION DOCUMENT
PRELIMINARY PRESCRIPTION FOR FISHWAYS
PURSUANT TO SECTION 18 OF THE FEDERAL POWER ACT

Approved this 14th day of April, 2021, by:

DAVID SIMMONS Digitally signed by DAVID SIMMONS
Date: 2021.04.14 16:17:19 -04'00'

David Simmons, Acting Field Supervisor
New England Field Office

United States Department of the Interior
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301

TABLE OF CONTENTS

UNITED STATES DEPARTMENT OF THE INTERIOR
DECISION DOCUMENT
PRELIMINARY PRESCRIPTION FOR FISHWAYS PURSUANT TO SECTION 18 OF THE FEDERAL POWER ACT

1 INTRODUCTION

On April 30, 2020, Green Mountain Power (GMP) and the City of Somersworth, New Hampshire (Licensees), filed an Application for a Subsequent Minor License for the Lower Great Falls Hydroelectric Project (Project; FERC No. 4451). On February 10, 2021 the Federal Energy Regulatory Commission (Commission; FERC) issued its Notice of Application Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Terms and Conditions, and Prescriptions. In response, the United States Department of the Interior (Department) hereby submits its Preliminary Prescription for the Project, pursuant to Section 18 of the Federal Power Act (FPA), as amended. This Preliminary Prescription is submitted with its supporting administrative record.

The Department developed its Preliminary Prescription through a review process that included consultation among fisheries biologists and fishway engineers from the United States Fish and Wildlife Service (Service), the New Hampshire Fish and Game Department (NHFGD), the Maine Department of Marine Resources (MDMR), and the Maine Department of Inland Fisheries and Wildlife (MEDIFW).

2 ADMINISTRATIVE PROCESS, HEARING RIGHTS, AND SUBMISSION OF ALTERNATIVES

This Preliminary Prescription was prepared, and will be processed, in accordance with the Department's regulations at 43 Code of Federal Regulations (C.F.R.) Part 45. These regulations provide that any party to a license proceeding before the Commission in which the Department exercises mandatory authority is provided both the right to trial-type hearings on issues of material fact and the opportunity to propose alternatives to the terms contained in the Preliminary Prescription.

The Department hereby provides notice that any party to this proceeding before the Commission may request a trial-type hearing on any issue of fact material to this Preliminary Prescription pursuant to, and in conformance with, the regulations of the Department at 43 C.F.R. §45.21. Such a request for a trial-type hearing must be filed with the Office of Environmental Policy and Compliance, Department of the Interior, 1849 C Street, NW, Mail Stop 2629, Washington, DC 20240, within 30 days of the filing of this document with the Commission. Should any request for trial-type hearing be filed, other parties may file interventions and responses thereto within 20 days of the date of service of the request for a hearing (43 C.F.R. §45.22). Trial-type hearings will be conducted, and a Modified Prescription developed, in accordance with the terms and time limits of 43 C.F.R. Part 45.

The Department further provides notice that any party to the license application process before the Commission may submit alternatives to the terms contained in the Preliminary Prescription by filing them pursuant to, and in conformance with, the Department's regulations at 43 C.F.R. §45.71. Any such alternative proposals must be filed with the Office of Environmental Policy

and Compliance, Department of the Interior, 1849 C Street, NW, Mail Stop 2629, Washington, DC 20240, within 30 days of the date of the submission of this document to the Commission. Such alternative proposals will be analyzed in accordance with 45 C.F.R. §45.73.

Finally, the Department will accept and consider any comments on the Preliminary Prescription filed by any member of the public, state or Federal agency, Tribe, the Applicant, or other entity or person. Comments are due within 30 days of this Preliminary Prescription being filed with the Commission, and should be sent to:

David Simmons, Acting Field Supervisor
New England Field Office
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, New Hampshire 03301
email: david_simmons@fws.gov

If no hearing is requested or alternative submitted, the Department will finalize its Preliminary Prescription for Fishways, with accompanying analysis, within 30 days of the close of FERC's National Environmental Policy Act comment period.

3 PROJECT DESCRIPTION

The Salmon Falls River joins the Cocheco River at the head of the Piscataqua River, which drains into the Great Bay Estuary. The Project is located in the states of New Hampshire and Maine on the Salmon Falls River, 3.1 miles upstream of its confluence with the Cocheco River. The total drainage area of the Project is 220 square miles. The Project consists of a 270-foot-long, 32-foot-high stone masonry and concrete dam with a 176.5-foot-long spillway topped by 4-foot-high wooden flashboards supported by steel pins, two 8.5-foot-diameter steel penstocks that bifurcate and lead to four vertical Francis turbine-generator units with a total generating capacity of 1,280 kW, and a 250-foot-long bypass reach between the dam and the Project's tailrace. Each of the four turbine units has a minimum hydraulic capacity of 60 cfs. Units 1 and 3 have a maximum hydraulic capacity 199 cfs and units 2 and 4 have a maximum hydraulic capacity of 152 cfs. As a result, the Project has an operating range from 60 to 702 cfs. The Licensees operate the Project in a run-of-river mode and maintain a continuous minimum flow of 6.05 cfs or inflow, whichever is less in the bypass reach.

The Licensees' proposed protection, mitigation, and enhancement (PME) measures include maintaining run-of-river operations, a continuous year-round bypass flow of 30 cfs, or inflow, whichever is less, installation and operation of an eel ramp for upstream eel passage, intermittent and targeted nighttime turbine shutdowns to protect downstream migration eel, and to construct and operate fish passage for American shad and river herring with operation beginning the four years after volitional upstream passage is provided at the downstream Rollinsford Hydroelectric Project (FERC No. 3777).[1]

[1] On March 16, 2021, GMP, the City of Somersworth, New Hampshire, and the Service entered into a Settlement Agreement for "[T]he Licensees to construct and operate, at their own expense, fish passage for American shad and river herring at the Lower Great Falls project…" The Settlement Agreement was filed with the Commission on April 6, 2021, under Accession Number: 20210406-6199.

4 RESOURCE DESCRIPTION

4.1 SALMON FALLS RIVER WATERSHED

A thorough description of the Salmon Falls River watershed is found on page 4 of the Salmon Falls Watershed Collaborative Action Plan (Salmon Falls Watershed Collaborative 2011), which is provided in Appendix A of this document.

The Salmon Falls River, in the vicinity of the Project, is known to support at least 24 species of fish, and representative examples include macrohabitat generalists such as yellow perch (*Perca flavescens*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis machrochirus*), golden shiner (*Notemigonus crysoleucas*), brown bullhead (*Ameiurus nebulosus*), and redfin pickerel (*Esox americanus americanus*); the fluvial dependent white sucker (*Catostomus commersonii*) and fallfish (*Semotilus corporalis*), the catadromous American eel (*Anguilla rostrata*). Diadromous fish passage is discussed in more detail below.

4.1.1 MIGRATORY FISH OF THE SALMON FALLS RIVER WATERSHED

Diadromous fish, including American shad, alewife, blueback herring, Atlantic salmon (*Salmo salar*), and American eel historically occurred in the Salmon Falls River (Odell et al. 2006; Old Berwick Historical Society 2020). Presently, diadromous fish can ascend the Salmon Falls River up to the Rollinsford Hydroelectric Project (FERC No. 3777) at river mile 0.9, via the alosine (American shad, alewife, blueback herring) and eel fish passage facilities located at South Berwick Hydroelectric Project (FERC No. 11163). The Rollinsford Hydroelectric Project is currently a barrier to upstream migrating anadromous fish. However, the Service's preliminary section 18 fishway prescription in that project's licensing proceeding requires the development of upstream and downstream fish passage at that Project.[2] Further, on January 31, 2021, the Town of Rollinsford, New Hampshire (Town), Licensee for the Rollinsford Project, GMP, and the U.S. Fish and Wildlife Service entered into a Settlement Agreement in which the Town agreed to provide anadromous fish passage at the Rollinsford Project.[3] The agreed upon upstream fish passage measures include provision to trap migrating American shad and river herring at the downstream South Berwick Project and distribute the fish upstream of the Rollinsford and Lower Great Falls projects. Therefore, it is likely that anadromous fish will be present upstream and downstream of the Lower Great Falls Project in the reasonably foreseeable future.

4.2 IMPACTS OF DAMS ON FISH MIGRATIONS

Migratory fish have evolved to require specific conditions in river systems, and the relatively recent alterations to many river systems by the construction of dams and other impacts have negatively affected migratory fish populations. Dams can impact both upstream and downstream fish migration in rivers (Limburg and Waldman 2009, p. 961). Dams not only block or impede fish migration, but also alter the rivers' hydrology and aquatic habitat availability. Upstream of dams, where water flow is slowed, lake-like conditions, rather than riverine conditions, prevail. Water flow downstream of dams, particularly at peaking hydroelectric projects, can be altered significantly (Limburg and Waldman 2009, p. 961) with dramatic changes in water depth and

[2] FERC Accession Number: 20200625-5042.
[3] FERC Accession Number: 20210305-5218.

velocity occurring over short time periods. Depending on the severity and location of blockages and changes to hydrology, migratory fish populations can be severely reduced or extirpated due to dams (Limburg and Waldman 2009, p. 960).

The degree to which a given dam is an impediment to the upstream movement of juvenile eel depends on multiple factors, including the height of the dam, its surface, whether the surface is wetted or not, and the size of the eel trying to ascend; some upstream barriers may be size-selective, as the ability of juvenile eel to scale obstacles decreases as they grow in size (Hitt et al. 2012). In general, a high dam with a dry, vertical surface represents the greatest barrier. While some portion of eel trying to ascend a given barrier may be successful, studies have shown that the density of eel tends to be higher downstream of a dam and lower upstream of a dam. On the Merrimack River, Hoover (1938) reported a great discrepancy in eel abundance above and below the Amoskeag Dam in Manchester, New Hampshire, with much higher densities just below the dam, and Sprankle (2002) reported similar findings with catch rates upstream of the Essex Dam in Lawrence, Massachusetts, much higher than downstream of the dam. High densities below barriers due to limited passage success may have the negative effects of altering natural sex ratios, increasing the transmission of parasites and diseases, and increasing intraspecific competition for habitat and food resources (Krueger and Oliveira 1999; Oliveira and McCleave 2000).

To adult alosines migrating to spawning habitat, nearly any dam represents a barrier to migration. Alosines are not leaping fish like salmon, and they require streaming flow to swim over rocks and structures in a river. Therefore, nearly any differential between headwater and tailwater elevation will inhibit their movement (Limburg and Waldman 2009).

For downstream migration, fish respond to river flow and migrate past dams via different routes, including over dam spillways, down bypass channels, and through hydroelectric turbines (Kynard and O'Leary 1993, p. 785; Castro-Santos and Haro 2003, p. 994; Jansen et al. 2007, p. 1442). At hydroelectric dams, large volumes of water can direct out-migrating fish into potential hazards while they attempt to pass the project. Fish may be injured or killed via entrainment through a turbine, discharge through a gate or over a spillway with no adequate plunge pool, impingement on screens and racks, and trauma due to changes in barometric pressure (barotrauma). Mortality caused by passing downstream, through turbines, at hydroelectric projects can vary greatly depending on species, size, and life stage (adult or juvenile) of fish (e.g., 12 percent mortality for American shad, Heisey et al. 2008, pp. 7-8; 100 percent mortality for American eel, Carr and Whoriskey 2008, p. 393), as well as on turbine design, including turbine flow, tip speed, rotational speed, number of blades/buckets, blade spacing, and runner diameter (Franke et al. 1997, Section 4, p. 6). Generally, fish passing through hydroelectric turbines can be injured or killed due to rapid barotrauma, cavitation, strike, grinding, turbulence, and shear stress (Cada et al. 1997; Brown et al. 2014, entire).

4.3 AMERICAN EEL

The American eel serves as an important prey species for many fish, aquatic mammals, and fish-eating birds.[4] Restoring eel to freshwater habitats contributes to restoring the historical ecosystem.[5] In some rivers, eel are an important host species for successful reproduction of

[4] https://www.fws.gov/northeast/americaneel/pdf/American_Eel_factsheet_2015.pdf (accessed May 2020).
[5] Ibid.

freshwater mussels.[6] Eel serve as prey for predatory fish when they are small and become predators themselves as they grow in freshwater systems.[7] In addition, eel support valuable recreational, commercial, and subsistence fisheries.

4.3.1 AMERICAN EEL BIOLOGY AND LIFE HISTORY

The American eel is a facultative catadromous species, meaning that American eel spawn in the ocean and grow to maturity in either marine or freshwater habitats, or some combination thereof (Shepard 2015, pp. 7–24). American eel are panmictic, meaning that there is a single spawning site without mating restrictions, neither genetic nor behavioral, upon the population, and therefore, random recombination occurs with each new generation of American eel. Thus, there are no unique adaptations to specific regions within the range of American eel from Canada to the Caribbean (Shepard 2015, pp. 4–10). The spawning location is east of the Bahamas and south of Bermuda in the center of the gyre known as the Sargasso Sea. After spawning, American eel eggs hatch into "leptocephali," a small transparent, larval stage that is passively transported in ocean currents for about 1 year. Leptocephali eventually metamorphose into “glass eels” which leave ocean currents and swim to coastal waters anywhere from the Caribbean to eastern Canada. Within days of reaching coastal waters, glass eel transform into small, fully developed, pigmented eel. They are often called elvers at this stage, an imprecise term that is generally applied to small eel in fresh water that may be of many sizes and ages. Juvenile eel are usually referred to as yellow eel. Small yellow eel are sexually indeterminate and cannot be differentiated histologically until reaching a length of about 8 inches.

Sexual maturation and silvering begins at ages from 3 years to more than 30 years. Females mature at later ages than males and eel mature at later age in fresh water, as compared to marine and estuarine waters where growth is more rapid. Age at maturation also increases with latitude—for example, silvering in fresh waters of the Chesapeake Bay region occurs at ages from 6 to 16 years (Helfman et al. 1987, pp. 44–45), but at 8 to 23 years in Canada (Cairns et al. 2005, p. 11). Depending on latitude, silver eel migration from the rivers occurs in large part in late summer in the north and late winter in the south. For example, silver eel migrate from the St. Lawrence River in large part from August to November, from Connecticut rivers in September through October, and from Georgia rivers from October through March (ASMFC 2012, p. 132).

Downstream migration has been commonly perceived as occurring primarily at night. Overall, 81.2 percent of the 293 eel passage events (including yellow eel) at dams on the Shenandoah River occurred during turbine shutdown periods between 1800 and 0600 hours (Eyler et al. 2016 p. 972). The other 18.8 percent passed during the day or were not detected. Downstream movement from fresh water is accelerated by heavy rains and rises in stream flow (i.e., freshets); two thirds of the 293 eel passage events at dams on the Shenandoah River coincided with high-discharge events (Eyler et al. 2016, p. 972). Eyler’s study was initially designed to record eel movement events between September 15 and December 15. That period was expanded to include all months of the year over more than 1 year. Downstream movement of eel was detected during each month of the year except July, and during day and night. Downstream migrants use tidal transport and travel near the surface, but also make vertical movements, especially when encountering dams (Brown et al. 2009, p. 10; ASMFC 2012, page 7).

[6] Ibid.
[7] Ibid.

4.3.2 AMERICAN EEL POPULATION STATUS AND MANAGEMENT GOALS

The decline of eel and the ecological services they provide is a widely held concern among Atlantic Coast states in the Northeast. Management objectives for American eel are outlined in the Interstate Fishery Management Plan (FMP) for American Eel published by the Atlantic States Marine Fisheries Commission (ASMFC 2000, page iv). The FMP's goals are to maintain and enhance the abundance of American eel in inland coastal waters and to contribute to the viability of the adult American eel spawning population at sea. An objective is to provide adequate upstream passage and escapement to inland waters for elvers and juvenile eel, as well as to provide adequate downstream passage and escapement to the ocean for pre-spawn adult eel. Another objective is to restore American eel where they have been extirpated and increase their numbers where they still occur. The FMP identifies the lack of adequate upstream and downstream passage for migrating juvenile and adult eels as an impact on the population.

Since its development in 2000, the FMP has been modified four times. Addendum I (approved 2006) established a mandatory reporting of harvest and effort by commercial fishers and dealers (ASMFC 2006, page 2). Addendum II (approved 2008) made recommendations for improving upstream and downstream passage for American eel. The ASMFC recommended special considerations for American eel in Commission hydropower licensing proceedings. These considerations include, but are not limited to, improving upstream and downstream passage, and collecting data on both means of passage (ASMFC 2008). In addition, the 2012 Benchmark Stock Assessment (ASMFC 2012) found that the American eel population in U.S. waters is at or near historically low levels due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease. Addendum III (ASMFC 2013) contains a recommendation that jurisdictions identify opportunities to work within the Commission's review process and with non-Commission dam owners to improve downstream eel passage and to seek opportunities to improve upstream eel passage through obstruction removal and deployment of eel passage structures. Addendum IV (ASMFC 2014) made changes to the commercial fishery, implementing restrictions on the elver and yellow eel commercial fisheries.

Accordingly, the NHFGD and MEDIFW have identified the need to improve aquatic connectivity for eel and pursue enhanced eel passage where practicable. Count data at South Berwick, the first dam on the Salmon Falls River, as well as a study performed as part of the Rollinsford relicensing proceeding (Gomez and Sullivan 2019), document that eel are in the vicinity of those downstream projects. Similarly, eight nighttime eel surveys at the Lower Great Falls Project revealed that juvenile eel in the pools downstream of the dam were too numerous to count and actively exhibiting a searching behavior at the base of the dam. During the 2018 passage season, an eel trap placed within the pool downstream of the dam captured 1,014 eel. Further, as discussed in the FLA, American eel are known to be present within the Project's impoundment and 20 miles upstream at the South Milton Hydroelectric Project.

There are no technical fishways at the Project designed for eel moving upstream and downstream. Providing safe, timely, and effective upstream passage will enhance the abundance of eel in the Salmon Falls River watershed. Likewise, providing safe, timely, and effective downstream passage will avoid or minimize mortality of eel if they pass downstream of the dam during their lengthy freshwater residency period and while adults are migrating to the

sea to spawn. This is consistent with regional fishery management goals (ASMFC 2000, entire) and the Service's 12-month finding (80 FR, page 60837).

4.4 ALOSINES: ALEWIFE, BLUEBACK HERRING, AND AMERICAN SHAD

Alosines are important forage stocks for other marine species (e.g., cod, striped bass, bait for lobster [Walter et al. 2003, page 355; Hall et al. 2012, pp. 723-724]). Depleted alosine stocks have negatively impacted other fisheries (Nelson et al. 2003, page 3; Ames 2004, page 19; Hall et al. 2012, pp. 728-729; Essington et al. 2015, page 6651) and impact freshwater predators (Mattocks et al. 2017, page 721). Historically, river herring and American shad supported important commercial and recreational fisheries. However, due to declines in stock abundance, many states have implemented bans on the harvest of these species (ASMFC 2007) and continue to implement closures (C. Patterson, NHFGD, personal communication, June 5, 2020).

4.4.1 ALOSINE BIOLOGY AND LIFE HISTORY

The American shad is the largest member of the herring family, averaging between 17 and 24 inches in length and between 3 and 6 pounds in weight at sexual maturity (MRTC 1997). The American shad's range extends along the East Coast from the Bay of Fundy, Canada, to Florida (Stier and Crance 1985, page 1). In the marine environment, the American shad is considered to be pelagic and highly migratory, moving between summer feeding areas and overwintering areas (ASMFC 2009). The species exhibits strong homing to its natal river and is capable of migrating long distances (e.g., 204 miles in the Connecticut River) up unimpeded rivers and streams (MDMR 2013; MEDIFW 2008; SRAFRC 2010; CRASC 2017). Maturation of American shad in the Northeast occurs between 3 to 5 years for males, and 4 to 6 years for females (Collette and Klien-MacPhee 2002). Adult shad begin to congregate along the coast, and in estuaries, when temperatures range from 3 to 15°C and spawn when temperatures range between 8 and 26°C. American shad require well oxygenated water of 5 milligrams per liter or more for successful spawning and egg and larval development (Stier and Crance 1985), and generally their spawning habitats are broad shallow water areas of rivers and streams over a clean sand and gravel substrate (Stier and Crance 1985). Shad usually spawn at night or during overcast days. In the northern part of their range, shad are capable of spawning more than once and may live up to 10 years (MDMR 2013). Juvenile shad spend the summer in their natal riverine habitat and migrate to the estuary in the fall before entering the ocean (Weiss-Glanz et al. 1986). American shad size, schooling behavior, and timing of migration (upstream and downstream) are key factors in designing, locating, and timing the operation of any fishway for the species and have been taken into account in preparing this Prescription for Fishways.

The blueback herring is an anadromous fish distributed along the Atlantic coast from Nova Scotia, Canada, to Florida (McBride et al. 2010). Adults grow to between 10 and 11 inches long, on average. The onset of spawning is related to temperature, and thus, varies with latitude (MRTC 1997). In the southern part of their range, adults were collected as early as January and as late as April during the spawning runs of 2002 through 2005 (McBride et al. 2010), whereas blueback herring in the Gulf of Maine typically begin their upstream spawning migration when water temperature exceeds 14°C (Loesch and Lund 1977, page 584).Their spawning migrations typically peak in mid-June, 3 to 4 weeks after the peak of the alewife spawning runs (Mullen et al. 1986, page 6). Adults prefer to spawn in swift flowing sections of freshwater tributaries, channel sections of fresh and brackish tidal rivers, and coastal ponds, over gravel and clean sand substrates, especially in northeastern rivers where alewife and blueback herring coexist

(MRTC 1997). Blueback herring are iteroparous, meaning they do not die after spawning and will return to spawn again. Spawning consists of males and females broadcasting their gametes simultaneously into the water column and over the substrate (MRTC 1997). Post-spawn adults migrate rapidly downstream after spawning, usually leaving the spawning area within 5 days (Mullen et al. 1986, page 7). Larvae begin to feed externally 3 to 5 days after hatching, and transform gradually into the juvenile stage (MRTC 1997). Juveniles remain in freshwater nursery areas feeding mainly on zooplankton (MRTC 1997), growing to a length of 3 to 4 inches before moving downstream to more saline waters and eventually to the sea. In the Gulf of Maine, juvenile blueback herring migrate to the ocean from August through November (Saunders et al. 2006, page 539). Blueback herring mature in 3 to 5 years, whereupon they return to their natal streams to spawn (Mullen et al. 1986, page 5). Adult blueback herring are strong swimmers, with abilities comparable to alewives adjusted for body size (Castro-Santos 2005, page 427). Generally, blueback herring do not leap or jump over obstacles; they use streaming flow to pass impediments. Blueback herring size, schooling behavior, and timing of migration (upstream and downstream) are key factors in designing, locating, and timing the operation of any fishway for this species and have been taken into account in preparing this Prescription for Fishways.

The alewife is an anadromous fish distributed along the Atlantic coast from Newfoundland and Labrador, Canada, to North Carolina (ASMFC 2012). Alewives in the Gulf of Maine generally begin their upstream spawning migration in early May (Saunders et al. 2006) but are reliant on water temperatures exceeding 10.5°C. Alewives can migrate in vast numbers displaying schooling behavior that may overwhelm upstream fishways and exhibit a preferred diel migratory behavior based on light and temperature (Mullen et al. 1986). In general, alewives migrate upstream during the day within a preferred temperature range (i.e., early year spawners will peak during the warmest time of the day and late year spawners will peak during the coolest time of the day). Adult migration in the northern portion of their range begins early-to-mid-spring when the ocean begins to warm and river temperatures are 16 to 19°C (Ellis and Vokoun 2009; Loesch 1987). Adult alewives are moderately strong swimmers, but rarely leap out of the water column to pass obstacles. Unlike salmonids, alewives prefer streaming flow; plunging flow and turbulence may disorient them. Alewives are able to spawn in a variety of lentic habitats, but typically spawn in ponds and lakes. Adult alewives spend weeks to months in freshwater systems after spawning (Rosset et al. 2017), and juvenile alewives live in freshwater for one to several months, emigrating from freshwater during August to as late as November (Saunders et al. 2006). Juvenile emigration is strongly correlated with precipitation events that result in transient decreases in water temperature and increases in stream flow (Gahagan et al. 2010). Juvenile emigration occurs in waves as large schools of fish, typically reaching estuarine habitats in a matter of days (Mullen et al. 1986). Alewife size, schooling behavior, and timing of migration (upstream and downstream) are key factors in designing, locating, and timing the operation of any fishway for this species and have been taken into account in preparing this Prescription for Fishways.

4.4.2 ALOSINE POPULATION STATUS AND MANAGEMENT GOALS

The most recent coast-wide stock assessment for American shad, completed in 2007, found that stocks are currently at all-time lows and do not appear to be recovering (ASMFC 2007).[8] The identified causes of the decline include overfishing, pollution, and habitat loss due to dam

[8] http://www.asmfc.org/species/shad-river-herring (accessed April 5, 2021).

construction. Likewise, the 2012 river herring benchmark stock assessment found that 23 of 52 river herring stocks were depleted relative to historic levels, one was increasing, and the status of the remaining stocks could not be determined due to insufficient data.[9] Alewife and blueback herring were petitioned for listing under the Endangered Species Act (ESA) in 2011. Although the National Marine Fisheries Service (NMFS) determined in 2013 that listing was not warranted (78 FR 48944), it committed to partnering with the ASMFC and other stakeholders to develop a comprehensive conservation plan for river herring throughout its entire range.[10] In August of 2017, NMFS announced the initiation of a new status review of river herring to determine whether listing either species as endangered or threatened under the ESA is warranted (82 FR 38672). In June of 2019, NMFS completed the status review and found that the listing was not warranted. However, NMFS' Status Review Team acknowledged that alewife are at historical low levels (84 FR 28630).

The decline of alosines and the ecological services they provide is a widely held concern among Atlantic Coast states in the Northeast. Management objectives for American shad and river herring are outlined in the FMP for anadromous alosine stocks of the eastern United States (ASMFC 1985) and the FMP's amendments (ASMFC 2009; ASMFC 2010).

The goal of Amendment 2 to the FMP is to enhance and restore east coast migratory spawning stocks of, among other alosines, alewife and blueback herring in order to achieve stock restoration and maintain sustainable levels of spawning stock biomass (ASMFC 2009). Objectives of Amendment 2 include preventing further declines in river herring abundance. The FMP states that much of the reduction in river herring stocks along the Atlantic Coast is related to degradation of spawning and nursery habitat by anthropogenic activities, including dam construction (ASMFC 2009). The protection, restoration, and enhancement of river herring habitat is deemed critical for preventing further declines in river herring abundance and to restoring healthy, self-sustaining populations to the East Coast of the United States (ASMFC 2009). One strategy identified in the FMP is for each state to develop a plan to improve the quality of, and restore adequate access to, river herring habitat within its area of jurisdiction (ASMFC 2009). Actionable recommendations in the FMP include pursuing installation of passage facilities where dam removal is not feasible and enhancing survival at dams during emigration (ASMFC 2009). The NHFGD developed the New Hampshire ASMFC River Herring Sustainable Fishing Plan (NHFGD 2020), and the MDMR developed the Maine River Herring Sustainable Fisheries Plan (MDMR 2015), which are included in Appendix B and Appendix C, respectively, of this document.

The goal of Amendment 3 to the FMP is to protect, enhance, and restore Atlantic Coast migratory stocks and critical habitat of American shad in order to achieve levels of spawning stock biomass that are sustainable, can produce a harvestable surplus, and are robust enough to withstand unforeseen threats (ASMFC 2010). Objectives include maximizing the number of juvenile shad recruits emigrating from freshwater stock complexes and restoring and maintaining shad spawning stock biomass and age structure to achieve maximum juvenile recruitment (ASMFC 2010). Identified strategies to achieve these objectives include restoring and maintaining access to historical spawning and nursery habitat and achieving river-specific restoration targets for shad populations as specified in the recent shad assessment or in existing

[9] Ibid.
[10] Ibid.

stock-specific restoration plans (ASMFC 2010). The MDMR developed the American Shad Habitat plan (MDMR 2013), which is included in Appendix D of this document.

Alosine populations have the ability to rebound once passage impediments are removed or safe, timely, and effective upstream and downstream passage is provided, as evident at the first dam on the Salmon Falls River, South Berwick. The South Berwick fishway passed river herring in the first year of its operation (2002), and 16,418 river herring in 2019 (C. Patterson, NHFGD, personal communication, June 10, 2020). As indicated in a technical guidance letter, dated October 18, 1999, from the Service to the owner of South Berwick, the upstream passage facility at the dam was designed to pass 180,000 river herring and 3,900 American shad.

Using the current New Hampshire River Herring Sustainable Fishing Plan (NHFGD 2020) guidance of 350 river herring per acre and the Connecticut River American Shad Plan of 111 shad per hectare (CRASC 2017), the anticipated alosine population for the impoundment above Rollinsford (71.7 acres), up to Lower Great Falls, is estimated to be approximately 21,315 river herring and 2,731 American shad. Upstream of Lower Great Falls to the Somersworth Hydroelectric Project (FERC No. 3820), the Salmon Falls River is anticipated to support a population of 12,425 river herring and 1,595 American shad. In order to enhance and restore a shad and river herring population to the Salmon Falls River, safe, timely, and effective, upstream and downstream passage must be provided.

5 PROPOSED FISH PASSAGE FACILITIES

5.1 ANADROMOUS SPECIES

There are no existing upstream or downstream alosine passage facilities at the Project. The Applicant is not proposing to provide upstream or downstream passage to anadromous species at this time.

5.2 AMERICAN EEL

There are no existing upstream or downstream eel passage facilities at the Project. The Applicant proposes to provide upstream eel passage within 4 years of the effective date of the subsequent license. The eel ramp location(s) would be based on the results of a two-season eel ramp siting study which will be performed starting the first full passage season after the effective date of the subsequent license. Downstream eel passage would be provided within 4 years of the effective date of the subsequent license, and would consist of interim targeted turbine shutdowns from 8 pm to 4 am for three consecutive nights following rain accumulation of 0.5 inch or more over a 24-hour period during the months of September and October, in combination with the construction and operation of a downstream fish bypass structure.

6 MANAGEMENT PLANS

6.1 COMPREHENSIVE PLANS

A list of Resource Management Plans approved by the Commission as Comprehensive Plans and that are relevant in this case is provided in Section 12.1. Specifically, the following published

regional fishery plans recognized by the Commission's Licensing Process contain management goals that pertain to alosines and American eel:

Atlantic States Marine Fisheries Commission. 2000a. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.

Atlantic States Marine Fisheries Commission. 2000b. Interstate fishery management plan for American Eel. Fishery Management Report No. 36 of the Atlantic States Marine Fisheries Commission.

Atlantic States Marine Fisheries Commission. 2008. Amendment 2 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2008.

Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.

Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.

Atlantic States Marine Fisheries Commission. 2013. Amendment 3 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. August 2013.

The goal of the ASMFC eel-specific plans are discussed in Section 4.3.2.

The goals and objectives of the ASMFC alosine-specific plans are discussed in Section 4.4.2.

6.2 STATE PLANS

NHFGD developed the New Hampshire ASMFC River Herring Sustainable Fishing Plan (NHFGD 2020). This plan's purpose is to ensure river herring populations in New Hampshire remain stable and fishing opportunities continue to exist. The plan consists of information regarding the current status of stocks in New Hampshire, sustainability targets, adaptive management strategies, and descriptions of the fishery in the Great Bay Estuary. Additionally, the MDMR developed the American Shad Habitat Plan (MDMR 2013) and the Maine River Herring Sustainable Fisheries Plan (MDMR 2015) to ensure existing river herring resources within Maine continue to thrive and provide a source of forage for Maine's fish and wildlife and provide commercial fishing opportunities in coastal Maine's communities.

In addition, both the New Hampshire and Maine Wildlife Action Plans (NHFGD 2015, MEDIFW 2015, respectively) identify American eel as a Species of Greatest Conservation Need (SGCN) and alewife, blueback herring, and shad as Species of Concern (SC), with the restoration of stream connectivity as an action to conserve each species.

7 STATUTORY AUTHORITY

Statutory authority to prescribe upstream and downstream passage facilities derives from Section 18 of the FPA, 16 USCS §8ll, which states in pertinent part:

> *...the Commission shall require the construction, maintenance and operation by a licensee at its own expense of ...such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior.*

Such authority is further defined in Section 170l(b) of the Energy Policy Act of 1992, P.L. 102-486, Title XVII, §l701 (b), 106 Stat. 3008, which states, in part:

> *That the items which may constitute a 'fishway' under Section 18 (Federal Power Act, 16 USCS §811) for the safe and timely upstream and downstream passage of fish shall be limited to physical structures, facilities, or devices necessary to maintain all life stages of such fish, and project operations and measures related to such structures, facilities or devices necessary to ensure the effectiveness of such structures, facilities, or devices for such fish.*

The Preliminary Prescription for Fishways herein is issued under authority delegated to the Regional Director from the Secretary of the Interior; the Assistant Secretary for Fish, Wildlife and Parks; and the Director of the Service pursuant to Section 18 of the FPA (see 64 Stat. 1262; 209 Departmental Manual 6.1; 242 Departmental Manual 1.IA).

8 ADMINISTRATIVE RECORD

Evidence to support the Department's Preliminary Prescription for Fishways is contained in the Administrative Record before the Commission, as supplemented by additional materials being provided under separate cover.

9 ALTERNATIVES CONSIDERED

Although the Licensees' final license application does not propose to implement upstream anadromous fish passage at the Lower Great Falls Project, as discussed above, the Licensees and the Service entered into a Settlement Agreement that specifies the Licensees construct and operate upstream fish passage for American shad and river herring at the Lower Great Falls Project. As a result, in Section 11 of this Fishway Prescription, pursuant to Section 18 of the FPA, the Service is prescribing permanent upstream fish passage facilities that will provide safe, timely, and effective alosine passage, consistent with the Settlement Agreement. Further, while the Licensees propose to construct and operate downstream fish passage structures for American eel and resident species, they do not propose to provide downstream passage for anadromous species. Therefore, in Section 11 of this Fishway Prescription, pursuant to Section 18 of the FPA, the Service is prescribing permanent downstream fish passage facilities that will provide safe, timely, and effective passage for alosine species.

The Service and the Licensees agree that upstream and downstream eel passage is needed at the Project. The design of upstream eel passage facilities will depend on the final location(s), which will be determined based on a two-season siting survey. The Licensees propose to perform the siting studies in the first full passage season after the effective date of the subsequent license.

The Licensees propose to implement downstream passage and protection measures for eel, and resident fish species, within 4 years of the effective date of the subsequent license. Measures would include targeted nightly shutdowns and the installation and operation of a downstream fish passage structure.

Although the Service contends there is general agreement among parties regarding the need for eel passage, the alternatives considered during consultation are discussed below.

9.1 UPSTREAM AMERICAN EEL PASSAGE

Fish passage count data at South Berwick, studies performed as part of the Rollinsford relicensing proceeding (Gomez and Sullivan 2019), and Appendix D of the FLA document that eel migrate up the Salmon Falls River and reach the Lower Great Falls Project. While the design, construction, and operation of upstream eelway(s) typically are much less costly than anadromous upstream passage facilities, proper siting is crucial. Project and bypass flows may change under a new license, which could result in markedly different hydraulic conditions. Therefore, in order to determine where eel congregate to move upstream, the Licensees will need to conduct the proposed two-season survey, starting the first passage season after license issuance. Once areas of juvenile eel concentration have been identified, the Licensees shall design eelway(s) suitable for those locations, in consultation with the agencies, and pursuant to Service design criteria (USFWS 2019).

9.2 DOWNSTREAM AMERICAN EEL PASSAGE

State-led fisheries surveys (NHFGD 2015), as well as an upstream eel passage assessment performed at Lower Great Falls in 2020 (Gomez and Sullivan 2020) indicate eel are present upstream of the Project. The Licensees propose to implement downstream passage and protection measures within 4 years of the effective date of the subsequent license. Specifically, measures include seasonal nightly turbine shutdowns and the installation and operation of a volitional downstream fish passage structure. As proposed, the turbines would be shut down from 8:00 pm to 4:00 am, during the months of September and October for three consecutive nights following rain accumulations of 0.5 inch or more over a 24-hour period. While the Licensees propose a volitional downstream fish passage structure, they do not provide any details for this facility. Given the presence of eel upstream of the Project, downstream passage protection measures will be needed sooner than 4 years after license issuance.

The Service notes a few issues with the Licensees' downstream passage proposal. First, limiting shutdowns to September and October does not fully protect outmigrating silver eel, as the passage season extends from August through November (Oliveira and McCleave 2000; Haro et al. 2003; ASMFC 2012). Second, because turbine shutdowns are inadequately protective of outmigrating silver eel, this measure is not a suitable long-term downstream passage solution. Lastly, the Project's trashracks have a clear spacing of 2 inches and do not meet the Service's design criteria of 0.75-inch clear spacing.

We further note that with the installation of the agreed upon upstream alosine passage, adult and juvenile alosines also will use the Licensees' proposed downstream passage facility. Therefore, the downstream fish passage structure at the Lower Great Falls Project should provide safe, timely, and effective passage for alosines and eel and should be designed in consultation with the agencies and pursuant to Service design criteria (USFWS 2019) to do so.

10 RESERVATION OF AUTHORITY TO PRESCRIBE FISHWAYS

In order to allow for the timely implementation of fishways, including effectiveness measures, and pursuant to Section 18 of the Federal Power Act, as amended, the Secretary of the

Department of the Interior, reserves their authority to prescribe the construction, operation, and maintenance of fishways at the Lower Great Falls Hydroelectric Project, FERC Project No. 4451, as appropriate, including, but not limited to, measures to determine, ensure, or improve the effectiveness of such fishways prescribed in section 11 below.

11 PRELIMINARY PRESCRIPTION FOR FISHWAYS

Pursuant to Section 18 of the FPA, as amended, the Secretary of the Interior, as delegated to the Service, hereby exercises her authority to prescribe the construction, operation, and maintenance of such fishways as deemed necessary, subject to the procedural provisions contained above.

The Department's Preliminary Prescription for Fishways is the result of consultation among the Service, NHFGD, MEDIFW, MDMR, and the Licensees. Fishways shall be constructed, operated, and maintained to provide safe, timely, and effective passage for river herring (alewife and blueback herring), American shad, and American eel at the Licensees' expense.

11.1 UPSTREAM AND DOWNSTREAM PASSAGE

The Licensees shall construct, operate, maintain, monitor, and periodically test the effectiveness of fishways for river herring, American shad, and American eel (collectively, the "target species") as described below. The fishways will be designed, constructed, maintained, and operated (which includes project operations) to safely, timely, and effectively pass the target species upstream and downstream of the Project.

11.2 DESIGN POPULATIONS

The American eel is a panmictic species; therefore, there are no subpopulations. All individuals are genetically, behaviorally, and physically representative of the entire worldwide population, and offspring spawned in the Sargasso Sea have the same random chance of ending up in any watershed between Florida and Maine. Based on monitoring data at the downstream South Berwick eelway, we expect thousands of juvenile eel to use upstream facilities at the Project. The type of eelway(s) likely to be used at the site has been shown to be capable of passing nearly 20,000 eel;[11] therefore, the Service expects it can accommodate the annual movement of eel on the Salmon Falls River.

As noted in Section 4.4.2, the anticipated alosine population for the Project's impoundment is approximately1,595 American shad and 12,425 river herring. A standard 4-foot-wide Denil fish ladder has an annual biological capacity of approximately 25,000 adult American shad, 12,000 Atlantic salmon, or 200,000 adult river herring (USFWS 2019). Given these capacities, a single 4-foot Denil ladder (or equivalent), installed at a slope of 1:8 (vertical:horizontal) or milder, should be sufficient to pass the design populations of the target species for the foreseeable future.

[11] In 2016, over 18,000 juvenile eel were counted passing an eel ramp at the Holyoke Project (FERC No. 2004).

11.3 FISH PASSAGE OPERATING PERIODS

Fishways shall be operational during the migration windows for target species present. The migratory season for diadromous fish has been studied for the major rivers of the Northeast (Facey and Van Den Avyle 1987, page 7; Mullen et al. 1986; Weiss-Glanz et al. 1986; Loesch 1987; ASMFC 2000, page 8; Saunders et al. 2006, page 539; ASMFC 2009, page 9; Shepard 2015; Eyler et al. 2016). The season depends on geographic location, water temperature, river flow, and other habitat cues. These dates may change based on new information, evaluation of new literature, and agency consultation. Based on data from nearby watersheds, approved fish passage protective measures shall be operational during the migration windows identified in Table 1 (below).

Table 1. Summary of migration periods for which fish passage will be provided.

Species	**Upstream Migration Period**	**Downstream Migration Period**
Alosines: American shad, river herring	April 15–July 15	June 1 – November 15
American eel	May 1–October 31	August 15 – November 15

11.4 FISHWAY OPERATION AND MAINTENANCE PLAN

Within 12 months of license issuance, the Licensees will prepare and provide to the Service, NHFGD, MEDIFW, MDMR, and the National Marine Fisheries Service, a Fishway Operation and Maintenance Plan (FOMP) covering all operations and maintenance of the upstream and downstream fish passage facilities in operation at the time. The FOMP shall include:

a. a schedule for routine fishway maintenance to ensure the fishways are ready for operation at the start of the migration season;
b. procedures for routine upstream and downstream fishway operations; and
c. procedures for monitoring and reporting on the operation and maintenance of the facilities as they affect fish passage.

The FOMP shall be submitted to the Service for review and approval prior to submitting the FOMP to the Commission for its approval. Thereafter, the Licensees will keep the FOMP updated on an annual basis, to reflect any changes in fishway operation and maintenance planned for the year. If the Service requests a modification of the FOMP, the Licensees shall amend the FOMP within 30 days of the request and send a copy of the revised FOMP to the Service. Any modifications to the FOMP by the Licensees will require the approval of the Service prior to implementation and prior to submitting the revised FOMP to the Commission for its approval.

The Licensees shall provide information on fish passage operations and project generating operations that may affect fish passage, upon written request from the Service or other resource agencies. Such information shall be provided within 10 calendar days of the request, or upon a mutually agreed upon schedule.

11.5 INSPECTION

The Licensees shall provide access to the project site and to pertinent project records to Service personnel and its designated representatives, for the purpose of inspecting the fish passage facilities and to determine compliance with the Prescription.

11.6 SCHEDULING

Timely construction, operation, maintenance, and measures for upstream and downstream fish passage, including studies and evaluations, are necessary to ensure their effectiveness and to achieve restoration goals. Therefore, the Licensees shall notify, and obtain approval from, the Service for any extension to comply with prescribed conditions.

11.6.1 IMPLEMENTATION

The Licensees shall develop design plans for fishways and submit these plans to the Service and other resource agencies for review and approval during conceptual, 30 percent, and 90 percent design stages. This will ensure safe, timely, and effective fishway passage is designed and constructed on a timely schedule to meet the implementation dates indicated below. Designs shall be consistent with the 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated version.

The Licensees shall adhere to the following dates for installing fishways:

a. The upstream anadromous fish systems are to be operational no later than March 15 of the fourth calendar year after permanent volitional upstream fishways for American shad and river herring become operational at the downstream Rollinsford Hydroelectric Project (FERC No. 3777).
b. The downstream anadromous fish and downstream eel passage system is to be operational within 3 years of license issuance.
c. The upstream eel passage systems are to be operational after the upstream anadromous fish systems are installed, within 4 years of license issuance.

For upstream and downstream anadromous fish and downstream eel passage systems, the Licensees shall adhere to the following design milestone schedule:

a. conceptual designs 15 months prior to the start of construction;
b. 30 percent design 12 months prior to the start of construction; and
c. 90 percent design and Basis of Design Report 3 months prior to the start of construction.

The Licensees shall adhere to the following design milestone schedule for the upstream eel passage system(s):

a. 30 percent designs 4 months prior to the start of construction, and following delivery of the eelway siting survey report; and
b. 90 percent designs 2 months prior to the start of construction.

Following approval by the Service and other resource agencies, the Licensees shall submit final design plans to the Commission for its approval and prior to the commencement of fishway

construction activities. Once the fishways are constructed, final as-built drawings that accurately reflect the Project as constructed shall be filed with the Service, the other resource agencies, and the Commission.

11.7 FISH PASSAGE EFFECTIVENESS MEASURES

Effectiveness testing of both upstream and downstream American eel and anadromous fish passage is critical to evaluating passage success, diagnosing problems, determining when fish passage modifications are needed, and what modifications are most likely to be effective over the term of the license.

11.7.1 FISHWAY EFFECTIVENESS MONITORING PLAN

The Licensees must develop a Fishway Effectiveness Monitoring Plan (FEMP) in consultation with, and requiring approval by, the Service. The FEMP will contain plans for ensuring (1) the effectiveness of the upstream anadromous, upstream eel, downstream anadromous, and downstream eel passage measures required pursuant to Sections 11.8 through 11.11; and (2) that the minimum bypass flow that provides safe, timely, and effective downstream passage to emigrating diadromous species (i.e., does not strand fish). The FEMP shall be submitted to FERC for approval 6 months prior to the implementation dates for installing upstream anadromous fish systems specified in Section 11.6.1.

The Licensees shall begin implementing effectiveness testing measures at the start of the first migratory season after the fishway(s) are operational and shall conduct quantitative fish passage effectiveness testing and evaluation for a minimum of 2 years. If the Service requests a modification of the FEMP, the Licensees shall amend the FEMP within 30 days of the request and send a copy of the revised FEMP to the Service and resource agencies. Any modifications to the FEMP by the Licensee will require approval by the Service prior to implementation.

The Licensees will submit yearly interim study reports to the Service following the conclusion of each study year. The interim reports for upstream passage studies will be submitted to the Service by February 15 following each study year. The final study report will be submitted to the Service within 6 months after the completion of the study. The final study report will include methods, data analysis, results, an assessment of any factors or potential problems hindering passage effectiveness, and provide recommended modifications to achieve safe, timely, and effective passage. In conjunction with submitting the final study report, the Licensee will also provide electronic copies of all data collected from studies to the Service.

The Licensees shall meet annually, in the late fall, with the Service and the other resource agencies to report on the occurrence of fish passage maintenance and operations, monitoring results, and review the operating plan. Any changes and planned maintenance must be completed prior to the start of the next migratory season.

11.8 UPSTREAM ANADROMOUS PASSAGE

1. The Licensees shall construct, operate, and maintain upstream fish passage facilities that pass anadromous fish species in a safe, timely and effective manner. Based on the best scientific information available at this time, these fishways could satisfy the standard of safe, timely, and effective: a technical fishway from the Project's tailrace, a

technical fishway at the Project's dam, or a nature-like fishway (NLF) at the Project's dam.[12] At the lowest end of its operating range, any NLF should be designed to meet Service criteria for depth, velocity, and pool size (USFWS 2019) while passing the minimum required flows in the bypass; additional bedrock modifications may be necessary to extend the operating range during periods of moderate spill.

2. The size of the fishway shall accommodate the anticipated production potential of the Lower Great Falls impoundment: 12,425 river herring, 1,595 shad, and approximately 500 resident or target species. A standard 4-foot-wide Denil fish ladder is estimated to have an annual biological capacity of 25,000 adult American shad, 12,000 Atlantic salmon, or 200,000 adult river herring (USFWS 2019). Given these capacities, a single 4-foot Denil ladder (or equivalent), installed at a slope of 1:8 (vertical:horizontal) or milder, should be sufficient to pass the design populations of target species.
3. The design elements (e.g., slope, pool/slot size, attraction water) of the fishway shall ensure successful passage of river herring and American shad. The fishway shall operate for the full range of design flows based on the migratory season for each species in accordance with provisions of Section 11.3.
4. The fishway shall be constructed and operational by March 15 of the fourth calendar year after permanent volitional upstream fishways for American shad and river herring become operational at the downstream Rollinsford Hydroelectric Project (FERC No. 3777).
5. Fishway design shall be consistent with the Service's 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated version.

Justification

The Salmon Falls River, in the vicinity of the Project, once supported runs of diadromous species including alosines (Odell et al. 2006; Old Berwick Historical Society 2020) and existing FMPs call for restoring access to historical spawning and rearing habitat. Currently, alosines are provided freshwater access to the Salmon Falls River via the South Berwick Dam at the head-of-tide. Approximately 16,418 river herring passed South Berwick in 2019, and 24,571 river herring passed South Berwick in 2018 (M. Dionne, NHFGD, personal communication, May 22, 2020).

The Offer of Settlement for the downstream Rollinsford Hydroelectric Project includes provisions for interim upstream passage for alosines via trap and track and the future installation of volitional passage facilities.[13] The Lower Great Fall Project will impede migratory movement of river herring and American shad in the Salmon Falls River.

Fish passage at the Lower Great Falls Project, along with the implementation of passage measures at the downstream Rollinsford Project will provide approximately 4.1 river miles of available habitat to anadromous fish in the Salmon Falls River.

[12] Nature-like fishways (NLF) are structures designed to mimic the natural functions and/or aesthetics of a river; NLF can include, but are not limited to, simple bedrock modification, weir placement, rock ramps, etc.
[13] Accession Number: 20210305-5218.

11.9 UPSTREAM AMERICAN EEL PASSAGE

1. The Licensees shall construct, operate, and maintain upstream fish passage facilities that provide safe, timely, and effective upstream passage for American eel.
2. In order to determine proper siting of the upstream eelway(s), the Licensees shall conduct a two-season upstream eel ramp siting survey beginning the first full passage season after license issuance. Based on results of that survey, the Licensees shall, in consultation with the Service and other resource agencies, determine optimal locations for siting permanent upstream eelway(s).
3. Permanent eelway(s) shall be operational no later than May 1 of the second calendar year after the siting surveys are complete.
4. The upstream facilities shall be designed in consultation with the resource agencies, and the resource agencies shall review the 30 percent and 90 percent drawings.
5. The designs shall be consistent with the Service's 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated version.

Justification

Dedicated upstream eel passage is necessary to provide access to rearing habitat upstream of the Project throughout the migratory eel passage season. Count data at South Berwick, as well as a study performed as part of the Rollinsford Project's licensing proceeding (Gomez and Sullivan 2019), and Appendix D of the Project's FLA, document eel are downstream of the Lower Great Falls Dam. Upstream migrating juvenile eel can be effectively passed at hydroelectric projects (Solomon and Beach 2004, entire).

Because the Project includes a bypass reach that will have a continuous flow, there are two potential areas of attraction for up-migrating eel: in the vicinity of the powerhouse and at the base of the dam. Therefore, more than one eelway may be needed to provide effective passage. The most suitable location(s) for permanent eelway(s) should rely on empirical data which will be collected during the siting surveys.

11.10 DOWNSTREAM AMERICAN EEL PASSAGE

1. The Licensees shall construct, operate, and maintain a downstream eel passage and protection system that provides safe, timely, and effective downstream passage for American eel.
2. The Licensees shall implement, as an interim measure, targeted nighttime turbine shutdowns to protect emigrating eel during the first year of license issuance. Turbine shutdowns shall occur from dusk to dawn for three consecutive nights following rain accumulations of 0.50 inch or more, as measured at the Project, over a 24-hour period. Turbine shutdowns should occur during the duration of the downstream eel passage season in accordance with provisions of Section 11.3.
3. The Licensees shall implement permanent downstream eel passage and protection measures within 3 years of license issuance.
4. Pursuant to the conditions provided herein, the Licensee shall develop a plan to provide permanent downstream eel passage and protection, in conformance with the Downstream Implementation Schedule specified in 11.6.1. The plan, including the design of permanent eel passage facilities and/or operational measures and permanent downstream alosine passage, shall be developed in consultation with, and require approval by, the

Service.

Justification

Dedicated downstream fish passage facilities are necessary to protect diadromous species emigrating past the Project. State-led fisheries surveys as well as an upstream eel passage assessment performed at Lower Great Falls in 2020 (Gomez and Sullivan 2020) indicate eel are present upstream of the Project's dam. The eel population inhabiting the river upstream of the Project will increase over time as upstream eelway(s) become operational. Absent passage and protection measures, outmigrating silver eel are be susceptible to impingement and/or entrainment. Estimated project-specific survival rates indicate eel would sustain high mortality rates should they pass through the Project's turbines.[14] Facilities and/or measures to provide safe downstream passage for eel are needed as they migrate through the Project on their spawning migration to the Sargasso Sea. Downstream migrating adults and juvenile diadromous fish can effectively be protected from project operation impacts that result in injury and mortality (NMFS 2012; USFWS 2019).

11.11 DOWNSTREAM ANADROMOUS FISH PASSAGE

1. The Licensees shall construct, operate, and maintain a downstream passage and protection system that provides safe, timely, and effective downstream passage for both spent juvenile and adult anadromous fish.
2. The Licensees shall implement permanent downstream alosine passage and protection measures within 3 years of license issuance.
3. Pursuant to the conditions provided herein, the Licensees shall develop a plan to provide permanent downstream alosine passage and protection, in conformance with the Downstream Implementation Schedule specified in 11.6.1. The plan, including the design of permanent downstream alosine passage and permanent eel passage facilities and/or operational measures, shall be developed in consultation with, and require approval by, the Service.

Justification

Dedicated fish passage facilities are necessary to protect diadromous species emigrating past the Project. Downstream migrating adult and juvenile alosines are exposed to project-related impacts (Franke et al. 1997). Estimated project-specific survival rates indicate alosines would sustain a high level of entrainment and mortality should they pass through the Project's turbines.[15] Unless river flows are being spilled at the Project, or fish utilize the minimum flow cutout in the flashboards as a means of passage, there is no alternative downstream route of passage. Therefore, facilities to provide safe downstream passage for alosines are needed as they emigrate through the Project on their way back out to sea. Downstream emigrating adults and juvenile diadromous fish can effectively be protected from project operation impacts that result in injury and mortality (NMFS 2012; USFWS 2019).

[14] FLA, Appendix E, Fish Entrainment and Mortality Study
[15] Ibid.

12 REFERENCES CITED

12.1 COMPREHENSIVE PLANS FILED AT THE COMMISSION

Atlantic States Marine Fisheries Commission. 2000a. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.

Atlantic States Marine Fisheries Commission. 2000b. Interstate fishery management plan for American Eel. Fishery Management Report No. 36 of the Atlantic States Marine Fisheries Commission.

Atlantic States Marine Fisheries Commission. 2008. Amendment 2 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2008.

Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.

Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.

Atlantic States Marine Fisheries Commission. 2013. Amendment 3 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. August 2013.

12.2 OTHER REFERENCES CITED IN THE DECISION DOCUMENT

Ames, E. P. 2004. Atlantic cod stock structure in the Gulf of Maine. Fisheries 29:10-28.

ASMFC. 1985. Fishery management plan for the anadromous alosid stocks of the eastern United States: American shad, hickory shad, alewife, and blueback herring. Fishery Management Report No. 6, Washington, D.C.

ASMFC. 2006. Interstate Fishery Management Plan for American Eel. Addendum I. 8 pages.

ASMFC. 2007. Terms of Reference and Advisory Report to the American Shad Stock Assessment Peer Review. July 16-20, 2007. 37 pages.

ASMFC. 2012. American Eel Benchmark Stock Assessment. Stock Assessment Report No. 12-01. 342 pages.

ASMFC. 2013. Fishery Management Report of the Atlantic States Marine Fishery Commission – Addendum III to the Fishery Management Plan for American Eel. 22 pages.

ASMFC. 2014. Fishery Management Report for the Atlantic States Marine Fishery Commission – Addendum IV to the Fishery Management Plan for American Eel. 26 pages.

Brown, L., A. Haro and T. Castro-Santos. 2009. Three-Dimensional Movement of Silver- Phase American Eels in the Forebay of a Small Hydroelectric Facility. Pages 277- 291 in J.M. Casselman and D.K. Cairns, editors. Eels at the edge: Science, Status, and Conservation Concerns. American Fisheries Society, Symposium. No. 58.

Brown, R.S., A.H. Coleto, B.D. Pflugrath, C.A. Boys, L.J. Baumgartner, Z. D. Deng, L.G.M. Silva, C.J. Brauner, M.M. Cooper, O. Phonkhampeng, G. Thorncraft and D. Singhanouvong. 2014. Understanding barotrauma in fish passing hydro structures: a global strategy for sustainable development of water resources. Fisheries 39:108-122.

Cada, Glenn F., Charles C. Coutant and Richard R. Whitney. 1997. Development of Biological Criteria for the Design of Advanced Hydropower Turbines, DOE/ID-10578, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Cairns, D.K. and coauthors. 2005. Conservation status and population trends of the American eel in Canada. Canadian Science Advisory Secretariat, Department of Fisheries and Oceans, Canada.

Carr, J. W. and F. G. Whoriskey. 2008. Migration of silver American Eels past a hydroelectric dam and through a coastal zone. Fisheries Management and Ecology 15:393–400.

Castro-Santos, T. 2005. Optimal swim speeds for traversing velocity barriers: an analysis of volitional high-speed swimming behavior of migratory fishes. Journal of Experimental Biology 208:421-432.

Castro-Santos, T. and A. Haro. 2003. Quantifying migratory delay: a new application of survival analysis methods. Canadian Journal of Fisheries and Aquatic Sciences 60: 986-996.

Collette, B., and G. Klien-MacPhee. 2002. Bigelow and Schroeder's Fishes of the Gulf of Maine. Third Edition. Smithsonian Institution Press, Washington and London.

Connecticut River Atlantic Salmon Commission (CRASC). 2017. Connecticut River American Shad Management Plan. Sunderland, Massachusetts. June 9, 2017.

Ellis, David and Jason Vokoun. 2009. Earlier Spring Warming of Coastal Streams and Implications for Alewife Migration Timing. North American Journal of Fisheries Management. 29. 1584-1589.

Eyler, S.M., S. Walsh, D.R. Smith and M.M. Rockey. 2016. Downstream Passage and Impact of Turbine Shutdowns on Survival of Silver American Eels at Five Hydroelectric Dams on the Shenandoah River. Tran. Am. Fish. Soc. 145:964-976.

Essington, T., P. Moriarty, H. Froehlich, E. Hodgson, L. Koehn, K. Oken, M. Siple and C. Stawitz. 2015. Fishing amplifies forage fish population collapses. Proc. of the Nat. Acad. of Sci. Vol 73. Pages 6648-6652.

Facey, D. E. and M. J. Van Den Avyle. 1987. Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic) -- American eel. FWS Biol. Rep. 82(11.74) and USACOE, TR EL-82-4, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Franke, G.F., D.R. Webb, R.K. Fisher, Jr., D. Mathur, P.N. Hopping, P.A. March, M.R. Headrick, I.T. Laczo, Y. Ventikos and F. Sotiropoulos. 1997. Development of environmentally advanced hydropower turbine system design concepts. Idaho National Engineering Laboratory. INEEL/EXT-97-00639.

Gahagan, B. I., K. E. Gherard and E. T. Schultz. 2010. Environmental and endogenous factors influencing emigration in juvenile anadromous alewives. Transactions of the American Fisheries Society 139:1069-1082.

Gomez and Sullivan. 2019. Upstream Eel Passage Assessment Study Report for the Rollinsford Hydroelectric Project (FERC No. 3777). 41 pp.

Gomez and Sullivan. 2020. Upstream Eel Passage Assessment Study Report for the Lower Great Falls Hydroelectric Project (FERC No. 4451). 18 pp.

Hall, C.J., A. Jordan and M. G. Frisk. 2012. The historic influence of dams on diadromous fish habitat with a focus on river herring and hydrologic longitudinal connectivity. Landscape Ecology 26: 95–107.

Haro, A., T. Castro-Santos, K. Whalen, G. Wippelhauser, and L. McLaughlin. 2003. Simulated effects of hydroelectric project regulation on mortality of American eels. Biology, management, and protection of catadromous eels. American Fisheries Society, Symposium 33, Bethesda, Maryland. Pages 357–365. 388 pp.

Heisey, P.G., D. Mathur, J.L. Fulmer and E. Kotkas. 2008. Turbine passage survival of late running adult American shad and its potential effect on population restoration. American Fisheries Society Symposium 61:000-000.

Helfman, G.S., D.E. Facey, L.S. Hales and E.L. Bozeman. 1987. Reproductive ecology of the American eel. Am. Fish Soc. Symp. 1:42-56. *In* M.J. Dadswell, R.J. Kauda, C.M. Moffitt, R.L. Saunders, R.A. Rulifson, and J.E. Cooper [eds.]. Common strategies of anadromous and catadromous fishes, American Fisheries Society, Symposium 1. Bethesda, Maryland, USA.

Hitt, N. P., E. Sheila and E. B. John. 2012. Dam removal increases American eel abundance in distant headwater streams. Transactions of the American Fisheries Society 141(5):1171-1179.

Hoover, E. 1938. Biological survey of the Merrimack River. New Hampshire Fish and Game Department. Concord, New Hampshire.

Jansen, H. M., H.V. Winter, M.C.M. Bruijs and H.J.G. Polman. 2007. Just go with the flow? Route selection and mortality during downstream migration of silver eels in relation to river discharge. ICES Journal of Marine Science 64:1437–1443.

Krueger, W. H. and K. Oliveira. 1999. Evidence for environmental sex determination in the American eel, *Anguilla rostrata*. Environmental Biology of Fishes 55(4):381–389.

Kynard, B. and J. O'Leary. 1993. Evaluation of a bypass system for spent American shad at Holyoke Dam, Massachusetts. North American Journal of Fisheries Management 13:782-789.

Limburg, K.E. and J.R. Waldman. 2009. Dramatic declines in North Atlantic diadromous fishes. BioScience 59: 955-965.

Loesch, J. G. 1987. Overview of life history aspects of anadromous alewife and blueback herring in freshwater habitats. American Fisheries Society Symposium 1:89-103.

Loesch, J. G. and W.A. Lund, Jr. 1977. A contribution to the life history of the blueback herring, *Alosa aestivalis*. Transactions of the American Fisheries Society 106:583- 589.

Maine Department of Inland Fisheries Wildlife (MEDIFW) Wildlife Action Plan. 2015. 382 pp.

Maine Department of Marine Resources and Department of Inland Fisheries and Wildlife (MDMR). 2008. Strategic plan for the restoration of diadromous fishes to the Penobscot River. Retrieved from http://cybrary.fomb.org/pages/20080300_PenobscotPlan.pdf. Accessed June 1, 2020.

Maine Department of Marine Resources (MDMR) American Shad Habitat Plan. 2013. 26 pp.

Maine Department of Marine Resources (MDMR) Maine River Herring Sustainable Fisheries Plan Update. 2015. 119 pp.

Mattocks, S., C. Hall and A. Jordaan. Damming, Lost Connectivity, and the Historical Role of Anadromous Fish in Freshwater Ecosystem Dynamics. 2017. BioSci. 67. Pages 713-728.

McBride, R.S., J.E. Harris, A. Reid Hyle and J.C. Holder. 2010. The Spawning Run of Blueback Herring in the St. Johns River, Florida. Transactions of the American Fisheries Society 139(2): 598-609.

Merrimack River Technical Committees (MRTC). 1997. Strategic plan and status review: anadromous fish restoration program, Merrimack River. U.S. Fish and Wildlife Service, Nashua, New Hampshire.

Mullen, D. M., C. W. Fay and J. R. Moring. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic): alewife/blueback herring. U.S. Fish and Wildlife Service Biological Report 82(11.56). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

National Marine Fisheries Service (NMFS). 2012. Diadromous fish passage: a primer on technology, planning, and design for the Atlantic and Gulf coasts. NMFS, Southeast and Northeast Regions. pp 163.

Nelson, G., B. Chase and J. Stockwell. 2003. Food Habits of Striped Bass (*Morone saxatilis*) in Coastal Waters of Massachusetts. J. Northw. Atl. Fish. Sci. Vol 32. Pages 1-25.

New Hampshire Fish and Game Department (NHFGD) Wildlife Action Plan. 2015. Retrieved from https://www.wildlife.state.nh.us/wildlife/wap.html. Accessed June 2, 2020.

New Hampshire Fish and Game Department (NHFGD) New Hampshire ASMFC River Herring Sustainable Fishing Plan. 2020. 59 pp.

Odell, J., A. Eberhardt, D. Burdick and P. Ingraham. 2006. Great Bay Estuary restoration compendium. The Nature Conservancy, New Hampshire Estuaries Project. University of New Hampshire, Dunham. 93 pp.

Old Berwick Historical Society. 2020. Berwick Begins: 1631-1713. Retrieved from http://oldberwick.org/oldberwick/index.php?option=com_content&view=article&id=519:berwick-begins-1631-1713&catid=53&Itemid=72. Accessed June 2020.

Oliveira, K. and J.D. McCleave. 2000. Variation in population and life history traits of the American eel, *Anguilla rostrata*, in four rivers in Maine. Environmental Biology of Fishes 59(2):141–151.

Rosset, J., A.H. Roy, B.I. Gahagan, A.R. Whiteley, M.P. Armstrong, J.J. Sheppard and A. Jordaan 2017. Temporal patterns of migration and spawning of river herring in coastal Massachusetts. Transactions of the American Fisheries Society, 146: 1101-1114.

Salmon Falls Watershed Collaborative, "Salmon Falls Watershed Collaborative Action Plan". 2011. PREP Reports & Publications. 432. https://scholars.unh.edu/prep/432

Saunders, R., M.A. Hachey and C.W. Fay. 2006. Maine's diadromous fish community: past, present, and implications for Atlantic salmon recovery. Fisheries 31:537-547.

SRAFRC. 2010. Migratory Fish Management and Restoration Plan for the Susquehanna River Basin. Approved by the Policy Committee November 15, 2010.

Shepard, S.L. 2015. American eel biological species report. Supplement to: Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding for the American Eel (*Anguilla rostrata*) Docket Number FWS-HQ-ES-2015-0143. U.S. Fish and Wildlife Service, Hadley, Massachusetts. xii +120 pages.

Solomon, D.J. and M.H. Beach. 2004. Manual for provision of upstream migration facilities for Eel and Elver. Science Report SC020075/SR2, Environment Agency, Bristol, UK. 72 pages.

Sprankle, K. 2002. An assessment of American eel in the Merrimack River Basin. Central New England Fishery Resources Office, U.S. Fish and Wildlife Service. Nashua, New Hampshire.

Stier, D.J. and J.H. Crance. 1985. Habitat suitability index models and instream flow suitability curves: American shad. US Fish and Wildlife Service Biological Report 82(10.88). 35 pages.

USFWS (U.S. Fish and Wildlife Service). 2019. Fish Passage Engineering Design Criteria.

USFWS, Northeast Region R5, Hadley, Massachusetts. 135 pages + Appendices.

Walter J., A. Overton, K. Ferry and M. Mather. 2003. Atlantic coast feeding habits of striped bass: a synthesis supporting a coast-wide understanding of trophic biology. Fisheries Management and Ecology, 2003, 10, 349–360.

Weiss-Glanz, L. S., J. S. Stanely and J. R. Moring. 1986. Species Profiles: Life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic) - American shad. U.S. Fish and Wildlife Service Biological Report 82(11.59). U.S. Army Corps of Engineers, TR EL-82-4. 16 pp.

12.3 FEDERAL REGISTER NOTICES

78 FR 48944. Endangered and Threatened Wildlife and Plants; Endangered Species Act Listing Determination for Alewife and Blueback Herring. Department of Commerce National Oceanic and Atmospheric Administration. Federal Register 78(155), 48944- 48994. August 12, 2013.

80 FR 60834. Endangered and Threatened Wildlife and Plants; 12-month Finding on Petitions to List 19 Species as Threatened or Endangered. Department of the Interior, Fish and Wildlife Service. Federal Register 80(195), 60834-60850. October 8, 2015.

82 FR 38672. Endangered and Threatened Species; Initiation of a Status Review for Alewife and Blueback Herring Under the Endangered Species Act (ESA). Federal Register 82(156), 38672-38674. August 15, 2017.

84 FR 28630. Endangered and Threatened Wildlife and Plants; Endangered Species Act Listing Determination for Alewife and Blueback Herring. June 19, 2019.

APPENDIX F: IPAC RESOURCE LIST

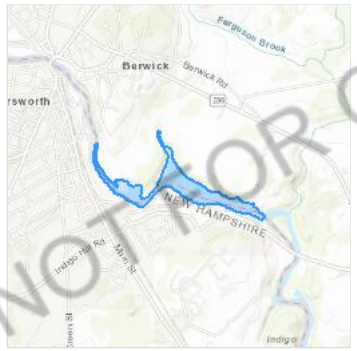
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Maine and New Hampshire



Local offices

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Oct 15 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

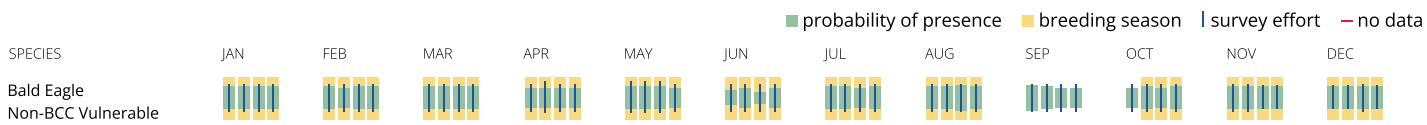
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/ documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON

Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Oct 15 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora pinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
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Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
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Survey Timeframe
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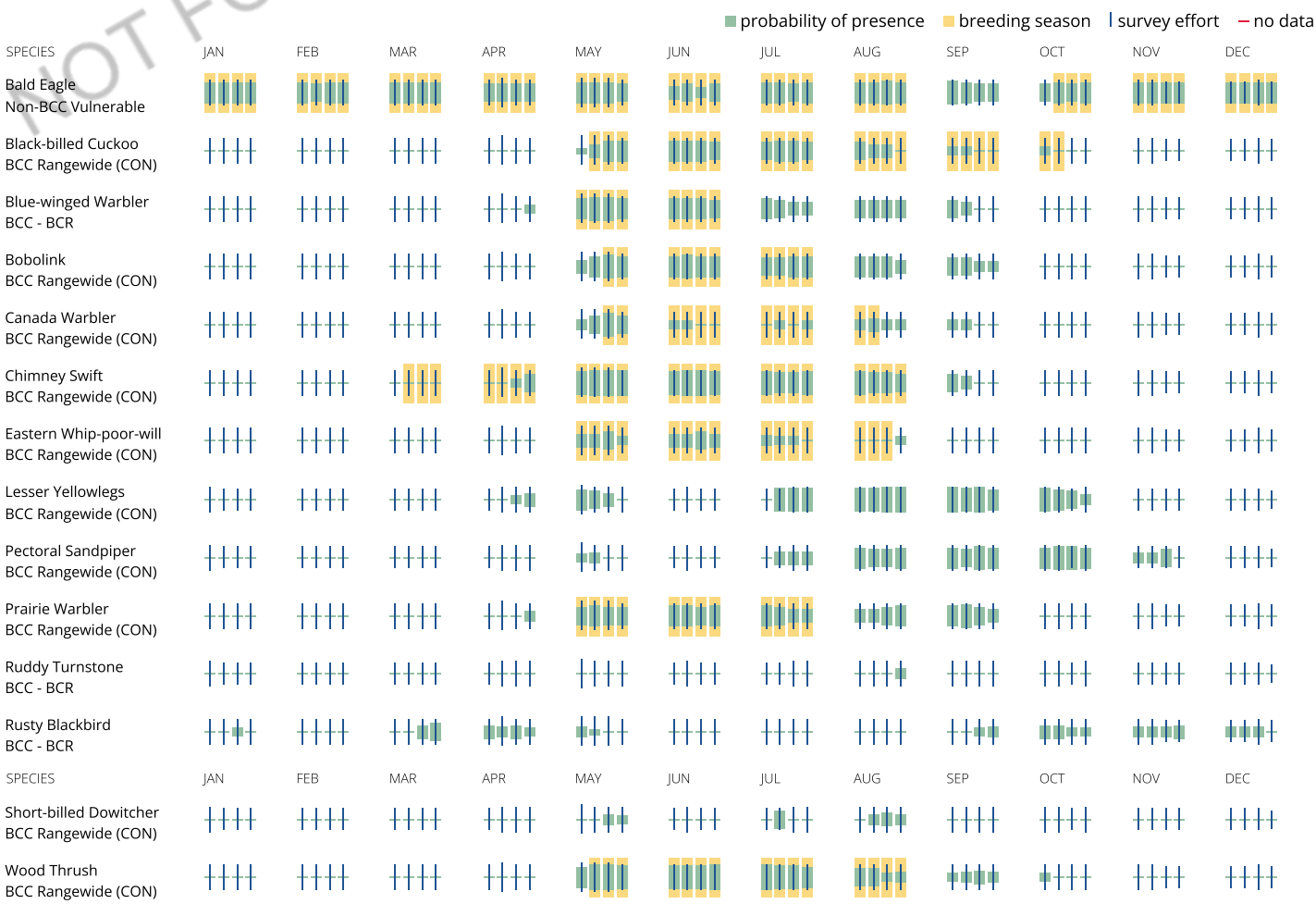

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project

area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1Ch
- PFO1E

RIVERINE

- R2UBH
- R4SBC
- R2UBFx

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to

establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.