



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 Bolton Falls Hydroelectric Project (FERC Project No. 2879).

Dear Ms. Ames:

Green Mountain Power Corporation (GMP or the Licensee) submits the attached Application for the Bolton Falls Hydroelectric Project located on the Winooski River in Vermont. 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
Generation Project Coordinator
Green Mountain Power Corporation
163 Acorn Lane
Colchester, VT 05446

**LOW IMPACT HYDROPOWER INSTITUTE
CERTIFICATION APPLICATION
BOLTON FALLS HYDROELECTRIC PROJECT
FERC PROJECT NO. 2879**



GREEN MOUNTAIN POWER CORPORATION



October 2023

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LIST OF ABBREVIATIONS AND ACRONYMS

APE	Are of Potential Effect
cfs	cubic feet per second
DOI	Department of the Interior
ESA	Endangered Species Act
FERC or Commission	Federal Energy Regulatory Commission
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
LIHI	Low Impact Hydropower Institute
mi ²	Square miles
msl	Mean sea level
MW	Megawatt
MWh	Megawatt-hours
NLEB	Northern longed-eared bat
NRHP	National Register of Historic Places
PLC	Programmable Logic Controller
Project	Bolton Falls Hydroelectric Project
RM	River mile
rpm	Revolutions per minute
SHPO	State Historic Preservation Officer
VT	Vermont
VDEC	Vermont Department of Environmental Conservation
VDHP	Vermont Division of Historic Preservation
USFWS	United States Fish and Wildlife Service
WQC	Water Quality Certification
ZOE	Zone of Effect

1 PROJECT DESCRIPTION

1.1 Project Location

Green Mountain Power Corporation (GMP or Licensee) owns and operates the 6.962-megawatt (MW) Bolton Falls Hydroelectric Project (the Project), located on the Winooski River in Washington County, Vermont (VT). Most of the infrastructure associated with the Project, including the intake, penstocks, bypass pipe, and powerhouse, is located within the town of Duxbury, Vermont. The right abutment of the Project dam is in the town of Waterbury, Vermont. A Project location map is shown in [Figure 1.1-1](#).

The Project dam is located on the Winooski River at approximately river mile (RM) 43. Its coordinates are 44° 21' 34.1" north and 72° 49' 00.8" west. At the Project, the total drainage area is approximately 821 square miles (mi²), which is approximately 76% of the drainage area at the Winooski River's mouth (1,080 mi²) where it enters Lake Champlain. The Project dam is the fourth dam upstream of Lake Champlain on the Winooski River. [Table 1.1-1](#) details the name, status, location, and attributes of all dams along the Winooski River from downstream to upstream and [Figure 1.1-2](#) provides a map of the current and historic dams located along the Winooski River.

The following sections describe the Project structures, features, and mode of operation. Project information is also summarized in [Table 1.2-2](#).

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 has a maximum height of 92 feet and a width 275 feet, and its construction consists of a timber crib dam buttressed with a masonry wall on the downstream face. The dam spillway is capped with a 196-foot-long reinforced concrete overflow spillway with a crest elevation of 392.0 feet, and a 5-foot-high inflatable rubber dam with a maximum crest elevation of 397.0 feet. The 1980's redevelopment of the Project initially included 5-foot wooden flashboards (crest elevation 397.0 feet) atop the dam crest; these were replaced by the current 5-foot-high inflatable rubber dam system in 1991. The foundation of the dam is below the normal tailrace elevation, with the deepest section found at approximately elevation 320 feet and approximately 25 feet below the normal tailwater elevation.

The Project dam was originally constructed in 1898 as a rock-filled timber crib dam, and the Project began generating electricity in 1899 with its two turbine-generator units. During 1899, the dam deflected and to strengthen it, an ashlar-faced stone dam was constructed in 1900 against the downstream face of the timber crib structure. In 1905/6, a third turbine generator unit was added, utilizing the large landward-side penstock for the supply of water. The new generating unit (No. 3) was in a powerhouse structure at the end of the powerhouse, which housed Units 1 and 2. However, by 1938, the Project had fallen into disrepair, and it was taken off-line. The Project dam and powerhouse were redeveloped in 1985/1986 under the previous FERC license, which was issued to GMP in February 1982. Construction began in May 1985 with power first generated in October 1986. As a result of this redevelopment, the remnants of the previous powerhouses were removed and a new powerhouse containing two equally sized turbine generator units was constructed.

The left abutment includes a concrete-capped masonry tower with a maximum elevation of 412.0 feet as well as a lower pad on the upstream face of the left abutment at elevation 400.0 feet that allows access to the trash rake and penstock gates.

The right abutment consists of a concrete cap atop the masonry wall to which the rubber dam is attached, with a top elevation of approximately 400.0 feet.

The dam includes two sluiceways into the masonry buttress section for drainage of the timber crib dam. The sluiceways are 4.0 feet wide by 4.5 feet high with an invert elevation of 347.0 feet.

A section of the former (destroyed) powerhouse masonry foundation wall near the dam's left abutment was stabilized with a reinforced concrete facing and anchored to bedrock with post-tensioned anchors in 1992/1993.

The Project forebay consists of two separate concrete intakes for each 10-foot diameter penstock. The bottom of the intakes are at elevation 360.0 feet, approximately 37 feet below the normal pond elevation. The top of the intakes are at elevation 389.1 feet, approximately 8 feet below the normal pond elevation. The intake structure is equipped with trashracks with 3-inch clear spacing and a trash raking system. The trashrack dimensions are 27 feet wide by 43 feet high and angled 70 degrees from the horizontal plane.

The penstocks are each 10-foot-diameter and 120-foot-long and are made in steel and encased in concrete. The two penstocks directly feed the two generating units, with each penstock dedicated to supplying water to only one unit. There are two access manholes in each penstock; one is located upstream near the intake structure and the other is located downstream near the turbine.

The Project impoundment is approximately 59 acres in surface area at a pool elevation of 397.0 feet. The Project impoundment has 4.2 miles of shoreline. The Project impoundment has an effective storage of 210 acre-ft and a gross storage capacity of 300 acre-feet.

The powerhouse, located on river left downstream of the dam's left abutment, is a reinforced concrete structure approximately 73 feet long by 57 feet wide. The two 10-foot-diameter steel penstocks encased in concrete supply water to the units in the powerhouse.

Following flooding in spring 1987 when water levels came within three feet of overtopping the powerhouse roof, the parapet walls around the powerhouse roof were raised several feet. Raising these walls appeared to greatly reduce (but not eliminate) the amount of damage sustained by the powerhouse following the August 2011 Hurricane Irene flooding.

There is also a 75-foot-long, 36-inch-diameter water bypass pipe that discharges water directly adjacent to the dam's left abutment on the left edge of the spillway. The invert for the bypass pipe intake is at approximately elevation 383 feet, approximately 14 feet below the normal pond elevation. The maximum pipe capacity at a pond elevation 397.0 feet is approximately 114 cfs.

A 130-foot long, 5 kV underground transmission line ties from the powerhouse to an adjacent switchyard. The generator main leads are connected to a 34.5/4.16 kV transformer in the switchyard. Station service power can either be tapped from the generators or supplied separately by GMP. There is also a 34.5 kV transmission line that is approximately 600 feet long that runs from the switchyard mentioned above to a second switchyard with a 34.5/4.16 kV transformer.

The Project tailrace is approximately 90 feet wide and 60 feet long.

The Project also includes various turbine governors, generator exciters, batteries, control panels, and circuit breakers.

Other Project facilities include a day-use recreation area below the dam that contains a picnic area, parking lot, and canoe put-in, a canoe take-out on the impoundment, a portage trail connecting the takeout and put-in, and access roads.

1.3 Project Operations

When generating during normal operations, the Project releases a minimum flow of 100 cfs to the bypass reach. During the ice-out period (typically April 1 through November 30), the minimum flow is released over the rubber bladder on the dam crest by maintaining an elevation of 397.29 feet. Providing a continuous spill over the rubber bladder in the winter period can be difficult operationally due to icing problems. Therefore, during the ice-in period (typically December 1 through March 31), as an alternative to spillage over the rubber bladder, the minimum flow can be released through the bypass pipe when ice conditions are experienced. During these circumstances, the impoundment elevation is maintained at 397.00 feet.

The Project is operated in an automatic run-of-river mode with no storage or flood control capacity. During periods when the minimum flow is passed over the rubber bladder on the dam crest, the impoundment is maintained at elevation 397.29 feet. The Project impoundment is maintained at an elevation of 397.0 feet, under normal flow conditions, during periods when the minimum bypass flow is passed through the bypass pipe.

1.4 Regulatory and Other Requirements

The Federal Energy Regulatory Commission (FERC or Commission) issued a 40-year license for the Project on October 5, 2022, with an expiration date of September 30, 2062 ([Appendix B](#)). In addition, on January 19, 2022, the Licensee was granted a 401 Water Quality Certification (WQC) from the Vermont Department of Environmental Conservation (VDEC) ([Appendix C](#)).

On May 17, 2023, FERC amended the Project license to allow GMP to replace the two existing turbine-generator units with two new turbine-generator units, and to add an additional steel roof hatch to the powerhouse. The installation of the new units would decrease the authorized installed capacity of the Project from 7,500 kW to 6,962 kW.¹

- Article 401 requires the Licensee to file various plans, reports, schedules, and amendments for Commission approval that are required by the 401. Certain conditions of the WQC contemplate long-term changes to Project operations or facilities, Article 401 requires that these changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license.
- Article 402 requires the Licensee to file within 180 days of license issuance, for Commission approval, a flow management plan detailing how the Project will operate in a true run-of-river mode and seasonal flow management to comply with the conservative flow. The plan must include procedures for reporting deviations from prescribed operating conditions to the VDEC. This plan was filed with the Commission on May 15, 2023.² The Plan was subsequently approved by the Commission on August 28, 2023.³

¹ FERC Accession No. 20230517-3020: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230517-3020.

² FERC Accession No. 20230515-5061: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230515-5061.

³ FERC Accession No. 20230828-3049: https://elibrary.ferc.gov/eLibrary/filelist?accession_num=20230828-3049.

- Article 403 requires the Licensee to maintain the impoundment water level at the elevation(s) specified in the flow management plan required by the WQC and Article 402. The Licensee must limit any planned, non-emergency maintenance activities that will require the impoundment be drawn down below the specified limits between November 1 and August 15 to protect Eastern pearlshell mussels in the impoundment. Article 403 additionally provides the requirements for reporting planned and unplanned deviations.
- Article 404 requires the Licensee to file within six months of license issuance, for Commission approval, a debris disposal plan that is consistent with the WQC. This plan was filed with the Commission on March 22, 2023.⁴ The Plan was subsequently approved by the Commission on July 20, 2023.⁵
- Article 405 reserves the Commission the authority to require the Licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of fishways as may be prescribed by the Secretary of the Interior pursuant to section 18 of the Federal Power Act.
- Article 406 requires the Licensee to file within 180 days of the license issuance, for Commission approval, the final Recreation Management Plan for the Project. This plan was filed with the Commission on March 22, 2023.⁶ The Plan was subsequently approved by the Commission on May 26, 2023.⁷
- Article 407 requires the Licensee implement the “*Programmatic Agreement Between the Federal Energy Regulatory Commission and the Vermont State Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuance of a New License to Green Mountain Power for the Continued Operation of the Bolton Falls Hydroelectric Project in Washington County, Vermont (FERC No. 2879-012)*,” executed on May 25, 2022, and including but not limited to the Historic Properties Management Plan (HPMP) for the Project.
- 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.

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 45.1) on the Winooski River in the Project impoundment and ends at the Project dam (RM 43.0). The approximate length of the 59-acre impoundment is 2.1 RM. The normal pond elevation is between 397 and 397.29 feet, msl.
- The Project dam discharges to the Winooski River, designated as ZOE 2 – Bypass Reach. The Project bypass reach is approximately 0.03 RM, or 150 feet, in length.

⁴ FERC Accession No 20230322-5129: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230322-5129.

⁵ FERC Accession No. 20230720-3048: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230720-3048.

⁶ FERC Accession No. 20230322-5132: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230322-5132.

⁷ FERC Accession No. 20230526-3029: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230526-3029.

- The Project bypass reach and powerhouse discharge to the Winooski River in a reach designated as ZOE 3 – Downstream. This ZOE extends downstream of the Project powerhouse approximately 1.5 RM to the confluence with Ridley Brook.

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

Name	Status	Town	FERC No.	Owner	Length (ft)	Impoundment (acres)
Clarks Saw Mill	In Service	Cabot	NA	Edward Larson	135	3
Cabot-6	Breached	Cabot	NA	Unknown		
Marshfield-6 ⁸	Breached	Marshfield	NA	Unknown		
Marshfield-7	Breached	Marshfield	NA	Unknown		
Marshfield-8	Removed	Marshfield	NA	Ben Heintz & Katy Leffel		
Marshfield-9	Breached	Marshfield	NA	Unknown		
Farrington	Breached	Marshfield	NA	Unknown		
Old Batchelder Mill	In Service	Plainfield	NA	Town of Plainfield	75	2
East Montpelier	Breached	East Montpelier	NA	Harry Daniels Lumber Co		
Montpelier No. 5	Breached (Partial)	East Montpelier	NA	Unknown	90	1.9
Montpelier No. 4	In Service	Berlin	6470	Winooski Hydroelectric Co	227	5
Montpelier No. 3	Breached (Partial)	Montpelier	NA	Unknown		12.5
Bailey Pond	In Service	Montpelier	NA	City of Montpelier		5
Middlesex No. 2	In Service	Middlesex	NA	GMP Corp	278	42
Bolton Falls No. 1 (Project Dam)	In Service	Duxbury	2879	GMP Corp	196	191
Essex No. 19	In Service	Essex	2513	GMP Corp	584	352
Gorge No. 18	In Service	South Burlington	NA	GMP Corp	350	87
Chace Mills No. 21	Removed	Burlington	NA	Unknown		
Winooski One	In Service	Burlington	2756	Burlington Electric Department	200	6

⁸ Note that the Marshfield-6 dam located on the Winooski River differs from the Marshfield No. 6 dam, which is located on Mollys Brook and owned by GMP.

TABLE 1.2-2: FACILITY INFORMATION

<i>Item</i>	<i>Information Requested</i>	<i>Response (include references to further details)</i>
Name of the Facility	Facility name (use FERC project name or other legal name)	Bolton 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. <input checked="" type="checkbox"/> State Program: GMP is applying to participate in the NEPOOL State REC Program: NH Class IV, RI Existing, VT Tier I, CT CEO 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/> 6. <input checked="" type="checkbox"/> describe: Sell into VT Tier I 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: 26,301 M MWh % of total MWh generated: <u>100%</u>
Location	River name (USGS proper name)	Winooski 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	02010003
	Nearest town(s), <u>county(ies)</u> , and state(s) to dam	Towns of Duxbury and Waterbury, Washington County, Vermont
	River mile of dam above mouth	43
	Geographic latitude and longitude of dam	Lat: 44° 21' 34.1" north Long: 72° 49' 00.8" 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

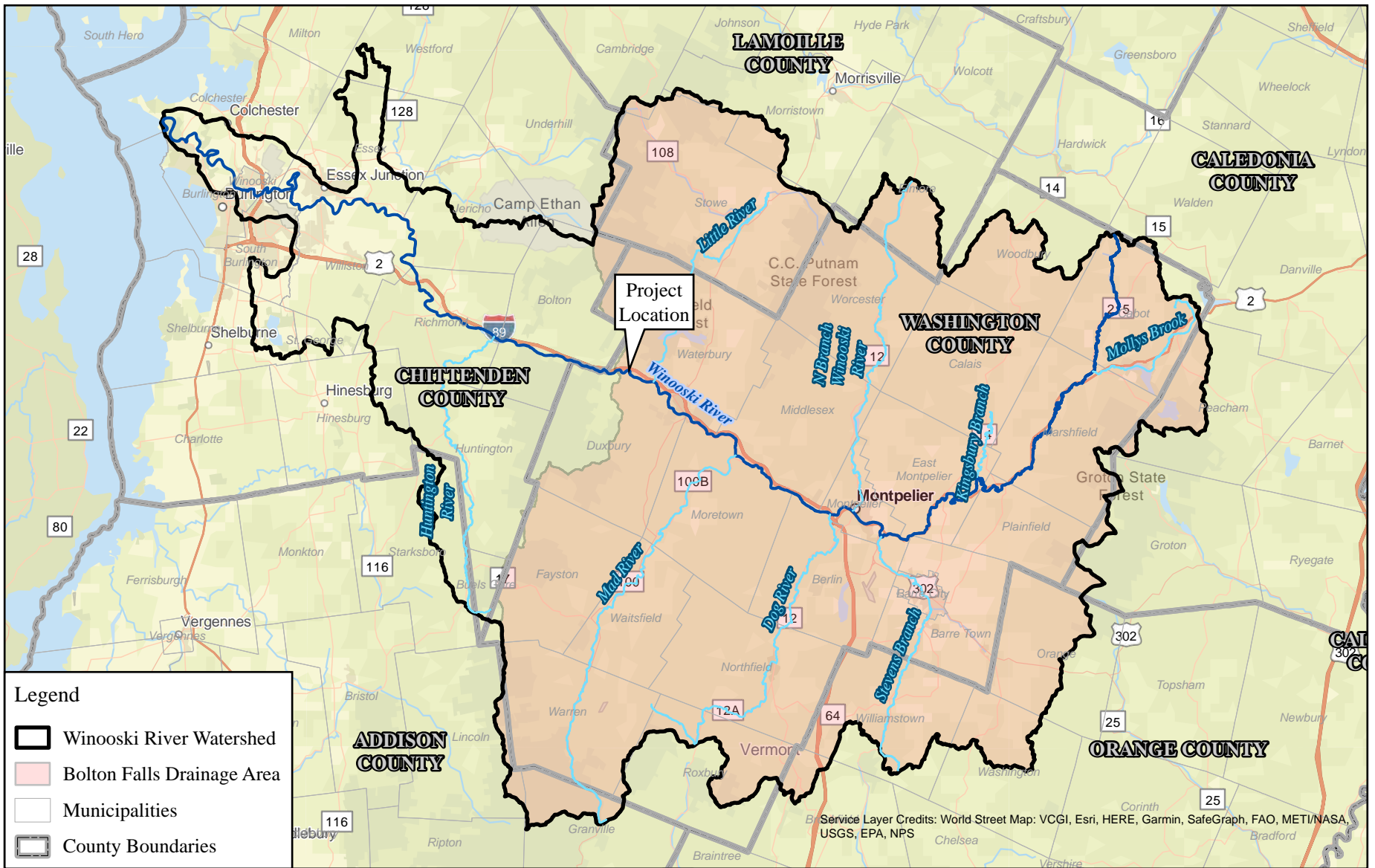
<i>Item</i>	<i>Information Requested</i>	<i>Response (include references to further details)</i>
	FERC licensee company name (if different from owner)	NA
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	P-2879, date of issuance 10/5/2022, date of expiration 9/30/2062
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Major
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	WQC # NA, Issued January 19, 2022 by the Vermont Department of Environmental Protection.
	Hyperlinks to key electronic records on FERC e-Library website or other publicly accessible data repositories ⁹	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-1986, Installed capacity= 6.962 MW
	Average annual generation (MWh) and period of record used For recertifications: Indicate if average annual generation has changed since last certification	26,301 MWh for the period 1987-2015.
	<u>Mode of operation</u> (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) For recertifications: Indicate if mode of operation has changed since last certification	Run-of-river
	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 3,481 kW Kaplan turbines. Maximum hydraulic capacity = 2, 210 cfs; 1,105 cfs per unit. Minimum hydraulic capacity = 280 cfs; 140 cfs per unit. Maximum output = 4,299 kW per unit. Minimum output = 461 kW per unit.
	Trashrack clear spacing (inches) for each trashrack	3-inch
	Approach water velocity (ft/s) at each intake if known	1.90 ft/s after installation of proposed new turbine-generator units in 2023/2024.

⁹ 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.

<i>Item</i>	<i>Information Requested</i>	<i>Response (include references to further details)</i>
	Dates and types of major equipment upgrades For recertifications: Indicate only those since last certification	Unit 1 and 2 turbine generators scheduled to be replaced in November 2023 and October 2024, respectively.
	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
<i>Dam or Diversion</i>	Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications	Dam was originally constructed in 1898 with power generation beginning in 1899. In 1905/1906 a third turbine generator was installed. The Project dam and powerhouse were reconstructed in 1985/1986.
	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 = 275 ft. Dam height = 92 ft. Inflatable rubber dam system= 5 ft.
	Spillway maximum hydraulic capacity	46,000 cfs
	Length and type of each penstock and water conveyance structure between the impoundment and powerhouse	Two (2) 10-foot diameter, 120-foot-long steel penstocks encased in concrete.
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Power generation
<i>Conduit Facilities Only</i>	Date of conduit construction and primary purpose of conduit	NA
	Source water	NA
	Receiving water and location of discharge	NA
<i>Impoundment and Watershed</i>	Authorized maximum and minimum impoundment water surface elevations For recertifications: Indicate if these values have changed since last certification	No maximum. Minimum = 397.0 ft, NGVD 1929
	Normal operating elevations and normal fluctuation range For recertifications: Indicate if these values have changed since last certification	Normal full pond = 397.0 to 397.29 feet NGVD 1929, when the rubber bladder atop the dam is inflated.
	Gross storage volume and surface area at full pool For recertifications: Indicate if these values have changed since last certification	Gross Storage Volume = 300 acre-ft. Surface Area = 59 acres.

<i>Item</i>	<i>Information Requested</i>	<i>Response (include references to further details)</i>
	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 Middlesex No. 2. Owned by GMP. Approximate River mile 49.4. The Middlesex No 2. dam does not have a downstream fish passage facility. See Figure 1-1.2 and Table 1-1-1 for other dams on the Winooski River.
	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 Essex No. 19 Hydroelectric Project (P-2513). Owned by GMP. Approximate River mile 17.6. The facility includes a downstream fish passage facility but does not have upstream fish passage. A trap and truck facility at the Winooski One Project, first dam on the river, transports landlocked salmon and steelhead trout above the Essex No. 19 dam.
	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.	33.0 acres of land. 58.3 acres of water. All land within the Project boundary is fee-owned property.
<i>Hydrologic Setting</i>	Average annual flow at the dam, and period of record used	1,421 cfs. Period of Record: 1928-2018
	Average monthly flows and period of record used	January: 1,367 cfs February: 1,010 cfs, March: 2,036 cfs, April: 4,045 cfs, May: 2,222 cfs, June: 1,145 cfs, July: 743 cfs, August: 620 cfs, September: 559 cfs, October: 984 cfs, November: 1,300 cfs, December: 1,270 cfs. Period of Record: 1928-2018.

<i>Item</i>	<i>Information Requested</i>	<i>Response (include references to further details)</i>
	Location and name of closest stream gaging stations above and below the facility	Upstream: Essex Junction, VT (USGS Gage No. 04290500). Downstream: Montpelier, VT (USGS Gage No. 04290500).
	Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation.	Watershed area at the dam: 821 square miles. Flow data from the Essex Junction, VT (USGS Gage No. 04290500) was multiplied by a ratio of the drainage areas at each point (821 mi ² /1,044 mi ²).
	Other facility specific hydrologic information (e.g., average hydrograph)	NA
<i>Designated Zones of Effect</i>	Numbers and names of each zone of effect (e.g., “Zone 1: Impoundment”)	Zone 1-Impoundment, Zone 2-Bypass Reach, Zone 3-Downstream.
	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 40.9-43.0, Zone 2-Bypass Reach: RM 43.0-43.01, Zone 3-Downstream: RM 43.01-44.51.
<i>Pre-Operational Facilities Only</i>		
<i>Expected operational date</i>	Date generation is expected to begin	NA
<i>Dam, diversion structure or conduit modification</i>	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
<i>Change in water flow regime</i>	Description of any change in impoundment levels, water flows or operations required for new generation	NA

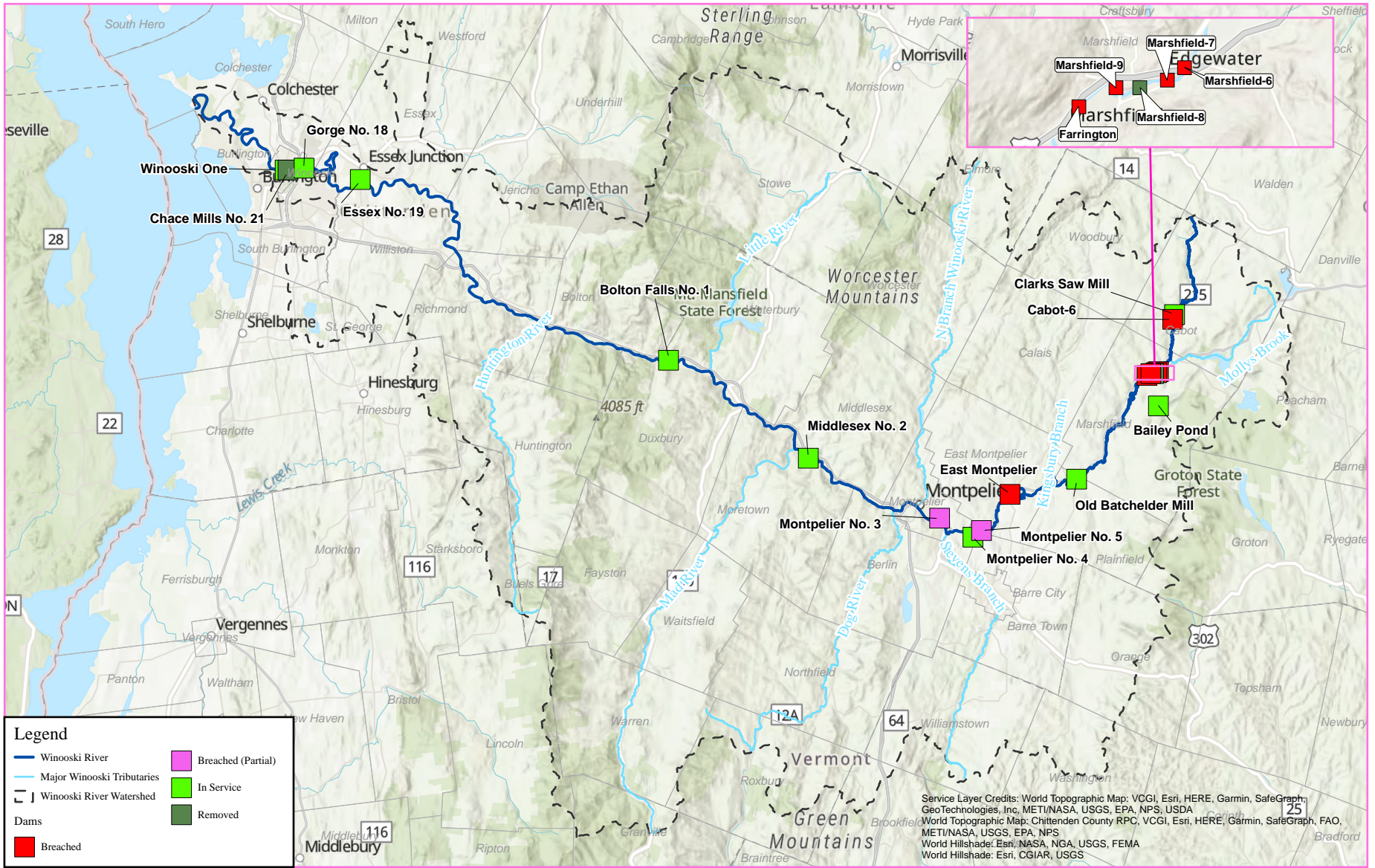


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Figure 1.1-1: Project Location Map

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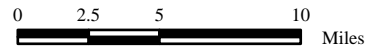


Figure 1.1-2:
 Current and Historic Dams
 Along the Winooski River

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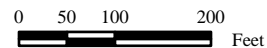
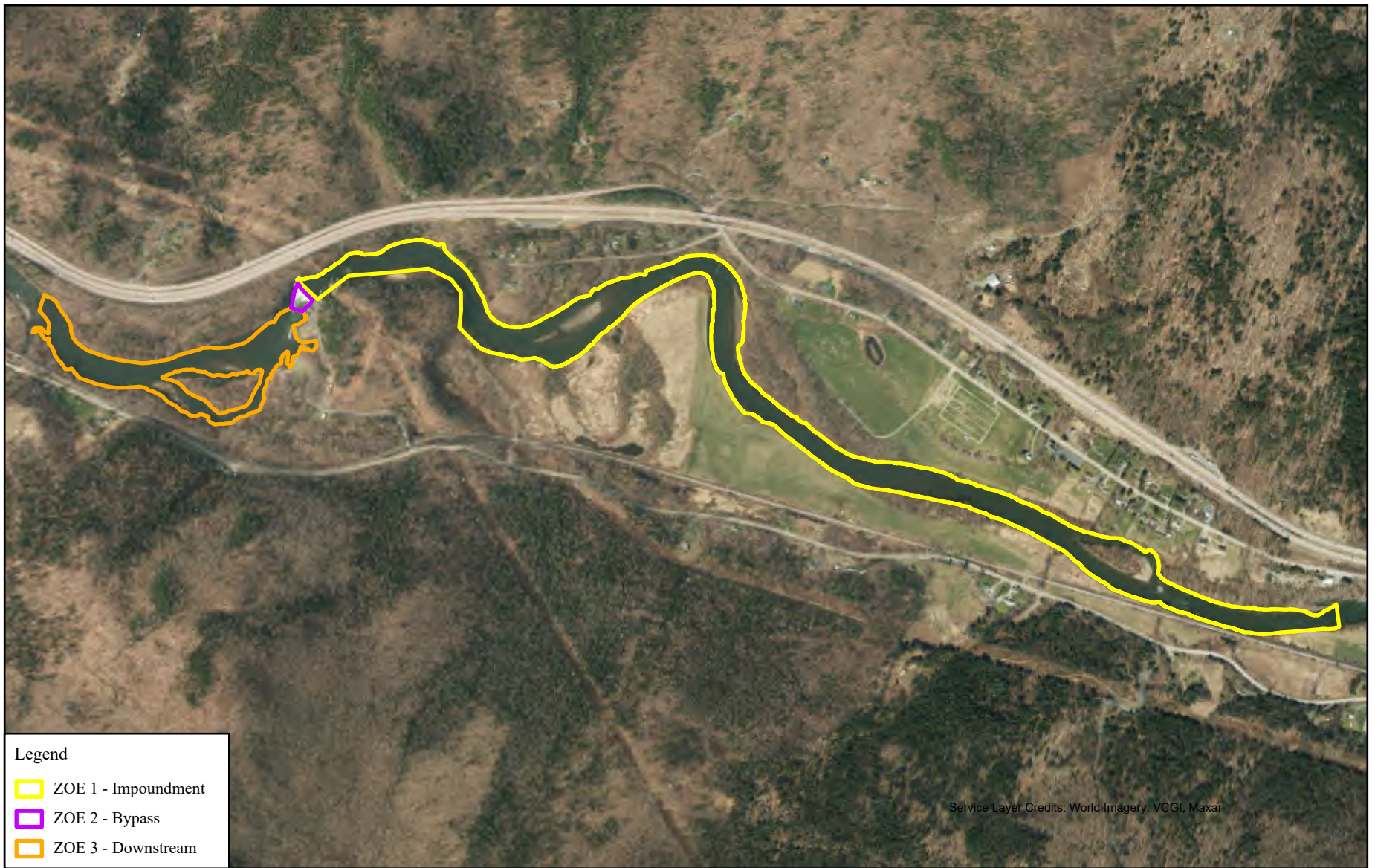


Figure 1.2-1:
Key Project Structures and Features

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Legend

- ZOE 1 - Impoundment
- ZOE 2 - Bypass
- ZOE 3 - Downstream



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0 1,250 2,500
Feet

Figure 1.5-1:
Zones of Effect

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Path: D:\GMP\01785\GIS\maps\LIHI\LIHI.aprx

2 STANDARDS MATRICES

Zone:		1: Impoundment	2: Bypassed Reach (if applicable)	3. Downstream Reach
River Mile at upper and lower extent of Zone:		40.9-43.0	43.0-43.01	43.01-44.51
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	1	1
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	2	2	2

3 SUPPORTING INFORMATION

3.1 Ecological Flow Standards

3.1.1 Ecological Flows Standards—Impoundment and Downstream ZOE

<i>(Criterion</i>	<i>Standard</i>	<i>Instructions</i>
A	2	<p><u>Agency Recommendation:</u></p> <ul style="list-style-type: none">• 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 B of the VDEC WQC requires that the Project be operated in a run-of-river mode, such that outflow equal to inflow on an instantaneous basis. When generating, the Project shall spill 100 cfs continuously year-round in the bypass reach unless otherwise indicated in the flow management and monitoring plan (Condition C). When the Project is not operating, all flow shall be spilled at the dam.
- Condition C of the VDEC WQC requires the Licensee to develop a flow management plan detailing how the Project will operate in a true run-of-river mode and seasonal flow management to comply with the conservation flow. The plan will also include a method for continuous monitoring and reporting (to allow records to be furnished upon request) of flow releases at the Project (conservation flow, spillage, and turbine discharge), impoundment levels, and inflows. This plan was filed with the Commission on May 15, 2023.¹⁰ The Plan was subsequently approved by the Commission on August 28, 2023.¹¹
- Article 403 of the FERC license requires that in addition to Condition B of the VDEC WQC, the Licensee is to:
 - Maintain the impoundment water level at the elevation(s) specified in the flow management plan required by VDEC water quality certification Condition C¹²; and

¹⁰ FERC Accession No. 20230515-5061: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230515-5061.

¹¹ FERC Accession No. 20230828-3049: https://elibrary.ferc.gov/eLibrary/filelist?accession_num=20230828-3049.

¹² GMP operates the Project in a run-of-river mode and maintains a steady impoundment at either 397.0 or 397.25 feet msl, depending on the method used to pass the 100 cfs minimum bypass flow (i.e., spillage over dam or bypass flow pipe).

- Limit any planned, non-emergency maintenance activities that will require the impoundment to be drawn down below the limits specified above to the period between November 1 and August 15 to protect Eastern pearlshell mussels in the Project impoundment.
- 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.
- There are no formal agreements with upstream facilities to regulate inflow or outflow at the Project. However, GMP does operate the downstream Essex No. 19 Hydroelectric Project, FERC No. 2513 and the upstream Middlesex No. 2 Project, which provides some level of coordination, if necessary.
- 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.

3.1.2 Ecological Flows Standards-- Bypass Reach ZOE

<i>(Criterion</i>	<i>Standard</i>	<i>Instructions</i>
A	2	<u>Agency Recommendation:</u> <ul style="list-style-type: none"> • 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.

- Condition B of the VDEC WQC requires that when generating, the Project shall spill 100 cfs continuously year-round in the bypass reach unless otherwise indicated in the flow management and monitoring plan (Condition C). The bypass reach is approximately 150 feet in length and backwatered to the dam. When the Project is not operating, all flow shall be spilled at the dam.
- Minimum bypass flow requirements at the Project are based upon a bypass habitat assessment and aesthetic flow study conducted by the Licensee during relicensing to evaluate the relationship between aquatic habitat and flow within the bypass reach, as well as aesthetic quality of spill over the Project dam.
- The bypass minimum flow requirement of 100 cfs or, inflow, whichever is less, protect water quality and aquatic habitat in the bypass reach and preserve the aesthetic character of the bypass.

3.2 Water Quality Standards

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

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
B	2	<p><u>Agency Recommendation:</u></p> <ul style="list-style-type: none">• 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 a WQC from the State of Vermont on January 19, 2022 ([Appendix B](#)).
- Vermont has regulatory authority over water quality in the Winooski River. According to the 2022 Vermont Water Quality Standards, the Winooski River in the vicinity of the Project is designated as Class B(2), and is also classified as a cold water fishery. Class B(2) waters shall be managed to achieve and maintain a level of quality that supports the following designated and existing uses: aquatic biota and wildlife; aquatic habitat; aesthetics; public water supply, with filtration and disinfection or other required treatment; irrigation of crops and other agricultural uses; swimming and other primary contract recreation; and boating, fishing and other related recreational uses.
- The Project is in the middle of an approximately 30-mile-long segment of the Winooski River that is not listed on the final lists of Impaired or Altered Waters. Currently, the segment of the Winooski River where the Project is located is not listed as Impaired on the final 2022 303(d) list¹³, nor is it listed as Altered on the final 2022 Part F list¹⁴. No TMDL is in-place for this specific segment of the river. However, other segments of the Winooski River and its tributaries upstream and downstream from the Project are listed as impaired, and TMDL's are in place or in development for those other segments.
- During the recent FERC relicensing process, GMP collected dissolved oxygen and water temperature data within the Project waters. FERC's analysis of this data within the 2022 Final Environmental Assessment¹⁵ indicated dissolved oxygen concentrations on average met or exceeded the State standard most of the time although there were several days in late August and early September when dissolved oxygen conditions fell below the State standard levels both above and below the dam. The low dissolved oxygen periods coincided with periods when the Project was shut down due to low flows and dissolved oxygen subsequently met the minimum levels established by the State's

¹³ https://dec.vermont.gov/sites/dec/files/documents/PriorityWatersList_PartA_303d_2022.pdf

¹⁴ https://dec.vermont.gov/sites/dec/files/documents/PriorityWatersList_PartF_2022.pdf

¹⁵FERC Accession Number 20220421-3031: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220421-3031.

dissolved oxygen standards after river flows increased and the Project began generating again (note that the new 100 cfs minimum bypass flow established with the 2022 FERC License eliminates this situation).

- To enhance aesthetics at the dam and enhance aquatic habitat and water quality in the bypass reach, the Project is operated to release a 100-cfs minimum flow or inflow, whichever is less, into the bypass reach via spill during the ice-out period (typically April 1 thru November 30), and through the bypass pipe during ice-in conditions (December 1 thru March 31).

3.3 Upstream Fish Passage Standards

The Winooski River offers a diverse fishery influenced by the presence of Lake Champlain at the mouth of the river. Due to other hydropower projects located closer to Lake Champlain, there is limited migratory fish presence at the Project.

3.3.1 Upstream Fish Passage Standards-Impoundment, Bypass Reach, and Downstream ZOE

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
C	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none">• 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 (Zone 1), Bypass Reach (Zone 2) and Downstream (Zone 3) ZOE are using standard 1 to justify meeting the upstream fish passage standard.

- Several species of migratory fish are present in Lake Champlain and the Winooski River, including Lake Sturgeon, Landlocked Atlantic Salmon, and Steelhead Rainbow Trout. The Winooski One Dam (FERC No. 2756) is the first dam present on the Winooski River and was built in a natural falls area. The Bolton Falls Project is located upstream of the extent of natural range for Lake Sturgeon. However, Landlocked Atlantic Salmon are present in the Bolton Falls Project area due to upstream fish passage efforts at downstream projects.
- At the Winooski One Dam, the downstream-most dam on the Winooski River, an upstream fish lift and a trap and truck program funded in cooperation with other upstream dam owners (GMP) provides access to upstream Winooski River areas. The trap and truck facility is designed to move approximately 4,000 Landlocked Atlantic Salmon, and 4,000 Steelhead Trout. Lake Sturgeon if found in the fish lift, are not moved above the Winooski One Project. Additionally, Steelhead are not transported above the Essex No. 19 Project. They are released directly above the Winooski One Project. Only Landlocked Atlantic Salmon are released above the Essex No. 19 Project.
- The program typically operates from mid-March to mid-May and October to mid-November. Steelhead Trout are targeted in the spring and Landlocked Atlantic Salmon in the fall. In 2004, Walleye were added to the targeted species list. However, Walleye caught at the fish lift are processed for biological information, but they are not released above the Winooski One Dam.
- Downstream passage measures are in place for the three projects (Essex 19, Gorge 18, Winooski One) downstream of the Bolton Falls Project.
- Under Article 405 of the FERC License authority is reserved to FERC to require the Licensee 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 pursuant to section 18 of the Federal Power Act.

- Currently there are no upstream fish passage facilities at the Bolton Falls Hydroelectric Project, as the VDEC WQC and FERC license do not require the development of upstream fish passage facilities, and no resource agencies have requested them.

3.4 Downstream Fish Passage and Protection Standards

In addition to the landlocked Atlantic salmon described in [Section 3.3](#), the Winooski River, in the vicinity of the Project, is known to support a variety of resident fish species ([Table 3.4.1-1](#)). Resident fish species include rainbow trout, brown trout, smallmouth bass, bullhead catfish species, and panfish. Several other species may be present at the Project but are not considered common.

3.4.1 Downstream Fish Passage Standards- Impoundment and Bypass Reach ZOE

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
D	2	<p><u>Agency Recommendation:</u></p> <ul style="list-style-type: none">• 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 (Zone 1) and Bypass Reach (Zone 2) ZOE are using standard 2 to justify meeting the downstream fish passage standard.

- There are no migratory fish species above the Project that require downstream fish passage.
- Currently there are no downstream fish passage facilities at the Bolton Falls Hydroelectric Project, as the VDEC WQC and FERC license do not require the development of downstream fish passage facilities, and no resource agencies have requested them.
- However, fish seeking downstream passage may pass over the dam during spillage of the 100 cfs minimum flow, or through the 75-foot-long, 36-inch-diameter bypass pipe when it is utilized to pass the 100 cfs minimum flow. The bypass pipe discharges water directly adjacent to the dam's left abutment on the left edge of the spillway. The maximum pipe capacity at a pond elevation 397.0 feet is approximately 114 cfs.
- The bypass reach extends approximately 150 feet downstream of the dam spillway and the width varies between 120 feet and 200 feet. The habitat in the bypass reach consists of a large deep pool that remains wetted under all operating conditions from backwatered powerhouse outflows and leakage through the dam. The bottom substrate consists primarily of bedrock with depths reaching up to 25 feet. Leakage from the dam varies from approximately 0 to 16 cfs. VDEC states that the large pool downstream of the dam within the bypass reach is important to the fishery as it offers deep water habitat which is currently limited in the Winooski River downstream of the Project and can provide cover and stable habitat conditions for overwintering trout and other fish.
- Even though the bypass reach remains wetted throughout the year, the 100 cfs minimum flow required under the new FERC license increases circulation in the pool habitat enhancing aquatic habitat conditions. The 100-cfs minimum flow is provided via spill over the dam during the ice-out

period (typically April 1 thru November 30), and through the bypass pipe during ice-in conditions (December 1 thru March 31).

- FERC’s analysis within the 2022 Final Environmental Assessment¹⁶ concluded that the risk of impingement of adult and juvenile resident fish is very low. Also, the burst swim speeds for juvenile and adult resident fish suggested that most fish could overcome the maximum approach and through velocities at the trash rack and swim away. Fish species and life-stages with a greater likelihood of entrainment (i.e., golden shiners, juvenile white sucker, juvenile smallmouth bass, and juvenile sculpin) are expected to exhibit high turbine survival (greater than 90 percent) through the Project’s Kaplan turbines.
- Condition D of the VDEC WQC requires the Licensee to consult with the Vermont Fish and Wildlife Department prior to the next replacement of trashracks at the Project to determine appropriate bar clearance spacing and location.

3.4.2 Downstream Fish Passage Standards-Downstream ZOE

Criterion	Standard	Instructions
D	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none"> • 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.

¹⁶FERC Accession Number 20220421-3031: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220421-3031.

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

Common Name	Scientific Name
Northern Pike	<i>Esox Lucius</i>
Chain Pickerel	<i>Esox niger</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Yellow Perch	<i>Perca flavescens</i>
Crappie species	<i>Pomoxis spp.</i>
Landlocked Salmon	<i>Salmo salar</i>
Brown Trout	<i>Salmo trutta</i>
Brook Trout	<i>Salvelinus fontinalis</i>
Walleye	<i>Sander vitreus</i>
Bullhead catfish species	<i>Ameiurus spp.</i>
Panfish	

3.5 Shoreline and Watershed Protection Standards

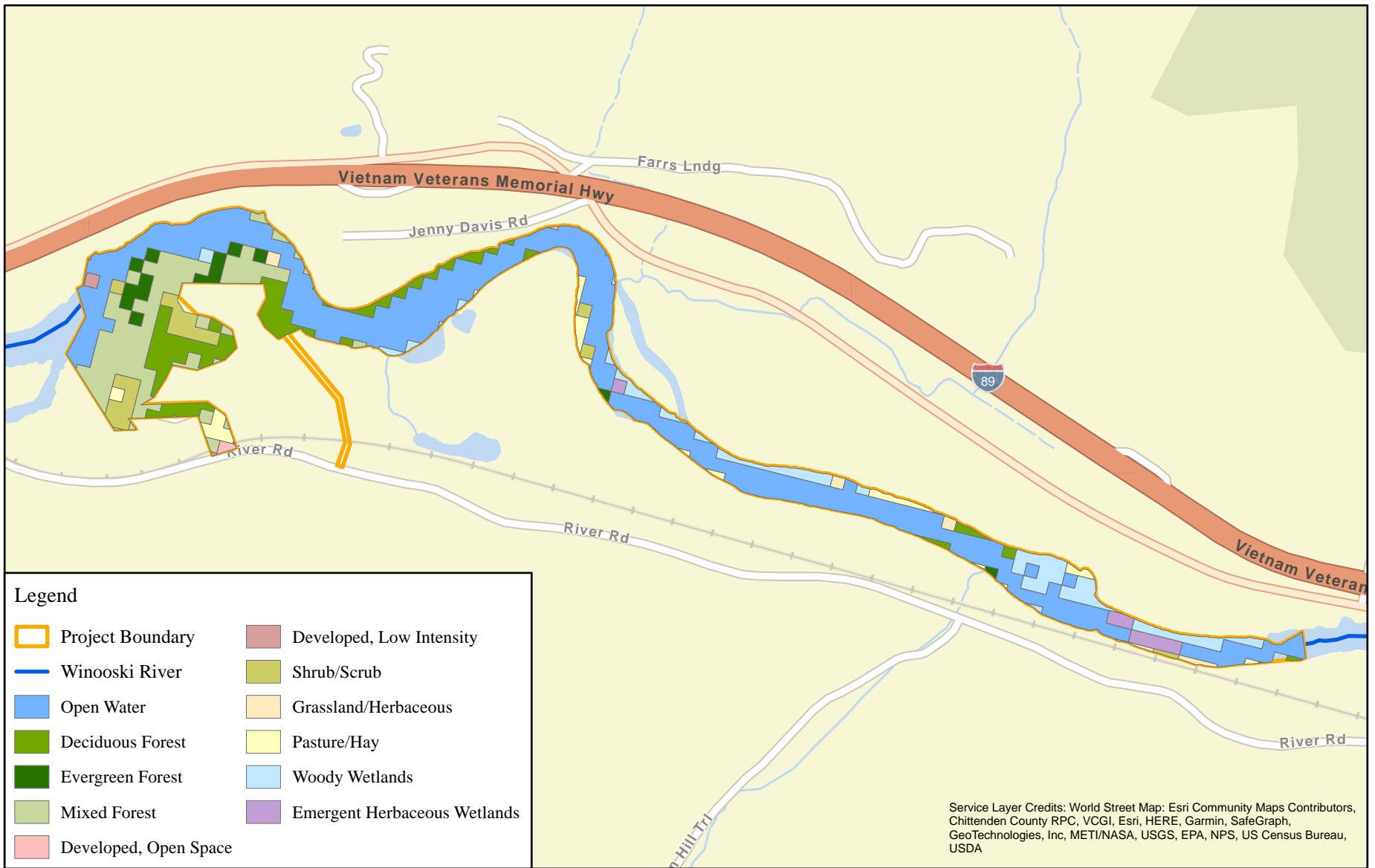
3.5.1 Shoreline and Watershed Protection Standards-Impoundment, Bypass Reach, and Downstream ZOE

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
E	1	<p><u>Not Applicable / De Minimis Effect:</u></p> <ul style="list-style-type: none">• 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 33.0 acres of land and 58.3 acres of water contained within the FERC Project boundary.
- Land use adjacent to and within the Project boundary is primarily upland deciduous, mixed, or evergreen forest, and woody wetlands. Developed land parcels are primarily located on the north side of the Project boundary. [Figure 3.5.1-1](#) shows land use designations in the Project vicinity.
- 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 FERC 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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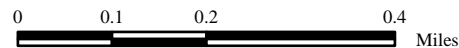


Figure 3.5.1-1:
Land Use Designations in the Project Vicinity

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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

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
F	2	<p><u>Finding of No Negative Effects:</u></p> <ul style="list-style-type: none">• 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 D. No critical habitats documented are within one mile of the Project boundary. In addition, Eastern pearlshell mussel (*Margaritifera margaritifera*), a state listed threatened species, was identified within the Project impoundment and downstream of the Project dam during the recent FERC relicensing.
- Article 403 requires the Licensee to maintain the impoundment water level at the elevation(s) specified in the flow management plan required by the WQC and Article 402. The Licensee must limit any planned, non-emergency maintenance activities that will require the impoundment be drawn down below the specified limits between November 1 and August 15 to protect Eastern pearlshell mussels in the impoundment. These measures were recommended to protect this species.
- 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.
- Maintenance activities at the Project will require only periodic mowing and tree trimming. Nothing in the record suggests that tree removal that would have the potential to affect NLEB maternity roost habitat occurs as part of Project operations.

- FERC's analysis within the 2022 Final Environmental Assessment¹⁷ concluded that although Project operations and maintenance may affect the NLEB, it would not result in the prohibited incidental take of this species under the final Endangered Species Act section 4(d) rule. The USFWS concurred with FERC determination.¹⁸

¹⁷FERC Accession No. 20220421-3031: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220421-3031.

¹⁸ FERC Accession No. 20220912-3014: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220912-3014.

3.7 Cultural and Historic Resources Standards

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

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
G	2	<p><u>Approved Plan:</u></p> <ul style="list-style-type: none">• 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.

- GMP delineated the Project's proposed Area of Potential Effect (APE) in consultation with the University of Vermont Consulting Archaeology Program, based on comments from the Vermont Division for Historic Preservation (VDHP or VT SHPO) and FERC recommendations that areas within 100 feet of the Project's boundary should be included. The APE encompasses the Project access road, substations, recreation area, dam, powerhouse, impoundment, transmission infrastructure, maintenance building, and tailrace, plus a 100-foot buffer. The APE was approved by the VDHP on October 16, 2019.
- Historic resources identified within the APE include the existing Bolton Falls stone dam constructed in 1900. The dam was determined by VDHP to be eligible for inclusion in the VDHP in 1981, and FERC requested that the US Department of the Interior (DOI) make a finding of National Register of Historic Places (NRHP) Eligibility for it. The Secretary of the DOI determined that the property is eligible on March 19, 1981. The dam may be eligible for nomination to the Historic American Engineering Record.
- As part of Project relicensing, the Licensee completed a desk-top review of previously surveyed properties; no above-ground historic resources have been found by the Vermont State Historic Sites & Structures Survey other than the dam. The Licensee additionally completed systematic on-site pedestrian surveys of all of the structures within the APE, as well as properties that are partially within the APE, but which contain structures that are outside the APE (including several of the residential properties along US Route 2, for which only the backyards are within the APE).
- As a result of Phase I and Phase II surveys performed as part of Project relicensing, three newly discovered archaeological sites are considered historic resources and are therefore eligible for listing in the NRHP. All three of the archaeological properties are eligible for listing in the NRHP fall under Criterion D: Information Potential.
- Article 407 of the FERC license and the terms of a Programmatic Agreement¹⁹ with the Vermont State Historic Preservation Office requires the Licensee to implement the Project's Historic Properties Management Plan²⁰ to ensure that measures are in place to protect Project historic properties from adverse effects related to the operation and maintenance of Project facilities. An HPMP also ensures

¹⁹ FERC Accession No. 20220601-3002: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220601-3002.

²⁰ FERC Accession No. 20220331-5203: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220331-5203.

that any previously undiscovered archaeological resources are not adversely affected by the Project during the term of the FERC license. If the Programmatic Agreement is terminated prior to Commission approval of the HPMP, the Licensee will continue to implement the provisions of its approved HPMP.

- The HPMP outlines undertakings and maintenance measures at the Project that have no potential to impact identified archaeological resources and are exempt from VT SHPO review (e.g., area cleanup, mowing and trimming lawns, clearing fallen trees, etc.). For undertakings not included in the exempt list, GMP is required to complete the environmental review process with VT SHPO, as per Section 106 of the National Historic Preservation Act of 1966. The VT SHPO Project Review identifies an undertaking's potential impacts to historic buildings and structures, historic districts, historic landscapes and settings, and to known or potential archaeological resources.
- For actions that have been identified to have a potential impact on known archaeological properties within the Project area, as well as unforeseen projects that extend beyond the Project's APE, the HPMP outlines the project review requirements to be conducted by a certified professional archaeologist. For any undertakings implemented as part of the HPMP, other than exempt activities, the Tribal Nations should be notified and provided an opportunity to comment. This includes the Abenaki Nation at Missisquoi, the Elnu Tribe of the Abenaki Tribal Headquarters, the Koasek Traditional Band of the Koas Abenaki Nation, the Nulhegan Abenaki Tribe, the Saint Regis Mohawk Tribe, and the Stockbridge-Munsee Mohican Tribe.
- Per Stipulation 1.D of the Programmatic Agreement, GMP is required to file an annual report with the VT SHPO of activities conducted under the implemented HPMP.

3.8 Recreational Resources Standards

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

- The Licensee does not have records of a previous FERC Environmental and Recreation Inspection being completed at the Project.

<i>Criterion</i>	<i>Standard</i>	<i>Instructions</i>
H	2	<u>Agency Recommendation:</u> <ul style="list-style-type: none">• The facility demonstrates compliance with resource agency recommendations for recreational access or accommodation (including recreational flow releases), or any enforceable recreation plan in place for the facility.

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 2 to justify meeting the recreational resources standard.

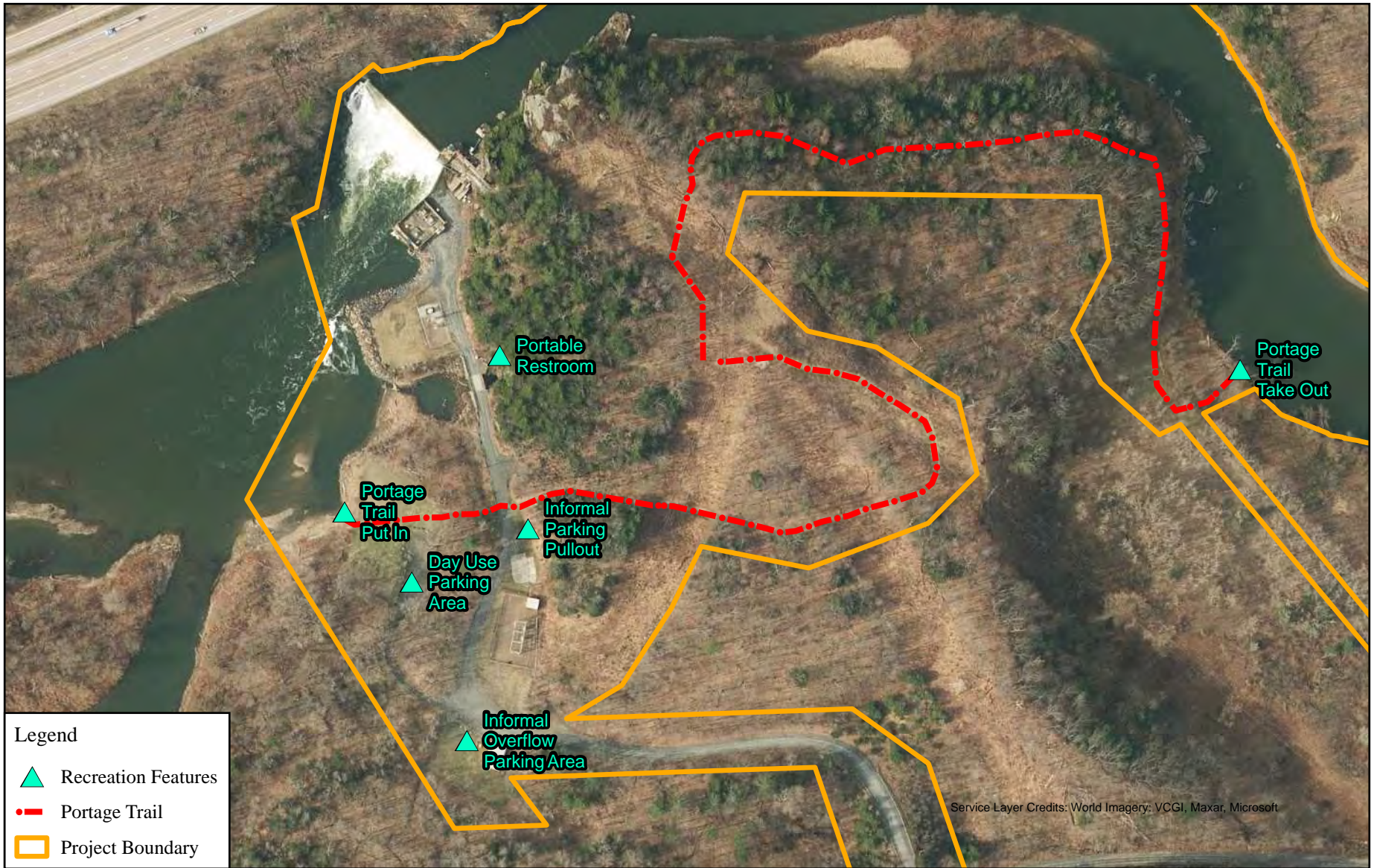
- The Project has two recreational facilities, both of which are operated and maintained by the Licensee: the Day Use Area (DeForge Hydroelectric Station Recreation Area) and the Portage Trail ([Figure 3.8-1](#)).
 - The Day Use Area consists of a parking lot, a grassy picnic area with one grill, and river access just below the dam ([Figure 3.8-2](#) to [Figure 3.8-4](#)). The Day Use Area parking lot serves all recreational facilities.
 - The Portage Trail consists of a car-top boat landing upriver from the dam, an unimproved launch area downriver of the dam, and an approximately 0.5-mile trail connecting the landing and launch area. Portions of the trail are wide enough to accommodate a motor vehicle, but it is typically closed to vehicular traffic ([Figure 3.8-5](#) and [Figure 3.8-6](#)).
- In addition to the two recreational facilities, recreationists also park in a small pullout along Power Plant Road near the Portage Trail or at a large flat area at the junction of Power Plant Road and the entrance to the Day Use Area ([Figure 3.8-7](#) and [Figure 3.8-8](#)). There is a portable restroom along Power Plant Road just outside of the gate to the powerhouse and dam.
- GMP proposed several improvements to the Project recreation facilities during the recent FERC relicensing process as part of a draft Recreation Management Plan. Those improvements includes: (1) relocating the existing Day Use Area parking lot out of the floodplain; (2) implementing creeping lovegrass recreation measures to redirect foot traffic at the Day Use Area; (3) adding two picnic tables and an information kiosk to the Day Use Area; (4) ensuring that signage at the Portage Landing is adequate for boaters to find the site from the river; (5) constructing an improved Portage Landing, including clearing vegetation, and grading; and (6) clearing brush along the Portage Trail and ensure signage is adequate for boaters to follow trail.
- Condition E of the WQC requires that the Licensee develop within 180 days of the effective date of the FERC license, a plan and implementation schedule for the recreation enhancements.
- Article 406 of the FERC license requires GMP to develop a final Recreation Management Plan that includes the GMP proposed recreation improvement made during the FERC relicensing process, as well as additional provisions: (1) to install and maintain a picnic table that is accessible to persons with disabilities at the Day Use Area; (2) to install a 12-foot-wide concrete level slab at the portage take-out; (3) develop design drawings for improving the slope of the existing Day Use Area access

road to enhance access for persons with disabilities; and (4) include an implementation schedule for completing the above improvements within two years of license issuance. This Recreation Management Plan was filed with the Commission on March 22, 2023.²¹ The Recreation Management Plan was subsequently approved by the Commission on May 26, 2023.²² The recreation site improvements are planned to be completed in 2024. As described in the FERC Order approving the Recreation Management Plan, within 90 days of completing construction of the recreation facilities (i.e., by December 31, 2024), GMP must file with the Commission a report documenting completion.




- GMP is required to file a Recreation Monitoring Report with FERC that includes an assessment of site condition and capacity by December 31, 2032, and every 10 years thereafter. Site condition must be assessed for each recreation amenity and categorized as proposed in the Recreation Management Plan. Site capacity must be observed as described in the Recreation Management Plan. Prior to filing, GMP must provide the report to the Vermont Agency of Natural Resources and allow at least 30 days for the Vermont Agency of Natural Resources to comment and provide recommendations on the report and any recommendations from GMP regarding the need for providing additional capacity should utilization exceed 80 percent of capacity in the parking lot, picnic tables, or if groups of three or more are waiting at the portage put-in facility more than 80 percent of observances. If changes are triggered by site condition or capacity needs, an update to the Recreation Management Plan must be filed with the Recreation Monitoring Report and must include approval from the Vermont Agency of Natural Resources.

²¹ FERC Accession No. 20230322-5132: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230322-5132.

²² FERC Accession No. 20230526-3029: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230526-3029.



Legend

-  Recreation Features
-  Portage Trail
-  Project Boundary



GREEN MOUNTAIN POWER
Bolton Falls Hydroelectric Project
FERC No. 2879
Low Impact Hydropower Institute Application

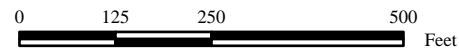


Figure 3.8-1:
Recreation Facilities and Access Points

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FIGURE 3.8-2: DAY USE AREA ACCESS ROAD



FIGURE 3.8-3: DAY USE AREA PARKING LOT



FIGURE 3.8-4: DAY USE AREA PICNIC AREA



FIGURE 3.8-5: PORTAGE BOAT LANDING



FIGURE 3.8-6: PORTAGE TRAIL EXIT



FIGURE 3.8-7: INFORMAL OVERFLOW PARKING



FIGURE 3.8-8: INFORMAL PARKING PULLOUT NEAR PORTAGE TRAIL



4 CONTACT FORMS

4.1 Applicant-Related Contacts

Facility Owner:	
Name and Title	John Tedesco, Generation Project Coordinator
Company	Green Mountain Power
Phone	802-655-8753
Email Address	John.Tedesco@greenmountainpower.com
Mailing Address	163 Acorn Lane, Colchester, VT 05446
Facility Operator (if different from Owner):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
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, Generation Project Coordinator
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, Generation Project Coordinator
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	<input checked="" type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input checked="" type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> 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	Vermont Department of Environmental Conservation	<input checked="" type="checkbox"/> Flows <input checked="" type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input checked="" type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input checked="" type="checkbox"/> Recreation
Name and Title	Jeffery Crocker, Supervision River Ecologist	
Phone	802-490-6151	
Email address	jeff.crocker@vermont.gov	
Mailing Address	1 National Life Drive, Davis 3, Montpelier, VT 05620	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Vermont Department of Environmental Conservation	<input checked="" type="checkbox"/> Flows <input checked="" type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input checked="" type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Betsy Simard, River Ecologist	
Phone	802-585-8189	
Email address	Betsy.simard@vermont.gov	
Mailing Address	One National Life Drive, Davis 3 Montpelier, VT 05602-3208	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Vermont Fish & Wildlife Department	<input checked="" type="checkbox"/> Flows <input checked="" type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input checked="" type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Eric Davis, River Ecologist	
Phone	802-490-6180	
Email address	eric.davis@vermont.gov	
Mailing Address	Watershed Management Division, Main Building – 2nd Floor, One National Life Drive, Montpelier, VT 05620	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Vermont Fish & Wildlife Department	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Brett Ladago	
Phone	802-485-7566	
Email address	bret.ladago@vermont.gov	
Mailing Address	3696 Roxbury Road, Roxbury, VT, 05669	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Vermont Division for Historic Preservation	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input checked="" type="checkbox"/> Recreation
Name and Title	Laura Trieschmann	
Phone	802-505-3579	
Email address	Laura.trieschmann@vermont.gov	
Mailing Address	One National Life Drive, Davis Building, 6th Floor, Montpelier, VT 05620	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Vermont Division for Historic Preservation	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Elizabeth Peebles, Historic Resources Specialist	
Phone	802 828-3049	
Email address	elizabeth.peebles@vermont.gov	
Mailing Address	One National Life Drive, Davis Building, 6th Floor, Montpelier, VT 05620-0501	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Vermont Division for Historic Preservation	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Scott Dillon, Survey Archaeologist	
Phone	802-272-7358	
Email address	scott.dillon@vermont.gov	
Mailing Address	One National Life Drive, Davis Building, 6th Floor, Montpelier, VT 05620-0501	

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 AND BYPASS PIPE



FIGURE A-2: PROJECT POWERHOUSE AND TAILRACE



FIGURE A-3: POWERHOUSE INTAKE STRUCTURE AND TRASH RAKE



FIGURE A-4: DAM SPILLWAY FROM TOP OF LEFT ABUTMENT



FIGURE A-5: PROJECT IMPOUNDMENT FROM TOP OF LEFT ABUTMENT



FIGURE A-6: SUBSTATION NO. 1



FIGURE A-7: SUBSTATION NO. 2 FROM PROJECT ACCESS ROAD



APPENDIX B: FERC LICENSE ORDER

181 FERC ¶ 62,006
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Green Mountain Power Corporation

Project No. 2879-012

ORDER ISSUING NEW LICENSE

(October 5, 2022)

INTRODUCTION

1. On January 30, 2020, Green Mountain Power Corporation (GMP) filed pursuant to Part I of the Federal Power Act (FPA),¹ an application for a new license to continue operation and maintenance of the Bolton Falls Hydroelectric Project No. 2879 (Bolton Falls Project, or project). The 7.50-megawatt (MW) project is located on the Winooski River near the town of Duxbury in Washington County, Vermont.² The project does not occupy federal land.

2. As discussed below, this order issues a new license for the project.

¹ 16 U.S.C. §§ 791(a)–825(r).

² The project is subject to the Commission's mandatory licensing jurisdiction under section 23(b)(1) of the FPA because the project is located on a non-navigable stream over which Congress has jurisdiction under the Commerce Clause, affects interstate commerce through a connection to the interstate grid, and involved construction after 1935 (*e.g.*, adding a new powerhouse and new generators which increased the project's capacity). See 16 U.S.C. § 817(1). From river mile 17.6 to its confluence with Lake Champlain, the Winooski River is a navigable water of the United States within the meaning of section 3(8) of the FPA (16 U.S.C. § 796(8)). The project, located at river mile 43, occupies a non-navigable segment of the Winooski River.

BACKGROUND

3. The Commission issued the original license for the project on February 5, 1982, and the license expired on January 31, 2022.³ Since then, GMP has operated the project under an annual license pending the disposition of its new license application.⁴

4. On December 1, 2020, the Commission issued a public notice accepting the application for filing, indicating that the application was ready for environmental analysis, and setting February 1, 2021, as the deadline for filing motions to intervene, protests, comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions.⁵ The U.S. Department of the Interior (Interior) filed a reservation of authority to prescribe fishways on January 26, 2021. The Vermont Agency of Natural Resources (Vermont ANR) filed a timely motion to intervene, comments, and recommendations on February 1, 2021.⁶

5. On August 13, 2021, Commission staff issued a draft environmental assessment (EA) analyzing the effects of the proposed project and alternatives to it, and setting a deadline for comments of September 12, 2021. Vermont ANR filed comments on the draft EA on September 13, 2021. The Vermont State Historic Preservation Office (Vermont SHPO) filed comments on the draft EA on October 15, 2021. On January 19, 2022, the Vermont Department of Environmental Conservation (Vermont DEC) issued a water quality certification for the project with 10 conditions. Commission staff issued a final EA on April 21, 2022.

³ *Green Mountain Power Corporation*, 18 FERC ¶ 62,156 (1982).

⁴ See 16 U.S.C. § 808(a)(1); *see also* Commission staff's February 3, 2022, Notice of Authorization for Continued Project Operation.

⁵ 85 Fed. Reg. 78,847 (January 7, 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). Because the 60-day filing deadline fell on a Saturday (*i.e.*, January 30, 2021), the filing deadline was extended until the close of business on Monday, February 1, 2021.

⁶ Timely, unopposed motions to intervene are granted by operation of Rule 214(c)(1) of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.214(c)(1) (2021).

6. The intervention, comments, recommendations, and Vermont DEC's water quality certification conditions have been fully considered in determining whether, and under what conditions, to issue this license.

PROJECT DESCRIPTION AND OPERATION

A. Project Area

7. The Winooski River begins in the town of Cabot, Vermont and flows northwest for approximately 90 miles where it empties into Lake Champlain approximately 5 miles north of downtown Burlington, Vermont. The Winooski River watershed has a total drainage area of about 1,080 square miles.

8. The Bolton Falls Project is one of ten hydroelectric dams in the Winooski River basin, seven of which are FERC-licensed.⁷ The drainage area at the project is about 821 square miles.

B. Project Facilities

9. Bolton Falls Dam is a 92-foot-high, 275-foot-long timber crib dam with a maximum crest elevation of 397 feet when the 5-foot-high rubber bladder atop the dam is inflated, and 392 feet when the rubber bladder is deflated.⁸ The dam includes a 196-foot-long concrete spillway with a crest elevation of 392 feet. At a normal full pool elevation of 397 feet, the impoundment has a surface area of 59 acres, a storage capacity of 300 acre-feet, and impounds about 2.1 miles of the Winooski River.

10. The project includes a forebay with two concrete intakes. Each intake is equipped with 27-foot-wide, 43-foot-high angled trash racks with a 3-inch clear spacing between the bars. Two 10-foot diameter, 120-foot-long steel penstocks encased in concrete extend from each intake through the dam to the generating units. The powerhouse is 73 feet

⁷ The 10 hydroelectric dams in the Winooski River basin from downstream to upstream include the following: Chace Mill (FERC Project No. 2756, also known as Winooski 1); Gorge No. 18 (non-FERC-licensed), Essex 19 (FERC Project No. 2513); Bolton Falls (FERC Project No. 2879); Waterbury Dam (FERC Project No. 2090); Moretown No. 8 (FERC Project No. 5944); Middlesex No. 2 (non-FERC-licensed); North Branch No. 3 (FERC Project No. 5124, also known as Wrightsville); Winooski 8 (FERC Project No. 6470); and Marshfield No. 6 (non-FERC-licensed also known as Molly's Falls). Six of the 10 dams are located on mainstem of the Winooski River while the remaining 4 are located on major tributaries of the Winooski River.

⁸ Unless otherwise stated, all elevations in this order are referenced to National Geodetic Vertical Datum of 1929 (NGVD 29).

long and 57 feet wide and contains two horizontal, 3,750-kilowatt Kaplan turbines for a total installed capacity of 7,500 kilowatts. The project tailrace is approximately 90 feet wide and 60 feet long and discharges to the Winooski River about 150 feet downstream of the dam, creating a 150-foot-long bypassed reach.⁹ The project also includes a 75-foot-long, 36-inch diameter bypass pipe that can discharge up to 114 cubic feet per second (cfs).

11. Project power is transmitted through an approximately 130-foot long, 5-kilovolt underground transmission line that connects to an adjacent switchyard that steps up the voltage to 34.5 kilovolts. From the switchyard, a 600-foot-long, 34.5-kilovolt overhead transmission line connects to a second switchyard that interconnects with the regional grid.

12. Recreation facilities at the project include a day use area (Day Use Area) below the dam and a canoe portage with a put-in and take-out area. Ordering Paragraph (B)(2) provides a more detailed description of the project's facilities.

C. Project Boundary

13. The current project boundary encompasses 93.4 acres and extends about 2.1 miles upstream and about 0.10 miles downstream from the dam. The project boundary generally follows the impoundment at its normal full pond elevation of 397.00 feet, and encloses the dam, powerhouse, transmission line, substations, Day Use Area, some of the portage trail, and the portage take-out and put-in.

14. As discussed below, the licensee proposes to modify the project boundary to include existing project features not currently encompassed by the project boundary and to remove lands that no longer serve a project purpose.

D. Current Project Operation

15. The current license allows GMP to operate the project on a peaking basis and fluctuate the reservoir level between 391.00 and 397.00 feet while discharging through the powerhouse a minimum flow of 300 cfs¹⁰ or inflow, whichever is less, downstream into the Winooski River. However, GMP voluntarily operates the project in a run-of-

⁹ The bypassed reach consists of a large deep pool that remains wetted under all operating conditions from a combination of spill, leakage through the dam, and backwatered powerhouse outflow.

¹⁰ When the project is not generating, GMP releases the 300-cfs minimum flow by spilling the required minimum flow over the dam into the bypassed reach.

river mode with project outflows approximating inflows to the impoundment at any given point in time.

16. A pond level sensor installed in the headpond near the powerhouse intake monitors water levels. The sensor's readings are used to adjust flows through the powerhouse via the turbine wicket gates to maintain the project impoundment water level at the 397.00-foot elevation. An air compressor system located on the intake structure inflates the rubber bladder and automatically begins to deflate when the impoundment rises more than a foot above the top of the bladder. The bladder system can also be manually controlled to lower the impoundment when necessary to facilitate project maintenance.

17. The maximum combined hydraulic capacity of the two project turbines is 2,400 cfs. Inflow to the impoundment that exceeds the maximum hydraulic capacity passes over the spillway. When inflow drops below 365 cfs (the lowest flow that GMP can operate one of its turbines), the turbine wicket gates are closed to prevent flow through the intake system and all flow is spilled over the dam into the bypassed reach. The 36-inch-diameter bypass pipe can discharge approximately 114 cfs at a pond elevation of 397.00 feet but is generally only used when the project impoundment is drawn down for maintenance purposes.

E. Proposed Operation and Environmental Measures

18. To protect aquatic resources, GMP proposes to continue to operate the project in a run-of-river mode.

19. To enhance aesthetics at the dam and enhance aquatic habitat and water quality in the bypassed reach, GMP proposes to release a 75-cfs minimum flow or inflow, whichever is less, into the bypassed reach via spill during daylight hours from April 1 through December 15. During the remainder of the year, flows into the bypassed reach would continue to consist of leakage, except when inflows exceed the hydraulic capacity of the project and the excess flows are spilled over the dam.

20. To enhance recreation, GMP proposes to implement a Recreation Management Plan filed in the license application that includes: (1) improving the Day Use Area by adding picnic tables¹¹ and an information kiosk, and relocating the primary parking area out of the floodplain to the existing informal lot; (2) improving the informal parking lot

¹¹ In its additional information response filed on June 1, 2020, GMP states that one of the two picnic tables would be accessible to persons with disabilities. GMP also states that the proposed portage take-out would be a concrete level slab, instead of a concrete ramp, to prevent a slipping hazard and that the landing would be 12 feet wide instead of 20 feet wide.

by laying gravel and designating parking spaces; (3) improving the portage take-out and trail by clearing vegetation, grading the take-out, installing steps, and adding signage; and (4) maintaining and monitoring the recreation facilities over the course of the new license.

21. To protect creeping lovegrass, a state-designated rare plant, GMP proposes in its Recreation Plan to place large boulders and new signs at the western end of the grassy picnic area to redirect users away from areas that contain the plant.

22. To protect cultural resources, GMP proposes to implement a Historic Properties Management Plan (HPMP), filed on March 31, 2022.

SUMMARY OF LICENSE REQUIREMENTS

23. This license, which authorizes the continued provision of 7.50 MW of renewable energy generation capacity, requires most of the proposed measures listed above, the conditions required by the Vermont DEC¹² water quality certification (Appendix A), and the staff-recommended measures described below. Combined, these measures will protect aquatic and terrestrial resources, water quality, threatened and endangered species, recreation and aesthetic resources, and cultural resources at the project.

24. Vermont DEC water quality certification condition B requires GMP to provide a continuous 100-cfs minimum spill flow or inflow, whichever is less, into the bypassed reach throughout the year. To monitor compliance with the required 100-cfs spill, the license requires GMP to include the specific impoundment water elevation that provides the required 100-cfs minimum spill flow in the flow management plan required by water quality certification condition C, maintain that impoundment level when operating in a run-of-river mode, and to file the flow management plan with the Commission for approval prior to implementing the plan. To protect sensitive life stages of Eastern pearlshell mussels located in the project impoundment, the license limits any planned, non-emergency maintenance activities by GMP which will draw down the impoundment below the required water level to the period between November 1 and August 15.

25. To verify compliance with the license's operational requirements, the license requires that the flow management plan required by water quality certification condition C include additional details on the flow and impoundment elevation monitoring equipment, that the plan include a provision to maintain a log of project operation, and that the licensee report deviations from the operating requirements to the Commission.

¹² Vermont DEC is a department within Vermont ANR, the administering authority for Vermont's Water Quality Certification program. Vermont DEC is responsible for issuing the water quality certificate.

26. To prevent maintenance debris from accumulating at the project and degrading water quality, this license requires a debris disposal plan.

27. To enhance recreation and public access, the license requires GMP to include in the Recreation Management Plan required by water quality certification condition E: (1) a provision to upgrade the access road between the parking area and Day Use Area; (2) a discussion on how the needs of persons with disabilities were considered in the preparation of the plan; and (3) a conceptual plan for the proposed improvements to the portage take-out.

WATER QUALITY CERTIFICATION

28. Under section 401(a)(1) of the Clean Water Act (CWA),¹³ 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 for the project.¹⁴

29. On January 22, 2021, GMP applied to the Vermont DEC for a water quality certification for the project, which Vermont DEC received on the same day. On January 19, 2022, Vermont DEC issued a certification for the project with 10 conditions, which are set forth in Appendix A of this order and are incorporated into the license by Ordering Paragraph (F).

30. Four of the certification conditions (conditions A, H, I, and J) are general or administrative in nature and are not discussed further.

31. The remaining six certification conditions require GMP to:

- (1) Operate the project in an instantaneous run-of-river mode where outflow from the project equals inflow except for short-term deviations such as during impoundment re-filling following planned or unplanned maintenance activities, spill 100 cfs continuously year-round into the bypassed reach when generating, and spill all inflow over the dam when not generating (condition B).

¹³ 33 U.S.C. § 1341(a)(1).

¹⁴ *Id.* § 1341(d).

- (2) Develop and submit for Vermont DEC approval a flow management plan that (a) details how the project will operate in an instantaneous run-of-river mode while also implementing spill flow requirements; (b) includes a method for continuous monitoring and reporting of flow releases at the project (conservation flow,¹⁵ spillage, and turbine discharge), impoundment levels, and inflows; (c) includes a provision to maintain flow data so that it is available upon request on a “near real-time basis”; and (d) includes procedures for reporting deviations from operating requirements to Vermont DEC within 15 days of the deviation (condition C).
- (3) Prior to the next replacement of trash racks at the project, consult with the Vermont Fish and Wildlife Department (Vermont FWD) on the trash rack design and placement to determine the appropriate bar clearance spacing and location and file the trash rack design information with Vermont DEC for approval (condition D).
- (4) Develop in consultation with relevant stakeholders¹⁶ a plan and implementation schedule for recreation enhancements and submit the plan and schedule for review and approval by Vermont ANR prior to implementation (condition E).
- (5) Dispose of debris associated with project operation in accordance with state laws and regulations (condition F).
- (6) Develop a water level management plan for review and approval by Vermont ANR prior to submitting the plan to the Commission that includes provisions¹⁷ for (a) protecting freshwater mussels from being dewatered

¹⁵ Vermont DEC does not define the term “conservation flow” in the water quality certification. However, staff assumed in the final EA that the term “conservation flow” refers to the certification requirement that GMP maintain a flow of 100 cfs year-round into the bypassed reach via spill over the dam. Final EA at 12.

¹⁶ Vermont DEC does not specify in its water quality certification which “relevant stakeholders” the licensee needs to consult with in developing the recreation management plan and implementation schedule.

¹⁷ Vermont DEC does not specify in the water quality certification what individual measures should be included in the required water level management plan; however, the agency’s comments on the draft EA filed on September 13, 2021, indicated that the plan should include provisions for protecting mussels, such as avoiding maintenance drawdowns during the mussel breeding season, conducting drawdowns on “cool and overcast days,” limiting the duration of the drawdown “as much as possible,” and “a

when drawdowns are needed for planned maintenance activities at the project, (b) protecting aquatic biota and wildlife in wetlands during maintenance-related drawdowns, and (c) notifying and receiving approval from Vermont DEC prior to conducting any project maintenance or repair work (including drawdowns below the normal operating range) if said work may have a material adverse effect on water quality or cause less than full support of an existing use or a beneficial value or use of State of Vermont waters (condition G).

32. As discussed below, in the Final EA, Commission staff did not recommend some of the water quality certification conditions.

Instantaneous Run-of-River Operation

33. In the final EA,¹⁸ staff did not recommend that the project be required to operate in an instantaneous run-of-river mode where outflow equals, rather than approximates, inflow (condition B). There is no indication that the project is technologically or mechanically capable of operating under conditions where outflow from the project equals inflow on an instantaneous basis such that a perfectly stable reservoir elevation would be maintained at all times.¹⁹ Further, staff found no evidence in the record to suggest that the project's current run-of-river operations in which total outflows approximate total inflows are adversely affecting environmental resources.

34. Staff found that continuing to operate the project in a run-of-river mode where outflows approximate inflows would continue to protect fish spawning areas and freshwater mussel beds from becoming dewatered, and ensure that downstream flows are similar to natural river flows.²⁰ Therefore, operating the project in a run of river mode such that downstream flows approximate inflow would provide the same benefit to aquatic resources upstream and downstream of the project as operating the project in instantaneous run-of-river mode as required by Vermont DEC certification condition B.

protective drawdown rate.”

¹⁸ Final EA at 72.

¹⁹ Because of the inherent lag times associated with the passive release of stream flows from an elevation-stabilized impoundment (*e.g.* when units, gates, or spillway mechanisms are raised and lowered to manage impoundment water levels), precise and consistent instantaneous matching of outflows to inflows at the project at best, is extremely difficult. More typically, outflow from the project approximates inflow at any given point in time.

²⁰ Final EA at 23.

Nonetheless, condition B is included in this license, because it is mandatory under section 401(a) of the CWA.

Minimum Flow

35. In the final EA,²¹ staff did not recommend maintaining a continuous, year-round 100-cfs spill flow over the dam to enhance aesthetics and protect aquatic habitat in the bypassed reach (condition B). With regard to aesthetics, staff determined that while maintaining a spill flow of 100 cfs over the dam would improve the visual appearance of the dam compared to existing conditions when only leakage flows²² are visible for the majority of the year, there would be little to no aesthetic benefit from spilling these flows during nighttime hours throughout the year or during daytime hours from November through March²³ when recreational use of project land and waters is expected to be low to non-existent.²⁴ With regard to aquatic habitat protection, spilling 100 cfs over the dam would increase the wetted area with active circulation immediately below the dam from 25 percent under current operation to 83 percent.²⁵ This could benefit aquatic habitat in the bypassed reach through improved water quality during the summer and early fall months, when the pool habitat below the dam typically consists of warm, stagnant water with occasional periods when dissolved oxygen concentrations are poor. However, the benefits to water quality and aquatic habitat from continuously spilling 100 cfs flow over the dam would be marginal during the late fall and winter months, because water quality conditions, particularly dissolved oxygen concentrations, already tend to be good at this

²¹ Final EA at 66-67.

²² GMP states that leakage occurs from two openings located at the base of the dam and ranges from 0 to 16 cfs depending on ambient conditions.

²³ GMP defines “nighttime hours” as one half-hour after sunset to one half-hour before sunrise based on the middle date of each month. Therefore, GMP proposes to spill flows during the following daylight hours (based on Eastern Standard Time or Daylight Savings Time) per month: April (5:40am to 8:06pm); May (4:56am to 8:42pm); June (4:38am to 9:08pm); July (4:53am to 9:04pm); August (5:26am to 8:27pm); September (6:02am to 7:32pm); October (6:38am to 6:37pm); November (6:19am to 4:54pm); and December (6:53am to 4:42pm).

²⁴ The Day Use Area from which views of the dam and the spill are most visible is only open to the public during the day. Also, visitor usage from November through March is likely low to non-existent due to the colder temperatures and icy, snowy weather conditions during these months. Final EA at 49 and 66-67.

²⁵ Final EA at 29.

time of year with little to no need for improvement.²⁶ Further, should the impoundment freeze, ice formations on the inflatable rubber dam crest from the spillage flow could interfere with the proper operation of the rubber dam. Staff estimates that maintaining a continuous 100-cfs spill flow over the dam would reduce generation by approximately 2,070 megawatt-hours (MWh) per year, resulting in an annual lost opportunity cost of \$79,112.

36. Instead of releasing 100 cfs year-round, staff recommended releasing 75 cfs over the dam during daylight hours from April 1 through October 31.²⁷ Staff's recommended flow would provide "good aesthetic value"²⁸ according to GMP's aesthetic study and would increase the percent of the reach showing active circulation from 25 percent under existing conditions to 75 percent during daylight hours during the summer and fall when water temperatures are highest and dissolved oxygen concentration lowest. Staff found that this flow would adequately protect aquatic habitat, improve the visual appearance of flow over the dam when visitors to the Day Use Area are present, and would avoid spilling during the coldest months when icing problems may occur. Releasing staff's recommended spill flow would reduce generation by approximately 535 MWh per year, resulting in a levelized annual lost opportunity cost of \$20,489. Staff found that the marginal improvements to aquatic habitat from Vermont DEC's required flow would not be worth the cost and therefore, did not recommend the higher flow. However, condition B, rather than staff's recommended measure, is included in this license, because condition B is mandatory under section 401(a) of the CWA.

Flow Release Monitoring

37. Vermont DEC certification condition C requires GMP to develop a flow management plan that includes monitoring flow releases and generation and making the data available on a "near-real time" basis. In the final EA,²⁹ staff did not recommend that GMP monitor inflows, outflows, and spill over the dam on a "near-real time basis."³⁰

²⁶ Final EA at 18-19 and 66-67.

²⁷ Final EA at 65.

²⁸ Final EA at 48.

²⁹ Final EA at 69-70.

³⁰ Vermont DEC does not indicate in the water quality certification the frequency of monitoring that would be needed to satisfy its condition that data be "available on a near-real time basis." However, staff assumed in the final EA this could be achieved via continuous monitoring and reporting at 15-minute intervals which would require GMP to install and operate at least two stream gages that are capable of continuously monitoring

Staff determined that GMP's existing automated impoundment level monitoring and control system, which is capable of logging impoundment water surface elevations and powerhouse flow levels at 15-minute intervals, is sufficient to monitor water levels, generation, and run-of-river operation where outflows approximate inflows. Staff determined that to comply with Vermont DEC's reporting requirements, GMP would need to install at least two new gages capable of continuously monitoring stream levels and transmitting the data in real-time. Staff estimated this would increase GMP's levelized annual monitoring costs by \$41,648. Because GMP's existing monitoring and control system would achieve the same compliance objectives at a lower cost, staff concluded that the benefits of the real-time flow monitoring would not be worth the higher costs. However, condition C is included in this license, because it is mandatory under section 401(a) of the CWA.

38. GMP states that its proposed spill flow of 75 cfs over the dam requires maintaining the reservoir at an elevation of 397.25 feet. To monitor compliance with the required 100-cfs spill, Article 402 requires GMP to identify the specific impoundment water level elevation (in feet U.S. Geological Survey Datum) needed to provide the 100-cfs minimum spill flow required by Vermont DEC certification condition B.

Trash Rack Replacement

39. In the final EA,³¹ staff did not recommend requiring GMP to consult with Vermont FWD on a new trash rack design with "appropriate" bar clearance spacing when the time comes for the current trashracks to be replaced (condition D). Staff's analysis in the final EA³² found that the current trashrack design presents a low risk of impingement for adult and juvenile resident fish and that most fish expected to encounter the trash racks are capable of overcoming the maximum approach and pass-through velocities at the trash rack and swim away before becoming entrained. Staff also determined that fish species and life-stages with a greater likelihood of entrainment are expected to experience high turbine survival (greater than 90 percent) through the project's Kaplan turbines due to their small size.³³ Further, nothing in the record suggests entrainment is adversely affecting resident fish populations residing in the project impoundment or that the trash racks would need to be modified or replaced. However, condition D is included in this license, because it is mandatory under section 401(a) of the CWA.

stream flows and transmitting the data in real-time. Final EA at 30.

³¹ Final EA at 72-73.

³² Final EA at 33-35 and 72-73.

³³ Final EA at 34-35 and 73.

Water Level Management Plan

40. In the final EA,³⁴ staff did not recommend developing a water level management plan for the purpose of, among other things, protecting freshwater mussels from being dewatered and aquatic biota and wildlife in wetlands from being impacted by maintenance-related drawdowns (condition G). Vermont DEC does not describe in its certification what measures would satisfy this requirement; however, in its comments on the draft EA,³⁵ Vermont DEC suggests that the plan could include provisions to avoid maintenance drawdowns during the mussel breeding season, conduct drawdowns on “cool and overcast days,” limit the duration of the drawdown “as much as possible,” and include “a protective drawdown rate.” These provisions are discussed further below.

Mussel Protection Measures

41. GMP periodically (up to 10 times annually) draws the impoundment down five feet (down to an elevation of 392 feet from 397 feet) to maintain the dam and its flow regulating equipment (*i.e.*, repair the rubber bladder, remove large woody debris, repair the intake and headgate infrastructure, etc.). GMP conducts these maintenance activities during the summer and fall when flow and temperature conditions make it easier to perform the work. GMP’s mussel surveys found that half (21 of 42) of the state-listed threatened Eastern pearlshell mussels found in the impoundment are located at depths of five feet or less.

42. Including a license requirement to avoid drawing down the impoundment for planned maintenance during the mussel breeding season (August 16 to October 31) would limit dewatering of sensitive reproductive or larval mussel life stages, and provide GMP nine months to conduct planned drawdowns, including during the low flow months of June, July and the first half of August.³⁶ Therefore, Article 403 requires GMP to limit any planned, non-emergency maintenance activities that will require the impoundment to be drawn down below the reservoir elevation limits specified in this license to the period between November 1 and August 15 to protect Eastern pearlshell mussels.

43. Staff determined that planning maintenance drawdowns around short-term weather conditions (*i.e.*, cloudy days) and limiting the duration of a drawdown would be impracticable and difficult to enforce. Moreover, restricting the rate at which GMP draws down the impoundment water level to perform maintenance would likely be ineffective due to the sedentary nature and low mobility of Eastern pearlshell mussels

³⁴ Final EA at 67-68.

³⁵ See Vermont DEC’s comment letter filed September 13, 2021.

³⁶ Final EA at 68.

located in the impoundment.³⁷ Thus, staff did not recommend requiring these other mussel protection measures.

Other Aquatic Biota and Wildlife

44. With respect to protecting aquatic biota and wildlife in wetlands from maintenance-related drawdowns, staff found in the final EA³⁸ that avoiding planned maintenance drawdowns during the late summer and early fall – the seasons when inflows to the impoundment are typically at their lowest – would reduce potential effects on wetland habitats used by wildlife. A license requirement to avoid drawing down the impoundment for planned maintenance during the mussel breeding season (August 16 to October 31) would achieve these same objectives without the need to develop a plan. Therefore, staff did not recommend that a water level management plan be developed. However, condition G is included in this license, because it is mandatory under section 401(a) of the CWA.

Vermont DEC Approval of Repairs

45. In the final EA,³⁹ staff did not recommend GMP obtain Vermont DEC approval prior to unplanned emergency maintenance repairs (condition G). Requiring such approvals before commencing work could limit GMP's ability to complete needed repairs in a timely fashion. However, condition G is included in this license, because it is mandatory under section 401(a) of the CWA.

COASTAL ZONE MANAGEMENT ACT

46. Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA),⁴⁰ 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.

³⁷ Eastern pearlshell mussels spend their lives situated in the bottom substrates of streams or lakes rarely moving more than a few meters in a lifetime. Final EA at 22.

³⁸ Final EA at 40 and 68.

³⁹ Final EA at 68.

⁴⁰ 16 U.S.C. § 1456(c)(3)(A).

47. The State of Vermont does not have a Coastal Zone Management Program. Therefore, a CZMA consistency certification is not required.

SECTION 18 FISHWAY PRESCRIPTIONS

48. Section 18 of the FPA⁴¹ 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 January 26, 2021, Interior filed a letter requesting that the Commission include a reservation of authority to prescribe fishways under section 18 in any license issued for the project. Consistent with Commission policy, Article 405 of this license reserves the Commission's authority to require fishways that may be prescribed by Interior for the Bolton Falls Project.

THREATENED AND ENDANGERED SPECIES

50. Section 7(a)(2) of the Endangered Species Act of 1973 (ESA)⁴² 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.

51. Based on the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation (IPaC) website, the threatened northern long-eared bat (*Myotis septentrionalis*) has the potential to occur in the project area.⁴³ There is no proposed or designated critical habitat for the bat in the project area.

52. FWS finalized an ESA section 4(d) rule for the northern long-eared bat in January 2016.⁴⁴ In the FWS's January 5, 2016 Programmatic Biological Opinion for the

⁴¹ 16 U.S.C. § 811.

⁴² 16 U.S.C. § 1536(a).

⁴³ See Commission staff's September 12, 2022 memorandum on FWS's Updated List of Threatened, Endangered, Candidate, and Proposed Species, as accessed through the IPaC database (<https://ecos.fws.gov/ipac/>) on September 12, 2022.

⁴⁴ 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,⁴⁵ 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.⁴⁶

53. To protect the northern long-eared bat, GMP states that maintenance activities at the Bolton Falls Project during the term of a new license would require only periodic mowing and tree trimming, but nothing in the record suggests that it would require any tree removal or that any tree removal that might occur at the project would have the potential to affect northern long-eared bat maternity roost habitat. In the final EA,⁴⁷ Commission staff concluded that although relicensing the project may affect the northern long-eared bat, it would not result in the prohibited incidental take of this species under the final ESA section 4(d) rule. The FWS concurred with staff's determination on September 12, 2022.⁴⁸ Therefore, no further action under the ESA is required for this species.

⁴⁵ 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).

⁴⁶ 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 3 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 4 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.

⁴⁷ EA at 42.

⁴⁸ On September 12, 2022, Commission staff requested FWS's concurrence via the northern long-eared bat key within the FWS's IPaC website (<https://ipac.ecosphere.fws.gov/>). An official letter generated by the New England Ecological Services Field Office stated that the determination was consistent with the FWS's January 5, 2016 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.

54. FWS proposed on September 14, 2022 to list the tricolored bat (*Perimyotis subflavus*) as endangered⁴⁹ based upon the range-wide impacts of white-nose syndrome which have caused estimated declines of more than 90 percent in affected colonies. Critical habitat is not being proposed for the species.

55. Tricolored bats are known to occur in 39 states including Vermont.⁵⁰ During spring, summer, and fall, tricolored bats roost primarily among leaf clusters of live or recently dead trees, and form summer maternity colonies where young are born.⁵¹

56. Project maintenance activities that may affect the tricolored bat are the same as those noted above for the northern-long eared bat. However, because project maintenance is not expected to require the removal of any trees that could affect the bat or its habitat, relicensing the Bolton Falls Project is not likely to jeopardize the continued existence of the tricolored bat.

HISTORIC AND CULTURAL RESOURCES

A. National Historic Preservation Act

57. Under section 106 of the National Historic Preservation Act (NHPA)⁵² and its implementing regulations,⁵³ federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register of Historic Places (National Register), defined as historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the

See Commission staff's September 12, 2022 Memorandum on Verification Letter for the Project Under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat.

⁴⁹ 87 Fed. Reg. 56,381 (2022).

⁵⁰ FWS, Environmental Conservation Online System (ECOS), <https://ecos.fws.gov/ecp/species/10515>.

⁵¹ FWS. 2021. Species Status Assessment Report for the Tricolored Bat (*Perimyotis subflavus*), Version 1.1. December 2021. Hadley, MA., https://www.fws.gov/sites/default/files/documents/Tricolored_Bat_SSA.pdf.

⁵² Section 106 of the National Historic Preservation Act of 1966, as amended, 54 U.S.C. § 306108, Pub. L. No. 113-287, 128 Stat. 3188 (2014). (The National Historic Preservation Act was recodified in Title 54 in December 2014).

⁵³ 36 C.F.R. Part 800 (2017).

undertaking. This generally requires the Commission to consult with the State Historic Preservation Officer (SHPO) to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

58. The Bolton Falls Dam is the only historic architectural resource within the project's area of potential effect (APE) that is eligible for listing in the National Register. Three pre-Contact era Native-American archaeological sites within the project's APE are eligible for listing in the National Register. GMP filed a Historic Properties Management Plan on March 31, 2022 that includes a process and procedures to address any potential adverse effects to the Bolton Falls Dam, the three archaeological sites, and any other historic properties that may be found at the project for the term of a new license. The mitigation measures proposed in the HPMP should minimize impacts to archaeological resources from ongoing maintenance activities and recreation.

59. To satisfy its responsibilities under section 106 of the NHPA, the Commission executed a Programmatic Agreement (PA) with the Vermont SHPO. GMP was invited to concur with the stipulations of the PA. The Vermont SHPO signed the PA on May 25, 2022. GMP concurred with the PA on May 27, 2022. A copy of the executed PA was issued on June 1, 2022. The PA requires the licensee to implement the HPMP filed on March 31, 2022. Execution of the PA demonstrates the Commission's compliance with section 106 of the NHPA. Article 407 requires the licensee to implement the PA and the HPMP.

B. Tribal Consultation

60. For the Bolton Falls Project relicensing, Commission staff contacted the Stockbridge-Munsee Band of Mohican Indians and the Saint Regis Mohawk Tribe, by letters issued February 16, 2017 and April 24, 2017, respectively.

61. Staff followed up with each Tribe by calling the Stockbridge-Munsee Band of Mohican Indians on March 21, and April 20, 2017, and the Saint Regis Mohawk Tribe on June 1, 2017. The Stockbridge-Munsee Band of Mohican Indians did not respond to Commission staff's inquiries. The Saint Regis Mohawk Tribe cultural staff member indicated during the June 1 call that the Tribe did not have any questions or concerns about the project.

62. The HPMP, which the licensee is required to implement through Article 407, requires the licensee to notify the Tribes of any activities, other than exempt activities, conducted under the HPMP that might affect cultural resources.

ENVIRONMENTAL JUSTICE

63. In conducting NEPA reviews of proposed hydropower projects, the Commission follows 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).⁵⁴ 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.”⁵⁵ 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.”⁵⁶

64. Consistent with the Council on Environmental Quality (CEQ)⁵⁷ and the

⁵⁴ 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.

⁵⁵ Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Feb. 1, 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* (Sept. 7, 2021), <https://www.epa.gov/environmentaljustice/ej-2020-glossary>.

⁵⁶ EPA, *Learn About Environmental Justice*, [https://www.epa.gov/environmentaljustice/learn-about-environmental-justice#:~:text=Environmental%20justice%20\(EJ\)%20is%20the,environmental%20laws%2C%20regulations%20and%20policies](https://www.epa.gov/environmentaljustice/learn-about-environmental-justice#:~:text=Environmental%20justice%20(EJ)%20is%20the,environmental%20laws%2C%20regulations%20and%20policies). Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. *Id.* Meaningful involvement of potentially affected environmental justice community residents means: (1) people have an opportunity to participate in decisions about activities that may affect their environment and/or health; (2) the public’s contributions can influence the regulatory agency’s decision; (3) community concerns will be considered in the decision-making process; and (4) decision makers will seek out and facilitate the involvement of those potentially affected. *Id.*

⁵⁷ CEQ, *Environmental Justice: Guidance Under the National Environmental Policy Act* 4 (Dec. 1997) (CEQ’s *Environmental Justice Guidance*), https://www.energy.gov/sites/default/files/nepapub/nepa_documents/RedDont/G-CEQ-EJGuidance.pdf. CEQ offers recommendations on how federal agencies can provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected

Environmental Protection Agency (EPA)⁵⁸ guidance, Commission staff identified one environmental justice community within a 1-mile radius of the project boundary and considered how the community may be affected by noise, visual, and traffic impacts of the construction of new recreation facilities, corresponding changes in recreational activity, and the effects of project operation and recreation on subsistence fishing.

65. In the final EA,⁵⁹ staff found that the construction activities associated with improving the Day Use Area, portage take-out, and portage trail would be of short duration and minor in scope and would not create substantial noise or excessive construction traffic or affect visual resources within the identified environmental justice community. Although recreation use at the Bolton Falls Project could increase with the planned public access improvements, the site is remote and unlikely to attract long-term and sustained increases in traffic or impacts to recreational fishing opportunities that would adversely affect the identified community. Therefore, relicensing the project as conditioned in this license would not result in a disproportionately high and adverse impact on the environmental justice community present within the project area.

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

66. Section 10(j)(1) of the FPA⁶⁰ requires the Commission, when issuing a license, to include conditions based on recommendations submitted by federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act,⁶¹ to

communities and improving the accessibility of public meetings, crucial documents, and notices. There were opportunities for public involvement during the Commission's pre-filing and environmental review processes, though the record does not demonstrate that these opportunities were targeted at engaging environmental justice communities. For assistance with interventions, comments, requests for rehearing, or other filings, and for information about any applicable deadlines for such filings, members of the public are encouraged to contact OPP directly at 202-502-6592 or OPP@ferc.gov for further information.

⁵⁸ See generally EPA, *Promising Practices for EJ Methodologies in NEPA Reviews* (Mar. 2016) (Promising Practices), https://www.epa.gov/sites/default/files/2016-08/documents/NEPA_promising_practices_document_2016.pdf.

⁵⁹ Final EA at 59.

⁶⁰ 16 U.S.C. § 803(j)(1).

⁶¹ 16 U.S.C. §§ 661 *et seq.*

“adequately and equitably protect, mitigate damages to, and enhance fish and wildlife (including related spawning grounds and habitat)” affected by the project.

67. No section 10(j) recommendations were filed with the Commission for the Bolton Falls Project.

SECTION 10(a)(1) OF THE FPA

68. Section 10(a)(1) of the FPA⁶² 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 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. Operation Compliance Monitoring

69. GMP does not propose any specific measures for monitoring and reporting compliance with its proposed operating mode (*i.e.*, run-of-river operation, maintaining impoundment levels, spill flows) but would continue to use its automated monitoring and control system to continuously monitor impoundment levels and adjust powerhouse flows and the rubber bladder to maintain the impoundment at the desired elevation. As discussed earlier, condition C of the water quality certification requires that GMP develop a flow management plan to monitor flow releases and generation and make the data available on a “near-real time” basis and to report deviations from operating requirements to Vermont DEC. In the final EA,⁶³ staff also recommended that GMP develop an operation compliance monitoring plan that describes the mechanisms and structures to be used (*i.e.*, type and exact locations of all flow and impoundment elevation monitoring equipment and gages) to monitor impoundment elevations, spill flows, and generation, and procedures for maintaining and calibrating monitoring equipment. Commission staff also recommended procedures for reporting deviations to both the Vermont DEC and the Commission. Staff estimated that developing the plan would have an estimated annual levelized cost of \$1,344 and concluded that the operational and resource benefits would be worth the cost. Because Vermont DEC’s flow management plan and staff’s recommended operation compliance monitoring plan essentially serve the same purpose, Article 402 does not require a separate operation compliance monitoring plan to implement staff’s recommendation but instead requires that GMP include in Vermont DEC’s flow management plan, staff’s recommended monitoring provisions.

⁶² 16 U.S.C. § 803(a)(1).

⁶³ Final EA at 69-70.

Article 402 also requires GMP to report deviations from operating requirements to the Commission in addition to Vermont DEC.

B. Debris Disposal

70. Vermont DEC certification condition F requires that “debris associated with Project operations shall be disposed of in accordance with state laws and regulations.” In the final EA,⁶⁴ staff recommended that GMP develop a debris disposal plan in consultation with Vermont DEC and Vermont FWD to avoid misunderstandings with project personnel, guide how and when GMP removes and disposes of debris, and to comply with the water quality certification. Staff estimated that developing the plan would have an estimated annual levelized cost of \$334 and found that the operational and resource benefits would be worth the cost. Article 404 requires that GMP develop and file for Commission approval a debris disposal plan that is consistent with the requirements of Vermont DEC certification condition F and includes a detailed description of procedures for collecting, managing, and disposing of organic and inorganic debris at the project and an implementation schedule.

C. Recreation Plan

71. GMP filed a proposed Recreation Management Plan with the license application. The water quality certification does not specifically reference the proposed Recreation Management Plan but instead more generally requires that GMP develop in consultation with “relevant stakeholders” a plan and implementation schedule for recreation enhancements and submit the plan and schedule for review and approval by Vermont ANR prior to implementation (condition E).

72. In the EA,⁶⁵ staff recommended a Recreation Management Plan for the project that includes all of the provisions proposed by GMP along with some additional provisions. Those additional provisions are discussed below.

73. GMP’s proposed plan includes a provision to relocate the existing Day Use gravel parking lot to the informal lot because floods that occur to varying degrees approximately 3 to 5 times per year cause erosion and deposition of litter that increase its maintenance

⁶⁴ Final EA at 70.

⁶⁵ EA at 64-65 and 70-71.

costs.⁶⁶ In the final EA,⁶⁷ staff determined that GMP's proposal to relocate the parking area to the informal parking area and improve the informal parking area would reduce GMP's maintenance requirements, but could also pose a challenge for persons with disabilities wanting to use the facilities in the Day Use Area because the informal parking area would require walking an additional 400 feet along the existing gravel access road that contains difficult grades for those with limited mobility. This could discourage the use of the Day Use Area and would be contrary to the purpose of adding a picnic table designed for persons with disabilities to the Day Use Area. Staff determined that modifying the access road to reduce the slope from the informal parking lot to the Day Use Area would provide better access for persons with disabilities. Staff estimated that improving the access road would add \$9,354 in additional annual leveled costs compared to GMP's proposal, but that the improvements were worth the cost. Therefore, Article 406 requires that the Recreation Management Plan developed pursuant to condition E of the water quality certification include a provision to improve the existing access road to provide better access from the informal parking area for persons with disabilities.

74. GMP proposes in the Recreation Management Plan to improve the portage take-out and trail by clearing vegetation, grading the take-out, installing steps, and adding signage. However, the Recreation Management Plan does not include GMP's other proposal to add a 12-foot-wide concrete level slab to the take-out to avoid a slipping hazard made in its June 1, 2020 additional information filing. In addition, the plan does not include GMP's proposal to make one of the two picnic tables for the Day Use Area accessible to persons with disabilities, also included in its June 1, 2020 additional information response. Staff recommended both of these measures in the EA.⁶⁸ Therefore, Article 406 requires GMP to include these proposed measures as provisions of the Recreation Management Plan developed pursuant to the water quality certification's condition E.

⁶⁶ Damages from flooding include erosion of the gravel parking lot and littering of the parking area and Day Use Area with debris. Occasionally, during more extreme flooding events, signage at the Day Use Area is damaged or lost. Depending on the degree of damage for any given flood, GMP states that work crews spend between 5 to 40 hours cleaning and repairing the Day Use Area parking lot and annual costs for these activities range from approximately \$10,000 to \$30,000. Final EA at 45-46.

⁶⁷ Final EA at 70-71.

⁶⁸ EA at 64-65.

75. Vermont DEC water quality certification condition E requires that the licensee consult with “relevant stakeholders” but does not identify them. In the EA,⁶⁹ staff recommended that the Recreation Management Plan be developed in consultation with Vermont ANR. Therefore, Article 406 requires that the consulted stakeholders, at a minimum, include Vermont ANR.

PROJECT BOUNDARY

76. Commission regulations require that all land and water necessary for the operation and maintenance of the project be included in the project boundary. Specifically, 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.”⁷⁰

77. GMP proposes to add 3.5 acres of land to the project to enclose the roads used to access project facilities and 4.1 acres of land needed to enclose the entire portage trail. GMP also proposes to remove from the project boundary 4.2 acres of land south of the portage trail, 2.9 acres of land south of Power Plant Road, and 2.1 acres of the Winooski River and shoreline downstream of the project tailrace because they do not support project recreation facilities, are not necessary for project operation and maintenance, and are outside of the influence of project operation. Based on new survey information, GMP also proposes to adjust the boundary along the impoundment to more accurately enclose the shoreline along the 397.00-foot contour elevation.

78. As noted in the Final EA,⁷¹ the additional lands GMP proposes to bring into the project boundary include features that are necessary to operate and maintain the project and therefore should be enclosed within the project boundary. In addition, the land and water proposed to be removed are not affected by project operation and do not serve any project purpose; therefore, these lands and water should be removed from the project boundary.

79. The Exhibit G project boundary map included in GMP’s filing on June 1, 2020⁷² accurately reflects the proposed changes to the project boundary and is incorporated into the license by Ordering Paragraph (C).

⁶⁹ EA at 72.

⁷⁰ 18 C.F.R. § 4.41(h)(2) (2021).

⁷¹ Final EA at 65.

⁷² GMP originally filed an Exhibit G with its license application on January 30,

ADMINISTRATIVE PROVISIONS

A. Annual Charges

80. The Commission collects annual charges from licensees for administration of the FPA. Article 201 provides for the collection of funds for administration of the FPA.

B. Reservation of Authority to Require Financial Assurance Measures

81. 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 licensee maintains sufficient financial reserves to carry out the terms of the license and Commission orders pertaining thereto.

C. Exhibit F and G Drawings

82. The Commission requires licensees to file sets of approved project drawings in electronic file format. Article 203 requires the filing of these drawings.

D. Amortization Reserve

83. The Commission requires that for new major licenses, non-municipal licensees must set up and maintain an amortization reserve account upon license issuance. Article 204 requires the establishment of the account.⁷³

E. Headwater Benefits

84. Some projects directly benefit from headwater improvements that were constructed by other licensees, the United States, or permittees. Article 205 requires the licensee to reimburse such entities for these benefits if they were not previously assessed and reimbursed.

F. Modifications of Project Facilities

85. Article 301 requires the licensee to coordinate with the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer on any proposed

2020; however, Commission staff informed GMP in a letter issued March 3, 2020, that the files could not be opened and requested GMP to refile them. GMP re-filed its Exhibit G files on June 1, 2020.

⁷³ See 18 C.F.R. § 11.3 (2021).

modifications resulting from environmental requirements that would affect project works, dam safety, or project operation.

G. Commission Approval of Resource Plans and Filing of Amendments

86. In Appendix A of this order, there are certain certification conditions that do not require the licensee to file certain plans with the Commission, or that contemplate future changes to the project facilities or operation without the opportunity for prior Commission review. Article 401 requires the licensee to file the plans with the Commission for approval and to file amendment applications with the Commission prior to making changes to project facilities or operations, as appropriate.

H. Use and Occupancy of Project Lands and Waters

87. Requiring a licensee to obtain prior Commission approval for every use and 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

88. Section 10(a)(2)(A) of the FPA,⁷⁴ 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.⁷⁵ Under section 10(a)(2)(A), Commission staff identified and reviewed 15 comprehensive plans relevant to this project.⁷⁶ No conflicts were found.

APPLICANT'S PLANS AND CAPABILITIES

89. In accordance with sections 10(a)(2)(C) and 15(a) of the FPA,⁷⁷ Commission staff evaluated GMP's record as a licensee with respect to the following: (A) conservation efforts; (B) compliance history and ability to comply with a new license; (C) safe management, operation, and maintenance of the project; (D) ability to provide efficient

⁷⁴ 16 U.S.C. § 803(a)(2)(A).

⁷⁵ Comprehensive plans for this purpose are defined at 18 C.F.R. § 2.19.

⁷⁶ The list of applicable plans can be found in section 5.4 of the final EA.

⁷⁷ 16 U.S.C. §§ 803(a)(2)(C); 808(a).

and reliable electric service; (E) need for power; (F) transmission services; (G) cost-effectiveness of plans; and (H) actions affecting the public. As discussed below, this order adopts staff's findings in each of the areas.

A. Conservation Efforts

90. Section 10(a)(2)(C) of the FPA⁷⁸ requires the Commission to consider the applicant's electricity consumption improvement program, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity cost-effectively, taking into account the published policies, restrictions, and requirements of state regulatory authorities. GMP coordinates its project operation with ISO New England to supply its energy to GMP's retail customers.

91. The Commission concludes that, given the limits of GMP's ability to influence users of the electricity generated by the project, GMP will operate the project in a manner that is consistent with section 10(a)(2)(C) of the FPA.

B. Compliance History and Ability to Comply with the New License

92. Based on a review of GMP's compliance with the terms and conditions of the existing license, GMP's overall record of making timely filings and compliance with its license is satisfactory. Therefore, GMP can satisfy the conditions of a new license.

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

93. Commission staff has reviewed GMP's record of management, operation, and maintenance of the Bolton Falls Project pursuant to the requirements of 18 C.F.R. Part 12, the Commission's Engineering Guidelines, and the periodic Dam Safety Surveillance and Monitoring Reports. The Commission concludes that the project works are in good condition, and that there is no reason to believe that GMP cannot continue to safely manage, operate, and maintain these facilities under a new license.

D. Ability to Provide Efficient and Reliable Electric Service

94. Commission staff has reviewed GMP's plans and its ability to operate and maintain the project in a manner most likely to provide efficient and reliable electric service. Staff's review indicates that GMP maintains formal procedures for assuring satisfactory operation of the generating units and associated equipment to ensure they continue to perform in an optimal manner and to minimize effects on energy production.

⁷⁸ *Id.* § 803(a)(2)(C).

Therefore, GMP is capable of operating the project to provide efficient and reliable electric service in the future.

E. Need for Power

95. 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 annual peak demand growth rate in the NPCC's New England region is projected to increase 0.1 percent from 2021 through 2030. The power from the proposed project would help meet a need for power in the New England region in both short and long-term.

F. Transmission Services

96. Power generated by the project's two turbine units is transmitted through an approximately 130-foot long, 5-kilovolt underground transmission line that connects to an adjacent switchyard which steps up the voltage to 34.5 kilovolts. From the adjacent switchyard, a 600-foot-long, 34.5-kilovolt overhead transmission line connects to a second switchyard that interconnects with the regional grid. GMP does not propose, and the license does not require, any changes that would affect this project's or other transmission services in the region.

G. Cost Effectiveness of Plans

97. GMP proposes modifications to project facilities and environmental measures to enhance environmental resources affected by the project. Based on GMP's record as an existing licensee, these plans are likely to be carried out in a cost-effective manner.

H. Actions Affecting the Public

98. GMP provided opportunities for public involvement in the development of its application for a new license for the Bolton Falls Project. The project provides ample opportunities for the public to use the project area for recreation such as fishing, swimming, and canoeing.

PROJECT ECONOMICS

99. In determining whether to issue a new 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 Corp.*,⁷⁹ 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.

100. In applying this analysis to the Bolton Falls Project, Commission staff considered three options: a no-action alternative, GMP's proposal, and the project as licensed herein.⁸⁰ Under the no-action alternative, the project would continue to operate as it does now. The project has an installed capacity of 7.50 MW, a capacity benefit of 6.25 MW, and generates an average of 26,301 MWh of electricity annually.⁸¹ The average annual project cost is \$480,513. The alternative source of power's annual cost to produce the same amount of energy and provide the same capacity benefit is \$2,677,439 in 2022 dollars.⁸² To determine whether the proposed project is currently economically beneficial, the project's cost is subtracted from the alternative source of power's cost. Therefore, the project costs \$2,196,926, or \$83.53/MWh, less than the alternative source of power's cost.

101. As proposed by GMP, the project would have an installed capacity of 7.50 MW, a capacity benefit of 8.90 MW, and generate an average of 25,660 MWh of energy annually. The levelized annual cost of operating the project as proposed by GMP would be \$541,716, or \$21.11/MWh. The alternative source of power's cost to produce the same amount of energy and provide the same capacity benefit is \$2,536,356 in 2022

⁷⁹ 72 FERC ¶ 61,027 (1995).

⁸⁰ Details of Commission staff's economic analysis for the project as licensed herein, and for the other two alternatives, are included in section 4 of the EA.

⁸¹ 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.

⁸² 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.

dollars. Subtracting the total annual project cost from the alternative source of power's current cost, the project's cost to produce power and capacity would be \$1,994,640, or \$77.73/MWh, less than the alternative source of power's cost.

102. As licensed herein with mandatory conditions and Commission staff's measures, the project will have an installed capacity of 7.50 MW, a capacity benefit of 4.37 MW, and generate an average of 24,231 MWh of energy annually. The levelized annual cost of operating the project will be \$643,389, or \$26.55/MWh. The alternative source of power's cost to produce the same amount of energy and provide the same capacity benefit is \$2,243,269 in 2022 dollars. Therefore, the project as licensed herein will cost \$1,599,880, or \$66.03/MWh, less than the alternative source of power's cost.

103. In considering public interest factors, the Commission takes into account that hydroelectric projects are a renewable resource and offer unique operational benefits to the electric utility system (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.

104. Although Commission 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.

COMPREHENSIVE DEVELOPMENT

105. Sections 4(e) and 10(a)(1) of the FPA⁸³ require the Commission to give equal consideration to 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.

106. The Final EA for the project contains background information, analysis of effects, and support for related license articles. Based on the record of this proceeding, including

⁸³ 16 U.S.C. §§ 797(e) and 803(a)(1).

the EA and the comments thereon, licensing the Bolton 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.

107. Based on Commission staff's independent review and evaluation of the Bolton Falls Project, recommendations from the resource agencies and other stakeholders, and the no-action alternative, as documented in the Final EA, the project as licensed herein is selected and found to be best adapted to a comprehensive plan for improving or developing the Winooski River.

108. This alternative is selected because: (1) issuing a new license will serve to maintain a beneficial and dependable source of electric energy; (2) the required environmental measures will protect or enhance water quality, fish and wildlife resources, terrestrial resources, recreational and aesthetic resources, and cultural resources; and (3) the 7.50 MW of electric capacity comes from a renewable resource that does not significantly contribute to atmospheric pollution.

LICENSE TERM

109. Section 15(e) of the FPA⁸⁴ provides that any new license issued shall be for a term that the Commission determines to be in the public interest, but not less than 30 years or more than 50 years.

110. On October 19, 2017, the Commission established a 40-year default license term policy for licenses, effective as of October 26, 2017.⁸⁵ The License Term 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 new license.

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

⁸⁴ 16 U.S.C. § 808(e).

⁸⁵ *Policy Statement on Establishing License Terms for Hydroelectric Projects*, 161 FERC ¶ 61,078 (2017) (Policy Statement).

The Director orders:

(A) This license is issued to Green Mountain Power Corporation (licensee), for a period of 40 years, effective the first day of the month in which this order is issued, to operate and maintain the Bolton Falls Hydroelectric Project. This 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 licensee's interests in these lands, enclosed by the project boundary shown by the Exhibit G filed on June 1, 2020.

Exhibit	FERC Drawing No.	Drawing Title	Filename Title⁸⁶
G-1	P-2879-1001	Exhibit G-1	Project Boundary Map
G-2	P-2879-1002	Exhibit G-2	Project Boundary Map

(2) Project works consisting of: (a) a 2.1-mile-long impoundment with a storage capacity of 300 acre-feet at a normal full pool elevation of 397 feet⁸⁷; (b) a 92-foot-high, 275-foot-long timber crib dam with a maximum crest elevation of 397 feet when the 5-foot-high rubber bladder atop the dam is inflated and a maximum elevation of 392 feet when the rubber bladder is deflated; (c) a 196-foot-long concrete spillway with a crest elevation of 392 feet; (d) a forebay with two concrete intakes, each fitted with 27-foot-wide, 43-foot-high trash racks; (e) two 10-foot diameter, 120-foot-long steel penstocks encased in concrete; (f) a 73-foot-long, 57-foot-wide powerhouse containing two horizontal, 3,750-kilowatt Kaplan turbines for a total installed capacity of 7,500 kilowatts; (g) a 75-foot-long, 36-inch diameter bypass pipe located on the left side of the spillway base (when looking downstream); (h) a 130-foot long, 5-kilovolt underground transmission line that connects to an adjacent switchyard; (i) a 600-foot-long, 34.5-

⁸⁶ This exact drawing title must be used in the filename when filing the electronic file format drawings required in license Article 203. There is no need to modify the titles as they appear on the drawings.

⁸⁷ Unless otherwise noted, all elevations are referenced to the National Geodetic Vertical Datum of 1929.

kilovolt overhead transmission line connecting to a second switchyard that interconnects with the regional grid; and (j) appurtenant facilities.

Other project facilities include: (a) a Day-Use Recreation Area below the dam that contains a picnic area, parking lot, and canoe put-in; (b) a canoe take-out on the impoundment; (c) a portage trail connecting the take-out and put-in; (d) an access road used by GMP to access project facilities below the dam and by the public to access the Day Use Area from River Road; and (e) an access road used by GMP to access the project dam and canoe take-out from River Road.

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

Exhibit A: Pages A-1 to A-3, sections A.1 through A.8, filed on January 30, 2020.

Exhibit F: The following Exhibit F drawings filed on January 30, 2020:

<u>Exhibit Drawing</u>	<u>FERC Drawing No.</u>	<u>Drawing Title</u>	<u>Filename Drawing Title⁸⁸</u>
F-1	P-2879-1003	Site Plan	Site Plan
F-2	P-2879-1004	Dam Section	Dam Section
F-3	P-2879-1005	Power Intake Plan	Intake Plan
F-4	P-2879-1006	Intake Profile	Intake Profile
F-5	P-2879-1007	Penstock Plan	Penstock Plan
F-6	P-2879-1008	Penstock and Unit No. 1 Profile	Penstock Unit 1 Profile
F-7	P-2879-1009	Powerhouse General Arrangement	Powerhouse Arrangement
F-8	P-2879-1010	Powerhouse Section Through Unit 2	Powerhouse Through Unit 2

⁸⁸ These exact drawing titles must be used in the filename when filing the electronic file format drawings required in license Article 203. Commission staff shortened the drawing titles due to filename character limits. There is no need to modify the titles as they appear on the drawings.

(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, F, and G described above are approved and made part of this license.

(D) This license is subject to the conditions submitted by the Vermont Department of Environmental Conservation under section 401(a)(1) of the Clean Water Act, 33 U.S.C. § 1341(a)(1), as those conditions are set forth in Appendix A to this order.

(E) This license is also subject to the articles set forth in Form L-10, (October 1975), entitled “Terms and Conditions of License for Constructed Major Project Affecting the Interests of Interstate or Foreign Commerce” (*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 licensee must pay the United States annual charges, effective the first day of the month in which this license is issued, and as determined in accordance with 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 7.50 megawatts.

Article 202. Reservation of Authority to Require Financial Assurance Measures. 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.

Article 203. Exhibit Drawings. Within 45 days of the issuance date of this license, as directed below, the licensee must file the approved exhibit drawings and geographic information system (GIS) data in electronic file format.

(a) The licensee must prepare digital images of the approved exhibit drawings in electronic format. Prior to preparing each digital image, the licensee must add the FERC Project-Drawing Number (*i.e.*, P-2879-1001 through P-2879-1010) in the margin below the title block of the corresponding approved drawing. The licensee must label and file the Exhibit F drawings 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, the Exhibit G drawings, and GIS data, 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-2879-1003, F-1, Site Plan, MM-DD-YYYY.TIFF].

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points (*i.e.*, latitude and longitude coordinates or state plane coordinates), arranged in a triangular format for GIS georeferencing the project boundary drawing to the polygon data. The licensee must identify the spatial reference for the drawing (*i.e.*, map projection, map datum, and units of measurement) on the drawing and label each reference point. In addition, a registered land surveyor must stamp each project boundary drawing. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY:	black & 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

(b) Project boundary GIS data must be in a georeferenced electronic file format (such as ArcGIS shapefiles, GeoMedia files, MapInfo files, or a similar GIS format). The filing must include both polygon data and all reference points shown on the individual project boundary drawings. Each project development must have an electronic boundary polygon data file(s). Depending on the electronic file format, the polygon and point data can be included in single files with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to ± 40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file names(s) must include: FERC Project Number, data description, date of this order, and file extension in the following format [P-2879, boundary polygon or point data, MM-DD-YYYY.SHP]. The filing must include a separate text file describing the spatial reference for the georeferenced data: map projection used (*i.e.*, UTM, State Plane, Decimal Degrees, etc.), the map datum (*i.e.*, North American 27, North American 83, etc.), and the units of measurement (*i.e.*, feet, meters, miles, etc.). The text file name must include: FERC Project Number, data description, date of this order, and file extension in the following format [P-2879, project boundary metadata, MM-DD-YYYY.TXT].

Article 204. Amortization Reserve. Pursuant to section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project must be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee must set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee must deduct the amount of that

deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee must set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee must maintain the amounts established in the project amortization reserve account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves must be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios must be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity must be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 205. Headwater Benefits. If the licensee's project was directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the original license (including extensions of that term by annual licenses), and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater improvement, the licensee must reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license. The benefits will be assessed in accordance with Part 11, Subpart B, of the Commission's regulations

Article 301. Project Modification Resulting from Environmental Requirements. If environmental requirements under this license require modifications that may affect the project works or operations, the licensee 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 and Filing of Amendments

(a) Requirement to File Plans for Commission Approval.

Certain conditions of the Vermont Department of Environmental Conservation (Vermont DEC) Clean Water Act section 401 water quality certification (certification) in Appendix A require the licensee 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 deadline specified:

Vermont DEC Certification Condition	Plan Name	Commission Due Date
C	Flow Management Plan	May 16, 2023
E	Recreation Management Plan and Implementation Schedule	May 16, 2023
G	Water Level Management Plan	May 16, 2023

The licensee must include with the flow management plan and the water level management plan documentation that the plan has been approved by Vermont DEC as required by Vermont DEC certification conditions C and G (Appendix A). The license must include with the recreation management plan documentation that the plan and its implementation schedule have been approved by Vermont's Agency of Natural Resources as required by Vermont DEC certification condition E (Appendix A). 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 licensee 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) Requirement to File Amendment Applications.

Certain conditions of the Vermont DEC certification in Appendix A contemplate long-term changes to project operations or facilities (e.g., conditions A, D, and J). 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 licensee must identify related project requirements and request corresponding amendments or extensions of time as needed to maintain consistency among requirements.

Article 402. Flow Management Plan. The flow management plan required by Vermont Department of Environmental Conservation (Vermont DEC) water quality certification (certification) condition C (Appendix A) must include the following additional provisions:

- (1) the specific impoundment water level elevation (in feet U.S. Geological Survey Datum) needed to provide a 100 cubic feet second (cfs) minimum spill flow into the bypassed reach required by Vermont DEC certification condition B (Appendix A);
- (2) a detailed description of how the licensee will monitor compliance with the operational requirements of Article 403 (*Project Operation*), including descriptions of the mechanisms and instrumentation or gages used (*i.e.*, type and exact locations of all flow and impoundment elevation monitoring equipment), and procedures for maintaining and calibrating all compliance monitoring equipment;
- (3) a provision to maintain a log of project operation; and
- (4) an implementation schedule.

As required by Vermont DEC water quality certification condition E (Appendix A), the licensee must prepare the plan after consultation with Vermont DEC and obtain Vermont DEC approval as required by the certification and Article 401.

The Commission reserves the right to require changes to the plan. The licensee must not begin implementing the plan until the Commission notifies the licensee that the plan is approved. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Article 403. Project Operation. In addition to implementing the run-of-river operation and minimum spill flow requirements of Vermont Department of Environmental Conservation (Vermont DEC) Clean Water Act section 401 water quality certification (certification) condition B (Appendix A), the licensee must:

- (1) maintain the impoundment water level at the elevation(s) specified in the flow management plan required by Vermont DEC water quality certification condition C (Appendix A) and Article 402 (*Flow Management Plan*); and
- (2) limit any planned, non-emergency maintenance activities that will require the impoundment to be drawn down below the limits specified in item 1 to the period between November 1 and August 15 to protect Eastern pearlshell mussels in the project impoundment.

Reporting of Planned Deviations

Run-of-river operation and spill flow requirements of Vermont DEC certification condition B (Appendix A) and impoundment level requirements of this article may be temporarily modified for short periods, of up to 3 weeks, after mutual agreement among

the licensee and Vermont DEC and Vermont Fish and Wildlife Department (collectively, resource agencies). After concurrence from the resource agencies and filing a report with Vermont DEC as required by Vermont DEC certification conditions C and G (Appendix A), the licensee must file a report with the Secretary of the Commission as soon as possible, but no later than 14 days after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and how project operations were modified, (2) the duration and magnitude of the deviation, (3) any observed or reported environmental effects and how potential effects were evaluated, and (4) documentation of consultation with the resource agencies. For planned deviations exceeding 3 weeks, the licensee must file a report with Vermont DEC and receive approval from Vermont DEC as required by Vermont DEC certification conditions C and G (Appendix A) and must file an application for a temporary amendment of the operational requirements and receive Commission approval prior to implementation.

Reporting of Unplanned Deviations

Run-of-river operation and spill flow requirements of Vermont DEC water quality certification condition B (Appendix A) and impoundment level requirements of this article may be temporarily modified if required by operating emergencies beyond the control of the licensee (*i.e.*, unplanned deviations). In addition to filing a report with Vermont DEC as required by Vermont DEC certification condition C (Appendix A), for any unplanned deviation from run-of-river operation, spill flow, or impoundment level requirements that lasts longer than 3 hours or results in visible environmental effects such as a fish kill, turbidity plume, bank erosion, or downstream flooding, the licensee must notify the resource agencies within 24 hours, and the Commission within 14 days, and file a report as soon as possible, but no later than 30 days after each such incident. The report must include: (1) the cause of the deviation, (2) the duration and magnitude of the deviation, (3) any pertinent operational and/or monitoring data, (4) a timeline of the incident and the licensee's response, (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the resource agencies, (6) documentation of any observed or reported environmental effects and how potential effects were evaluated, and (7) a description of measures implemented to prevent similar deviations in the future.

In addition to filing a report with Vermont DEC as required by Vermont DEC certification condition C (Appendix A), for unplanned deviations from run-of-river operation, spill flow, or impoundment level requirements lasting 3 hours or less that do not result in visible environmental effects, the licensee must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period. The report must include for each 3 hours or less deviation: (1) the cause of the deviation, (2) the duration and magnitude of the deviation, (3) any pertinent operational and/or monitoring data, (4) a timeline of the incident and the licensee's response to each deviation, (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.

Article 404. Debris Disposal Plan. Within six months of license issuance, the licensee must file with the Commission for approval, a debris disposal plan that is consistent with the requirements specified in Vermont Department of Environmental Conservation (Vermont DEC) water quality certification condition F (Appendix A) and includes the following provisions:

- (1) a detailed description of the licensee's procedures for collecting, managing and disposing of organic and inorganic debris at the project; and
- (2) an implementation schedule.

The licensee must prepare the plan after consultation with the Vermont DEC and the Vermont Fish and Wildlife Department (collectively, agencies). The licensee 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 licensee 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 licensee does not adopt a recommendation, the filing must include the licensee's 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 licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 405. Reservation of Authority to Prescribe Fishways. Authority is reserved to the Commission to require the licensee 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 pursuant to section 18 of the Federal Power Act.

Article 406. Final Recreation Management Plan. The final Recreation Management Plan required by the Vermont Department of Environmental Conservation (Vermont DEC) water quality certification condition E (Appendix A) must include the provisions included in the Recreation Management Plan in Appendix H of the license application, filed on January 30, 2020, and the following:

- (1) A provision to install and maintain a picnic table that is accessible to persons with disabilities;
- (2) A provision to install a 12-foot-wide concrete level slab at the portage take-out;
- (3) Design drawings for improving the slope of the existing access road to enhance access for persons with disabilities; and
- (4) An implementation schedule for completing the above improvements within 2 years of license issuance.

The licensee must develop the plan after consultation with, at a minimum, Vermont Agency of Natural Resources (Vermont ANR). The licensee 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 consulted entities, and specific descriptions of how the consulted entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the consulted entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's 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 licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 407. Programmatic Agreement and Historic Properties Management Plan. The licensee must implement the "Programmatic Agreement Between the Federal Energy Regulatory Commission and the Vermont State Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuance of a New License to Green Mountain Power for the Continued Operation of the Bolton Falls Hydroelectric Project in Washington County, Vermont (FERC No. 2879-012)," executed on May 25, 2022, and including but not limited to the approved Historic Properties Management Plan (HPMP) for the project. In the event that the Programmatic Agreement is terminated, the licensee must continue to implement the provisions of its approved HPMP.

The Commission reserves the authority to require changes to the HPMP at any time during the term of the license.

Article 408. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee 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 licensee 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 licensee 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 licensee 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 licensee 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 licensee 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 licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that 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 licensee 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 licensee 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 licensee's costs of administering the permit program. The Commission reserves the right to require the licensee 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 licensee 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-kV 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 licensee must file with the Commission 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 licensee 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 licensee 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 licensee to file an application for prior approval, the licensee 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 licensee 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 licensee 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 or waters.

(4) The Commission reserves the right to require the licensee 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 licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

(F) The licensee 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.

(G) 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. § 825l, 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 licensee's failure to file a request for rehearing constitutes acceptance of this order.

Project No. 2879-012

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for
Terry Turpin
Director
Office of Energy Projects

Form L-10
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

**TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED
MAJOR PROJECT AFFECTING INTERESTS OF
INTERSTATE OR FOREIGN COMMERCE**

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. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is

transferred to a new licensee or to a nonpower licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. 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 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 9. 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 10. 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 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. 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 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 Commission may prescribe for the purposes hereinbefore mentioned.

Article 13. 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 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. 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 16. 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 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary

of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. 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 19. 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 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 20. 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 21. 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 22. 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 23. 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 Vermont Department of Environmental Conservation (issued January 19, 2022)

Decision and Certification

The Department has examined the Project application and other pertinent information deemed relevant by the Department in order to issue a decision on this certification application pursuant to the Department's responsibilities under Section 401 of the federal Clean Water Act. After examination of these materials, the Department certifies that there is reasonable assurance that operation of the Project, when done in accordance with the following conditions will not violate Standards; will not have a significant impact on use of the affected waters by aquatic biota, fish or wildlife, including their growth, reproduction, and habitat; will not impair the viability of the existing populations; will not result in a significant degradation of any use of the waters for recreation, fishing, water supply or commercial enterprises that depend directly on the existing level of water quality; and will be in compliance with sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act, 33 U.S.C. section 1341, and other appropriate requirements of state law:

- A. **Compliance with Conditions.** The Applicant shall operate and maintain this Project consistent with the findings and conditions of this certification. The Applicant shall not make any changes to the Project or its operations that would have a significant or material effect on the findings, conclusions or conditions of this Certification without approval of the Department.

See finding 113 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A- 101.

- B. **Flow Management.** The Project shall be operated in instantaneous run-of-river mode with outflow equal to inflow on an instantaneous basis. Instantaneous run-of-river operation means no utilization of impoundment storage and that outflow from the facility is equal to inflow to the impoundment on an instantaneous basis except for short term deviations, as further described in Finding 70 and incorporated by reference. When generating, the Project shall spill 100 cfs continuously year-round in the bypass reach unless otherwise indicated in the flow management and monitoring plan (Condition C). When the Project is not operation, all flow shall be spilled at the dam.

See finding 70, 71, 74, 76, and 123-127 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-304 & § 29A-306 (b) & § 306

(c)(3)(B)(i).

- C. **Flow Management and Monitoring Plan.** The licensee shall develop within 180 days of the effective date of the FERC license, a flow management plan detailing how the Project will operate in a true run-of-river mode and seasonal flow management to comply with the conservation flow. The plan will also include a method for continuous monitoring and reporting (to allow records to be furnished upon request) of flow releases at the Project (conservation flow, spillage, and turbine discharge), impoundment levels, and inflows. The plan shall include provisions for the flow data to be available on a near real-time basis.

The plan will include procedures for reporting deviations from prescribed operating conditions to the Department. Reports shall be made within 15 days after a deviation and will include, if possible, the causes, severity and duration of the deviation, observed or reported adverse environmental impacts from the incident, pertinent data, and measures to be taken to avoid recurrences.

The plan shall be subject to Department approval. The Department reserves the right to review and approve any material changes made to the plan.

See finding 113 and 127 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-304 & § 29A-306(b).

- D. **Trashracks.** Prior to the next replacement of the trashracks at the Project, the Applicant shall consult with the Fish and Wildlife Department with respect to the trashrack design and placement, to determine the appropriate bar clearance spacing and location. The Applicant shall file the trashrack design information with the Department of Environmental Conservation for approval prior to commencement of work.

See finding 57-63, and 119 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-306(a).

- E. **Recreational Facilities.** The Applicant shall develop within 180 days of the effective date of the FERC license, a plan and implementation schedule for recreation enhancements. The plan and schedule shall be developed in consultation with relevant stakeholders and shall be subject to approval by the Agency prior to implementation.

See finding 90, 102, 105, 134, 138, and 139 for a statement of necessity. 10 V.S.A § 5403 & 10.V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-103(b)(1)(G).

- F. **Debris Disposal.** Debris associated with Project operations shall be disposed of in accordance with state laws and regulations.

See finding 107 and 140 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-303(1).

- G. **Maintenance Plan and Repair Work.** The licensee shall develop within 180 days of the effective date of the FERC license, a water level management plan for when drawdowns are needed for planned maintenance activities at the Project. The plan shall include provisions that will be taken to protect freshwater mussels from being dewatered during these activities, and will protect aquatic biota and wildlife in wetlands impacted by maintenance-related drawdowns. The plans shall be subject to review and approval by the Agency prior to being submitted to FERC. Additionally, any Project maintenance or repair work, including drawdowns below the normal operating range to facilitate repair/maintenance work, shall be filed with the Department for prior review and approval, if said work may have a material adverse effect on water quality or cause less-than-full support of an existing use or a beneficial value or use of State waters.

See finding 80, 80, 87, 88, 129 and 133 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-103(a), § 29A-306(b) and § 29A-304(b).

- H. **Compliance Inspection by Department.** The Applicant shall allow the Department to inspect the Project area at any time to monitor compliance with certification conditions.

See finding 113 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-104(a).

- I. **Posting of Certification.** A copy of the certification shall be prominently posed within the Project powerhouse.

See finding 113 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-104(a).

- J. **Modification of Certification.** The conditions of this certification may be altered or amended by the Department to assure compliance with the Vermont Water Quality Standards and to respond to any changes in classification of management objectives for the waters affected by the Project, when authorized by law, and, if necessary, after notice and opportunity for hearing.

See finding 113 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12

Project No. 2879-012

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0330 026 § 29A-104(a).

APPENDIX C: VERMONT WATER QUALITY CERTIFICATION



Vermont Department of Environmental Conservation

Agency of Natural Resources

Watershed Management Division

1 National Life Drive, Davis 3

[phone] 802-490-6151

Montpelier, VT 05620-3522

<http://www.watershedmanagement.vt.gov>

DISTRIBUTED AND FILED ELECTRONICALLY

January 19, 2022

Jason Lisai

Green Mountain Power Corp.

163 Acorn Lane

Colchester, VT 05446

RE: Section 401 Water Quality Certification:
Bolton Falls Hydroelectric Project (FERC No. 2879)

Dear Mr. Lisai:

Attached you will find a copy of the water quality certification for the Bolton Falls Hydroelectric Project, issued by the Department of Environmental Conservation. You should carefully review the certification, particularly the conditions in the Decision and Certification section.

Please contact me should you have any questions.

Very truly yours,

A handwritten signature in black ink, appearing to read "Jeffrey B. Crocker". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jeffrey B. Crocker

Supervision River Ecologist

Attachment

c: Distribution List

VERMONT AGENCY OF NATURAL RESOURCES**Water Quality Certification
(33 U.S.C. § 1341)**

In the matter of: Green Mountain Power Corporation
 163 Acorn Lane
 Colchester, Vermont 05446

APPLICATION FOR BOLTON FALLS HYDROELECTRIC PROJECT

Section 401 of the federal Clean Water Act requires that 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 that any such discharge will comply with other substantive provisions of the Clean Water Act. 33 U.S.C. § 1341(a)(1). The certifying State may set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a federal license or permit will comply with the Clean Water Act and with any other appropriate requirement of State law. 33 U.S.C. § 1341(d). In Vermont, the Agency of Natural Resources is the certifying agency of the State for purposes of Section 401 of the Clean Water Act. 10 V.S.A. § 1004. The Secretary of Natural Resources has delegated the authority to make certification determinations to the Department of Environmental Conservation (Department).

The Department has reviewed a water quality certification application dated January 22, 2021 and filed by the Green Mountain Power Corporation (GMP or the Applicant) for the Bolton Falls Hydroelectric Project (the Project). The supporting documentation for the certification application includes the Applicant's Federal Energy Regulatory Commission (FERC) license application (FERC No. 2879) dated January 30, 2020, other supporting documents filed by the Applicant in support of the application, and a bypass flow demonstration on November 29, 2021. The record for this decision includes the June 1, 2020, and August 11, 2020, FERC Additional Information Request (AIR) responses; the FERC Draft Environmental Assessment (EA) dated August 13, 2021; and many other documents related to the Project and its relicensing filed through October 1, 2021.

The current application is subject to review under the Vermont Water Quality Standards promulgated by the Agency of Natural Resources and effective beginning January 15, 2017 (Environmental Protection Rule, Chapter 29A) (Standards). (Standards, Section 29A-101 Applicability).

The Department, based on the application and record before it, makes the following findings and conclusions.

I. Applicable Statutes and Regulations**A. Applicable provisions of the Vermont Water Quality Standards**

1. The Vermont Water Quality Standards (Environmental Protection Rule, Chapter 29A) (Standards) are promulgated by the Secretary of the Vermont Agency of Natural Resources pursuant to 10 V.S.A., Chapter 47, Water Pollution Control. Section 1252 of Chapter 47 provides for the

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classification of designated uses as either Class A(1), A(2), B(1) or B(2) and authorizes the adoption of standards of water quality to achieve the purpose of classification.

2. All waters of the State shall be managed to support their designated and existing uses. (Standards, Section 29A-104(b)).
3. The designated uses are: aquatic biota and wildlife that may utilize or are present in the waters; aquatic habitat to support aquatic biota, wildlife, or plant life; the use of waters for swimming and other primary contact recreation; the use of waters for boating and related recreational uses; the use of waters for fishing and related recreational uses; the use of waters for the enjoyment of aesthetic conditions; the use of the water for public water source; and the use of water for irrigation of crops and other agricultural uses. (Standards, § 29A-104(d)).
4. The affected reaches of the Winooski River including the impoundment, bypass and downstream reach, have been classified as Class B(2) for all uses.
5. The Antidegradation Policy in the Standards requires that “[a]ll waters shall be managed in accordance with [Standards] to protect, maintain, and improve water quality.” (Standards, Section 29A-105).
6. The Winooski River is designated as cold water fish habitat. (Standards, Section 29A-308).
7. In waters designated as cold water fish habitat, the dissolved oxygen (DO) standard is not less than 7 mg/L and 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonids in waters that the Secretary determines are salmonid spawning or nursery areas important to the establishment or maintenance of the fishery resource. In all other waters designated as a cold water fish habitat, the standard is not less than 6 mg/L and 70 percent saturation at all times. (Standards, Section 29A-302(5)(A)).
8. The general temperature standard for waters is “[c]hange or rate of change in temperature, either upward or downward, shall be controlled to ensure full support of aquatic biota, wildlife, and aquatic habitat uses.” (Standards, Section 29A-302(1)(A)).
9. In waters designated as cold water fish habitat and classified as Class B(2) for the fishing use, the total increase from ambient temperature due to all discharges and activities shall not exceed 1.0° F. (Standards, Section 29A-302(1)(B)(iii)).
10. The turbidity standard as an annual average under dry weather base-flow conditions is 10 NTU for cold water fish habitat. (Standards, Section §29A-302(4)(A)).
11. The management objectives for waters classified as Class B(2) for aquatic biota and wildlife are “Waters shall be managed to achieve and maintain good biological integrity.” (Standards, Section 29A-306(a)(3)(A)). The Class B(2) criteria for aquatic biota and wildlife use, require “[c]hange from the natural condition for aquatic macroinvertebrate and fish assemblages not exceeding moderate changes in the relative proportions of taxonomic, functional, tolerant, and intolerant aquatic organisms.” (Standards, Section 29A-306(a)(3)(B)).
12. The management objectives for waters classified as Class B(2) for aquatic habitat are “[w]aters shall be managed to achieve and maintain high quality aquatic habitat. The physical habitat

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structure, stream processes, and flow characteristics of rivers and streams and physical character and water level of lakes and ponds necessary to fully support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements, are maintained and protected.” (Standards, Section 29A-306(b)(3)(A)). The Class B(2) criteria for aquatic habitat use in rivers and streams are “[c]hanges to flow characteristics, physical habitat structure, and stream processes limited to moderate differences from the natural condition and consistent with the full support of high quality aquatic habitat. (Standards, Section 29A-306(b)(3)(B)(i)). Additionally, “waters shall comply with the Hydrology Criteria in Section 29A-304” of the Standards. (Standards, Section 29A-306(b)(3)(B)(iii)).

13. The Hydrology Policy in the Standards requires that “[t]he proper management of water resources now and for the future requires careful consideration of the interruption of the natural flow regime and the fluctuation of water levels resulting from the construction of new, and the operation of existing, dams, diversions, and other control structures.” (Standards, Section 29A-103(f)(1)).
14. To effectively implement the hydrology policy, hydrology criteria shall be achieved and maintained, where applicable. The hydrology criteria require for waters classified as Class B(2) for aquatic habitat that “[a]ny change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria.” The preferred method for ensuring compliance with this subsection is a site-specific flow study. In the absence of a site-specific study, the use of general hydrologic standards is also accepted. (Standards, Section 29A-304(b)(3)).
15. The management objective for waters classified as Class B(2) for aesthetics is “[w]aters shall be managed to achieve and maintain good aesthetic quality.” (Standards, Section 29A-306(c)(3)(A)). The Class B(2) criteria for aesthetics use in rivers and streams are “[w]ater character, flows, water level, bed and channel characteristics, and flowing and falling water of good aesthetic value.” (Standards, Section 29A-306(c)(3)(B)(i)).
16. The management objective for waters classified as Class B(2) for boating is “[w]aters shall be managed to achieve and maintain a level of water quality compatible with good quality boating (Standards, Section 29A-306(d)(3)(A)). The Class B(2) criteria for boating use is “waters shall comply with the Hydrology Criteria in Section 29A-304 of these rules.” (Standards, Section 29A-306(d)(3)(B)).
17. The management objectives for waters classified as Class B(2) for swimming and other primary contact recreation are “[w]here sustained direct contact with the water occurs, waters shall be managed to achieve and maintain a level of water quality compatible with good quality swimming and other primary contact recreation with very little risk of illness or injury from conditions that are a result of human activities.” (Standards, Section 29A-306(f)(3)(A)).
18. The management objectives for waters classified as Class B(2) for fishing are “[w]aters shall be managed to achieve and maintain a level of water quality compatible with good quality fishing. (Standards, Section 29A-306(e)(3)(A)). The criteria for fishing are “measures of wild salmonid densities, biomass, and age composition indicative of good population levels” and compliance with the temperature criteria in Section 29A-302(B) of the Standards. ((Standards, Sections 29A-306(e)(3)(B)(i)) and 29A-306(e)(3)(B)(ii)).

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II. Factual Findings

A. Background and General Setting

19. The Bolton Falls Hydroelectric Project is an existing licensed project located on the Winooski River in Vermont. The Winooski River is the largest tributary to Lake Champlain. The Winooski River flows 90 miles in a mostly western direction from the Town of Cabot in the east to its terminus in Lake Champlain in the Town of Colchester. The Winooski River has a total drainage area of 1080 square miles, and the Project has a watershed size of 821 square miles.
20. There are several major tributaries to the Winooski including the Stevens River, North Branch of the Winooski River, Dog River, Mad River, Little River and the Huntington River. There are 13 hydroelectric projects located on the mainstem and tributaries of the Winooski River. Three hydroelectric generation projects are located downstream of the Project on the mainstem of the Winooski River, with another three projects located upstream on the mainstem. The remainder are located on tributaries to the Winooski River.
21. The Bolton Falls Hydroelectric Project is owned and operated by Green Mountain Power Corporation (GMP). The Project is located in the Towns of Waterbury and Duxbury.
22. The Project site was originally developed in 1899 with two turbine generator units (units 1 & 2), and between 1905-1906 a third turbine generator unit (unit 3) was added. The Project was heavily damaged by the November 1927 flood which washed away part of the powerhouse including unit 2. The Project continued to operate with units 1 and 3 until the Project ceased operation in 1938. The Project was abandoned in 1939. The current dam and powerhouse were reconstructed between 1985 and 1986 as part of the recommissioning of the Project.
23. This site was originally licensed by FERC on February 5, 1982, as Project No. 2879, with the term of the license running through January 31, 2022.

B. Project and Civil Works

24. The Project dam is a 92-foot-high, 275-foot-wide timber crib dam buttressed with a masonry wall on the downstream face. The dam spillway is capped with 196-foot-long reinforced concrete overflow spillway with a crest elevation of 392.0 feet, and a 5-foot-high inflatable rubber dam with a maximum crest elevation of 397.0 feet. There is a concrete-capped masonry tower with a maximum elevation of 412.0 feet as well as a lower level on the upstream face at an elevation of 400.0 feet which allows access to the intake area. The dam includes two 4.0-foot-wide by 4.5-foot-high sluiceways in the masonry buttress section for drainage of the timber crib dam with an invert elevation of 347.0 feet. The dam creates an approximately 59-acre impoundment at an elevation of 397.0 feet and extends upstream approximately 2 miles.
25. The Project forebay consist of two separate concrete intakes leading to a 10-foot diameter penstock. The bottom of the intakes are at an elevation of 360.0 feet with the top of the intake at an elevation of 389.1 feet. The intake structure is equipped with trashracks that are 27-foot-wide by 43-foot-high at a 70-degree angle with 3-inch clear spacing and a raking system.
26. The two penstocks are each 10-foot-diameter and 120-foot-long and are made of steel and encased in concrete. The two penstocks enter the powerhouse delivering water directly to each

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generating unit. Additionally, there is a 36-inch diameter steel bypass pipe with an invert elevation of 383 feet that discharges near the left side of the spillway base. It has a maximum hydraulic capacity of 114 cfs at normal pool elevation of 397.0 feet.

27. The powerhouse was constructed between 1985-1986 and is located on river left downstream of the dam. It is a reinforced concrete structure approximately 73-feet-long by 57-feet-wide. Within the powerhouse, there are two horizontal Kaplan turbines each with a generating capacity of 3,750 kW. Both turbines have a hydraulic range of 365 cfs to 1,200 cfs. The total combined capacity of the Project is 7,500 kW with a hydraulic capacity of 365 cfs to 2,400 cfs.
28. The generators are horizontal shaft synchronous type, operating at 277 rpm at 4,160 volts. There is a 130-foot long, 5 kV underground transmission line from the powerhouse to an adjacent switchyard. The generators are connected to a 34.5/4.16 kV transformer in the switchyard. There is also a 34.5 kV transmission line that is approximately 600 feet long that runs to a second switchyard with a 34.5/4.16 kV transformer.

C. River Hydrology

29. The Winooski River is the largest tributary watershed to Lake Champlain. The Winooski River begins in the town of Cabot, flows in a mostly western direction to the town of Colchester where it enters Lake Champlain. The watershed drains an area of 1,080 square miles and six counties.
30. There are six U.S. Geological Survey (USGS) gaging stations that have historically operated on the Winooski River. Three USGS gaging stations are currently operating on the mainstem of the Winooski River. The two closest being USGS 04288040 Winooski River Crossett Brook at Waterbury Vermont with a watershed size of 379 square miles (upstream) and USGS 04290500 Winooski River near Essex Junction, Vermont with a watershed size of 1,044 square miles (downstream).
31. Hydrologic information is tabulated below (Table 1) for the Project. The statistics were calculated using the most recent 30 years of daily streamflow data from four USGS gages within the contributing area: Little River (04289000), Mad River (04288000), Dog River (04287000), and Winooski River (04288040). The total streamflow from these subwatersheds accounts for 88% of the drainage area (722.5 square miles (sq. mi.)) at the Project. Flows from the ungaged portion were estimated using the unregulated Mad and Dog River streamflow in cfs/sq. mi. and applied to the remaining 98.5 sq. mi. of drainage area. The statistics are also reflective of flow regulation occurring upstream within the Winooski and Little River subwatersheds.

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Table 1. Estimated hydrologic statistics for the Bolton Falls Hydroelectric Project. Statistics were estimated using surrounding USGS gages and prorated to the Project site.

Statistic	Winooski River at Bolton Falls Hydro
Drainage Area (sq. miles)	821
Annual Runoff (inches)	26.8
10% Exceedance Flow (cfs)	3,328.5
50% Exceedance Flow (cfs)	899.1
90% Exceedance Flow (cfs)	295.1
7Q10 (cfs)	135.9

D. Current License Conditions

32. The Bolton Falls Hydroelectric Project is currently licensed to operate as a peaking facility, with a minimum flow of 300 cfs, or inflow if less, in the tailrace and a maximum generation flow of 2,600 cfs, or inflow if greater. The current license allows the impoundment to be drawn down six feet from an elevation of 397.0 feet to a minimum of 391.0 feet for the purpose of generation. Currently, no spillage or flow is required to be released into the bypassed reach of river. However, the applicant indicates that the Project is typically operated in an automated run-of-river mode to maintain a constant impoundment elevation of 397.0 feet.

E. Applicant's Proposal

33. The Applicant is proposing to operate in an automated run-of-river mode. During normal flow conditions, the impoundment will be maintained at either elevation 397.0 or 397.25 feet during times of aesthetic spill.
34. The Applicant is proposing to provide 75 cfs via spillage into the bypassed reach during daylight hours April 1st through December 15th. Leakage of an unknown amount, but estimated to be between 0 to 16 cfs based on ambient conditions, will continue to be provided during the remaining period (December 16th through March 31st), and during nighttime hours.
35. Nighttime is defined as one half-hour after sunset to one-half hour before sunrise, based on the middle date of each month. The proposed times for each month are specified by the Applicant in finding 37.
36. GMP is not proposing to add capacity or to make any major modification to the Project facilities.
37. Within the license application the Applicant is proposing to include the following conditions;

Impoundment Levels

Except as temporarily modified by (1) Approved maintenance and dam safety monitoring activities, (2) extreme hydrologic conditions, as defined below, or (3) agreement between GMP, the Vermont Agency of Natural Resources, and appropriate state and/or federal fisheries management agencies, the Project will be operated in run-of-river mode with the impoundment level maintained at elevation 397.0 feet, under normal flow conditions, during periods when

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aesthetic spillage is not required. During periods when aesthetic spillage over the dam is required, the Project will be operated in run-of-river mode with the impoundment level maintained at elevation 397.25 feet, under normal flow conditions.

“Extreme Hydrologic Conditions” means the occurrence of events beyond GMP’s control such as, but not limited to, abnormal precipitation, extreme runoff, flood conditions, ice conditions or other hydrologic conditions such that the operational restrictions and requirements contained herein are impracticable to achieve or are inconsistent with the safe operation of the Project.

Bypass Minimum Flows

Except as temporarily modified by (1) approved maintenance and dam safety monitoring activities, (2) extreme hydrologic conditions, as defined above, (3) or agreement between GMP, the Vermont Agency of Natural Resources, and appropriate state and/or federal agencies, a bypass minimum flow of 75 cfs or inflow, whichever is less, shall be provided, via spillage over the Project dam, during daylight hours from April 1 through December 15. Leakage flow will be provided during nighttime hours from April 1 through December 15. Leakage flow from the Project will be provided at all times from December 16 through March 31.

Nighttime is defined as one half-hour after sunset to one-half hour before sunrise, based on the middle date of each month, as shown below.

Month	Night Start	Night End
January	17:08	6:55
February	17:51	6:23
March	19:28	6:35
April	20:07	5:39
May	20:43	4:55
June	21:09	4:37
July	21:05	4:52
August	20:28	5:25
September	19:33	6:01
October	18:38	6:37
November	16:55	6:18
December	16:43	6:52

38. The Applicant is proposing additional environmental measures, which include continuing to operate and maintain the canoe portage put-in and take-out, in addition to operating and maintaining the day use recreation area.
39. The Applicant will implement a recreation management plan which includes but is not limited to, relocating the existing parking area out of the floodplain, improving the portage landing, adding signage, and adding two picnic tables.

F. Current Status

40. In September 2020, the U.S. Environmental Protection Agency approved a list of waters considered to be impaired based on water quality monitoring efforts and in need of total

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maximum daily load (TMDL) development to address the pollution. The Department submitted the list under Section 303(d) of the federal Clean Water Act. According to the State of Vermont's 2020 303(d) list of impaired surface waters in need of TMDL, there are no listed waters within or near the Project affected area (State of Vermont 2020 303(d) List of Waters, Part A – Impaired Surface Waters in Need of TMDL, September 2020).

41. The Agency's publication *Hydropower in Vermont, An Assessment of Environmental Problems and Opportunities* is a state comprehensive plan.¹ The plan indicated that hydroelectric development has a significant impact on Vermont streams. Artificial regulation of natural stream flows and the lack of adequate minimum flow at sites were found to have reduced to a large extent the success of the state's initiatives to restore the beneficial values and uses for which the affected waters are managed under the federal Clean Water Act and Vermont law.
42. Vermont's *Wildlife Action Plan* lists freshwater mussels as a species of greatest conservation need and high priority.² Dams are identified as a threat to the species as they fragment and remove habitat, as in many cases river habitat is converted to reservoirs. Additionally, the plan notes hydropower dams can create unnatural frequency of water level and velocity changes. A high priority strategy for protection of freshwater mussels identified in the plan is to work with dam operators and owners to reduce impacts of dam operations on mussels.

G. Water Chemistry

43. There are fourteen wastewater discharges upstream of the Project in the Winooski watershed. Four are located on the mainstem and ten on tributaries. The Waterbury Wastewater Treatment Facility is the closest, approximately 3 miles upstream from the Project. Additionally, there are eleven wastewater discharges downstream of the Project on the mainstem of the Winooski River.
44. There is no water withdrawn from the mainstem of the Winooski River for the purposes of public drinking water upstream of the Project. There are some withdrawals for drinking water located on tributaries to the Winooski River, including the Village of Waterbury, Montpelier, Barre, and by the Mountain Water Company for Sugarbush Resort. Additional water withdrawals occur in the Winooski basin for the purposes of snowmaking generally between November and March of every year.
45. Water quality data has been collected sporadically within the Project area. These occasions include the licensing of the Bolton Falls Hydroelectric Project, and the relicensing of the Waterbury Reservoir Hydroelectric Project (FERC No. 2090). Long term water quality monitoring takes place near the Waterbury Wastewater Treatment Facility upstream of the Project, and near the Richmond Wastewater Treatment Plant downstream of the Project. Macroinvertebrate data have also been sporadically collected within the Winooski River. Sample collections closer to the Project have occurred between 1991 and 2015.
46. As part of the Project relicensing the Applicant conducted a water quality study in 2018. Data loggers were deployed to continuously collect water temperature and dissolved oxygen (DO) on

¹ DesMueles and Parks. 1988. *Hydropower in Vermont. An assessment of Environmental Problems and Opportunities*. Vermont Department of Environmental Conservation. Montpelier, Vermont.

² Vermont Fish & Wildlife Department. 2015. *Vermont Wildlife Action Plan 2015*. Vermont Fish & Wildlife Department. Montpelier, VT.

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15-minute intervals at 7 locations near the Project. Data loggers were deployed from June 1 to September 30 immediately upstream of the Project, two within the Project impoundment, one logger near the Project intake, one within the Project tailrace, one within the bypassed reach, and lastly one downstream of the Project tailrace.

47. During periods of August and September DO did not meet Vermont Water Quality Standards. These locations included upstream of the Project, within the impoundment, in the bypass reach, in the tailrace and downstream of the Project. The Applicant proposes that this is not due to Project operations because the Project was not operating during those instances. Instead DO below Standards occurred because of either low flow within the Winooski River or maintenance activities.
48. Some low DO readings may have been due to biofouling as indicated by rapid increases in DO concentrations coinciding with data logger checks (data download and replacement). Because biofouling can occur gradually, when the data became inaccurate is unknown.
49. Additionally, some instances of DO being below Standards in the tailrace occurred during Project generation and during impoundment drawdown maintenance (June 1, 2018). Generation was above 1 MW and DO fell below 6 mg/L. Within the same maintenance event (5/29/2018-6/28/2018), DO again fell below Standards starting June 20th, and generally remained low until the data logger was checked on June 27th, at which point DO returned to above 6 mg/L. Maintenance activities are considered part of Project operations.
50. Temperature patterns observed indicated that generally, there is a diurnal pattern of increasing and decreasing temperatures, with the greatest diurnal fluctuation occurring upstream. During some periods of non-generation, water temperatures downstream of the Project were increased compared to upstream, coinciding with warmer water from the impoundment surface spilling over the dam. Downstream temperatures generally decreased at the onset of generation cycles as deeper water from the intake was released. The cumulative impacts from the Waterbury Reservoir Hydroelectric Project may buffer the temperature effects due to the Project.
51. Additional water quality data was collected within the bypassed reach and provides a snapshot of DO and temperature. The samples were taken between 0956 and 1118 on July 22, 2019. Winooski River flows were 864 cfs, and there was an unknown amount of leakage flowed to the bypassed reach. Spillage into the bypassed reach had occurred approximately 30 hours earlier. The onetime spot measurements indicated that the area sampled in the bypassed reach was relatively uniform in both DO (above 6 mg/L) and temperature.

H. Aquatic Biota

52. The Winooski River is classified by the State of Vermont as Class B(2) for the aquatic biota designated uses and is designated as a cold water fish habitat. The term aquatic biota means all organisms that, as part of their natural life cycles, live in or on waters. (Standards, Section 29A-102(5)). Aquatic biota include fish, aquatic insects, amphibians, and some reptiles, such as turtles.
53. The Winooski River supports a diverse fish community influenced by its confluence with Lake Champlain. In the vicinity of the Project the river supports rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), white sucker (*Catostomus commersonii*), fallfish (*Semotilus corporalis*), longnose dace (*Rhinichthys cataractae*), yellow

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perch (*Perca flavescens*), pumpkinseed (*Lepomis gibbosus*), and smallmouth bass (*Micropterus dolomieu*).

54. Downstream of the Project, landlocked Atlantic salmon (*Salmo salar*) are present. Currently salmon are trapped at the Winooski One Hydroelectric Project (FERC No. 2756) and released above the Essex No. 19 Hydroelectric Project (FERC No. 2513). The Project represents the upper end of the reach that is accessible to salmon.
55. The Vermont Fish and Wildlife Department stocks brown and rainbow trout in the Winooski River annually. However, it is assumed that little to no reproduction occurs in the Project area due to the limited extent of gravel.

Fish Passage and Protection

56. Currently there are no fish passage facilities at the Bolton Falls Hydroelectric Project. With the exception of landlocked Atlantic salmon, fish species in the vicinity of the Project do not require migration to complete their lifecycle. However, resident species do move both upstream and downstream.
57. As part of the relicensing, the Applicant conducted an entrainment, impingement, and mortality study for resident species. Target species included in the evaluation were rainbow trout, brown trout, brook trout, fallfish, longnose dace, golden shiner, white sucker, smallmouth bass, and slimy sculpin.
58. The intake structure is equipped with trashracks that are 27-feet-wide by 43-feet-high at a 70-degree angle with 3-inch clear spacing and a raking system. The estimated intake velocity in front of the trashracks is 2.07 feet per second at maximum generation.
59. The Applicant evaluated three passage routes: (1) over the dam; (2) through the bypass pipe; and (3) through the Project turbines. Species were evaluated for likelihood of encountering the trashracks at the Project based on life history traits.
60. Brook trout, fallfish, longnose dace, and slimy sculpin all had a low probability of encountering the intake. Rainbow trout, brown trout, and golden shiner had a low to moderate probability of encountering the intake. Smallmouth bass has a moderate chance of encountering the intake. White sucker was the only species to have a moderate to high chance of encountering the intake.
61. Fish species were evaluated for burst swim speed. If burst swim speed was greater than the velocity in front of the intake, it was assumed that individuals would be able to escape entrainment or impingement.
62. Most juvenile and adult target species have a burst swim speeds greater than the intake velocity. The exception is for golden shiner adults and juveniles and juvenile smallmouth bass. The Project operates at full capacity approximately 18% of the time, with an intake velocity of 2.07 ft/s at full capacity.
63. Additionally, fish were evaluated for survival through the Kaplan turbines at the Project. This analysis uses previous survival study estimates based on fish length. Depending on fish length, immediate survival is estimated to be between 87.2 and 95.4%. 48-hour survival is estimated to

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be between 83.9 to 93.4%. Fish less than 8 inches have an estimated immediate and 48-hour survival of 94.8% and 93.4% respectively.

I. Aquatic Habitat

64. The Winooski River is classified by the State of Vermont as Class B(2) for the aquatic habitat designated use.
65. Waters designated as Class B(2) for aquatic habitat use shall be managed to achieve and maintain high quality aquatic habitat, characterized by the physical habitat structure, stream processes, and flow characteristics of rivers and streams and the physical character and water level of lakes and ponds necessary to protect and support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements. (Standards, Section 29A-306(b)(3)(A)).
66. The impoundment extends 2.1 miles upstream from the dam and has a surface area of 59 acres at normal pond elevation (397 feet msl). The depth in the impoundment varies and contains sand and gravel bars and islands.
67. The bypass reach is approximately 150 feet long and varies in width from approximately 120 to 200 feet wide. The reach is largely comprised of one large pool. There is no known bathymetry map of the bypass reach, but the bottom consists of highly irregular bedrock with depths up to 25 feet.
68. The bypass pool offers deep water habitat that is limited in this reach of the Winooski River which is largely comprised of shallow riffle and run habitat. Deep water pool habitat is an important habitat type for trout and other fish both spatially and temporally to provide both cover and stable habitat conditions. These conditions may be particularly important for overwintering habitat.
69. The powerhouse discharges into a 150 feet long reach of the Winooski River before the river channel widens. Additionally, there is a channel island that bifurcates flow into a north and south channel before rejoining on the downstream end of the island. The southern channel is primarily a flood chute and is likely only accessed during medium to high flow events. Both channels are characterized by run and riffle habitats with sand and gravel substrates.

Flow Needs for the Protection of Aquatic Habitat

70. The Applicant has proposed a run-of-river operating mode, meaning outflow will equal inflow, but did not specify an interval for which this would occur. Because the applicant has proposed to operate the project as an instantaneous run-of-river project, the Agency presumes the Applicant's intent is to not regulate flow below the Project, except for short term and unavoidable special circumstances such as during impoundment refilling following maintenance activities and Project shutdowns.
71. An instantaneous run-of-river project is one which does not operate out of storage, and therefore, does not artificially regulate streamflows below the project's tailrace. Outflow from the project is equal to inflow to the project on an instantaneous basis. The flow regime below the project is essentially the river's natural regime, except in special circumstances as outlined above.

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72. The Bolton Falls Hydroelectric Project bypass reach is backwatered, with a large deep pool at the base of the dam. Under current operations no spillage is required to be provided to the bypassed reach.
73. The Applicant conducted a habitat study in the bypassed reach to evaluate a range of spillage flows at the dam to assure compliance with Class B(2) management objectives and criteria for the aquatic habitat designated use (Standards). The method used was a flow demonstration where an assessment team evaluated a series of flows ranging from leakage to 217 cfs to determine the percentage of broken water surface and active circulation in the reach at each flow.
74. The percentage of broken water surface in the reach ranged from 10-15% at leakage to 92% at a flow of 217 cfs with the largest increases between 75 cfs to 150 cfs (40 to 60 percent) and 150 cfs and 217 cfs (60 to 92 percent). The percent of the reach with active water circulation ranged from 25% at leakage and increased to 100% at the highest flow observed. The largest increase in active circulation was between 50 cfs and 75 cfs (50 to 75 percent) followed by the increase between 75 cfs and 150 cfs (75 to 92 percent) (Table 2).

Table 2. The habitat assessment team's consensus for the percentage of broken water surface and active water circulation for the Bolton Falls bypass reach for the first bypass habitat assessment (October 2019).

Spillage Flows (cfs)	Percent of Reach with Broken Surface	Percent of Reach with Active Circulation
0 (leakage)	10-15	25
15	25	35
50	33	50
75	40	75
150	60	92
217	92	100

75. At the suggestion of the Agency^{3, 4} an additional habitat study took place to evaluate the percent of reach with broken surface and percent of reach with active circulation for flows between 75 cfs and 150 cfs in November 2021. The same procedure (finding 73) was followed but different flows were evaluated. Flows of 75 cfs and 150 cfs were repeated to evaluate consistency between bypass habitat demonstrations.
76. The percentage of broken water surface ranged from 40-55% between 75 and 150 cfs. There was generally a consistent increase in percent of broken water surface between flows. The percentage of reach with active circulation ranged from 75-90% between flows of 75 and 150 cfs. The largest increase occurred between 75 cfs and 100 cfs, increasing by 8 percentage points (75% to 83%) (Table 3).

³ Bolton Falls Hydroelectric Project Pre-Filling Meeting Follow Up. Letter from VT DEC. January 21, 2021.

⁴ Bolton Falls Hydroelectric Project Comments on Draft EA. Letter from VT DEC. September 13, 2021.

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Table 3. The habitat assessment consensus rating for the percentage of broken water surface and active water circulation for the Bolton Falls bypass reach for the second habitat assessment (November 2021).

Spillage Flows (cfs)	Percent of Reach with Broken Surface	Percent of Reach with Active Circulation
75	40	75
100	45	83
125	51	85
150	55	90

77. The Applicant is proposing to provide a minimum bypass flow of 75 cfs, or inflow, whichever is less, via spillage over the dam during daylight hours from April 1 through December 15 for aesthetic and aquatic habitat purposes, with leakage being provided the remainder of the time. The Applicant estimates that leakage typically ranges from 0 to 16 cfs depending on conditions.

Water Level Fluctuation in the Impoundment

78. The Bolton Falls Hydroelectric Project is proposing to operate in a run-of-river mode with the impoundment at an elevation of 397.0 feet during times of no spill and 397.25 feet for the remainder of the time. Run-of-river operations will result in little water level fluctuations within the impoundment during normal operations, except during times of raising or lowering the impoundment for spillage purposes.
79. The Applicant has indicated that it will need to periodically drawdown the impoundment for repairs and maintenance purposes. The Applicant has estimated a drawdown could occur between 0 to 10 times annually and in general the duration of the drawdown for maintenance varies from less than a day to a month. Additionally when the impoundment is lowered, it is typically five feet or less below the normal elevation of 397.0 feet.
80. Maintenance activities are not seasonally planned as they are dependent on when repairs are needed. The timing and duration of a drawdown can have different effects on the habitat available within the impoundment. Spring lowering would result in loss of spawning and rearing habitat for some fish. Additionally, lowering the impoundment will have effects on mussel species, specifically the Eastern pearlshell (*Margaritifera margaritifera*, state threatened) which was observed in depths less than 5 feet.

J. Wildlife and Wetlands

81. Hydroelectric operations, namely water level fluctuations in impoundments, can affect wetland and shoreline vegetation. The Applicant is proposing to maintain a steady impoundment at either 397.0 or 397.25 feet elevation during normal Project operations.
82. There are wetlands identified within the Project boundary as classified by the U.S. Fish and Wildlife Service under the National Wetlands Inventory. Those located in the Winooski River include; two riverine, upper perennial, unconsolidated shore, seasonally flooded wetlands; lacustrine, limnetic, unconsolidated bottom, permanently flooded and impounded; and riverine, upper perennial, unconsolidated bottom, and permanently flooded.

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83. Wetlands located adjacent to the Winooski River include; palustrine, forested, broad-leaved deciduous, temporary flooded; forested, broad-leaved deciduous/scrub-shrub broad-leaved deciduous seasonally flooded; riverine, unknown perennial, unconsolidated bottom, permanently flooded; and palustrine, scrub-shrub, broad-leaved deciduous, and temporary flooded.
84. Additionally, there are wetlands classified as Class II and protected under Vermont Statutes Annotated Title 10, Chapter 37 and the Vermont Wetland Rules. The wetlands identified are similar in location and dimensions to those identified by the National Wetlands Inventory. A proposed non-exempt activity within a wetland requires authorization from Vermont Department of Environmental Conservation. The operation of hydroelectric facilities in compliance with state and federal requirements is considered an allowed use under the Vermont Wetland Rules, and is generally permitted without a state wetlands permit (Vermont Wetland Rules Section 6.7). Conditions related to protection of aquatic habitat and biota may be imposed through this certification.
85. Due to the run-of-river operations, there is likely to be limited Project impacts on wetlands. Aquatic biota and wildlife in the wetland will likely be affected during Project maintenance. The effect and severity will depend on the duration and drawdown extent of any particular activity.

K. Rare, Threatened, and Endangered Species

86. Northern long-eared bat (*Myotis septentrionalis*) is federally listed as threatened and state-listed as endangered. This species winters in caves and cave-like structures, but summers in cavities, under bark or in hollows of live and dead trees. Tree maintenance has the potential to disrupt roosts between April 1st and October 31st. There are no known occurrence, habitat, or winter hibernacula of northern long-eared bat within a 1-mile radius of the Project boundary.
87. Eastern pearlshell (*Margaritifera margaritifera*) is a mussel that is state-listed as threatened and occurs within the Project impoundment and just downstream of the facility. Habitat preferences are small rivers with sand, fine gravel or a sand-gravel mix bottom. Eastern pearlshell are the longest-lived freshwater invertebrate in the animal kingdom.
88. The Applicant conducted an assessment on Eastern pearlshell mussels within the impoundment and downstream. Individual Eastern pearlshell mussels mostly occurred within the impoundment at varying substrates and water depths. The individuals were primarily larger, indicating little recruitment to the population. Some of the larger individuals located could be at least 40-50 years old, indicating survival under various conditions. However, the greatest concern for the individuals located within the impoundment are periodic maintenance drawdowns.
89. Additional Vermont ranked rare-uncommon plants were located during the relicensing of the Project.
90. Creeping lovegrass (*Eragrostis hypnoides*) are typically located on the shores of Lake Champlain or major rivers, in riverine-sandbar areas. This plant was observed in the day use area of the Project, where hundreds of individuals were located. It was observed, that because of public access to this area there were impacts to existing habitat, and within the highest-trafficked portions of the habitat creeping lovegrass was not present.

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91. Stout goldenrod (*Solidago squarrosa*) are typically located on acidic ledges, cliffs or rock outcrops. During the survey, this plant was located on a rock outcrop upstream of the dam, and was likely one individual. There were some indications that the public was in the vicinity including trash and graffiti.
92. Hay sedge or silvery-flowered sedge (*Carex argyrantha*) are typically located in early successional sites. The hay sedge was located in the transmission line corridor, where maintenance mowing occurs. It is anticipated that this mowing allows the area to remain in early succession which is preferred by the hay sedge.

L. Shoreline Erosion

93. The Project impoundment extends approximately 2.1 miles upstream. The total shoreline length is approximately 4.2 miles. Much of the shoreline is either steep rock outcrops or vegetated banks.
94. The soils mapped around the impoundment include, fine sands, fine sandy loams, very fine sandy loams, loamy fine sands, and silt loams. The soils listed range from not highly erodible to highly erodible.
95. Because the Applicant proposes to operate the facility in a run-of-river mode and maintain the reservoir at either 397.0 feet elevation or 397.25 feet elevation, there will likely be limited erosion over and above what might naturally occur as a result of Project operations.

M. Recreation Use

96. The Project has two recreational facilities, the DeForge Hydroelectric Station Recreation Area and the portage trail. Both are operated and maintained by the Applicant. The DeForge Hydroelectric Station Recreation Area is a day use area and consists of a parking lot, a grassy picnic area with a grill, and river access just below the dam. The portage trail consists of a take-out upstream of the dam, an unimproved launch area downstream of the dam, and an approximately 0.5-mile trail connecting the take-out to the launch area downstream.
97. The parking area for the day use area has space to accommodate twelve vehicles with another small pullout along Power Plant Road near the portage trail that has space for two vehicles. There is a portable restroom on site along Power Plant Road just outside the gate to the powerhouse and dam.
98. The Applicant conducted a recreation study as part of the relicensing effort to (1) identify which recreational opportunities are being utilized (2) identify potential obstacles to recreational users, and (3) identify any recreational improvements to enhance future recreational opportunities.
99. The surveys indicate that most of the recreational use occurs at the day use area (92%) and only a small portion (8%) occurs at the portage trail. Annual recreational use is estimated at 7,422 recreation days with the majority (72%) occurring in the summer. The most popular recreational activities for the two recreation areas combined are boating (39%) followed by fishing from shore (25%) and wading/swimming (10%). The remainder was made up of picnicking, wildlife viewing, and sightseeing.

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100. On average, only 1 of the 12 day-use parking lot spaces was occupied on a non-peak weekend at the Project. Occasionally the parking lot was observed to be utilized to full or near full capacity, including during the Onion River Race Ramble and the Fourth of July. It is anticipated that based on this usage, the day use area will be used at 9% capacity in 2060.
101. Most respondents to the survey questionnaire were extremely satisfied or moderately satisfied with the number and condition of the recreation facilities and opportunities. The survey questionnaire also invited individuals to suggest improvements to the recreational facility. The most common suggestion was to add toilets, followed by removing litter. Other suggestions included adding picnic tables, improving signage, and improving the portage landing.
102. The Applicant is proposing to continue to operate and maintain the two existing recreation sites. Additionally, a Recreation Management Plan (RMP) for the Project will be developed. The RMP will include additional measures to enhance recreation at the Project.
103. The Applicant states that the lower parking lot floods annually, and therefore plans to relocate the lower parking lot and expanding on the upper, or overflow, parking lot. This will reduce the number of vehicles from 34 to 22 (17 at the overflow lot and 5 at the informal pullout). The proposed parking lot would offer handicap parking.
104. Additional measures in the proposal include, reroute foot traffic away from creeping lovegrass, add picnic tables one of which will conform with the Americans with Disabilities Act, and improve signage. At the portage, the Applicant will construct a new take-out, improve signage, and clear brush.
105. Friends of the Winooski River submitted comments on the RMP proposed by the Applicant. Concerns included accessibility for those with limited mobility if the parking lot is relocated, in addition to suggestions on the portage landing upstream of Bolton Falls. The Applicant developed conceptual designs and cost estimates for alternatives raised by Friends of the Winooski River.
106. Based on the analysis the Applicant's preferred alternative was to adopt the changes proposed for the portage landing and construct a gravel lot at the informal overflow parking area with 16 standards and one accessible parking spaces and blocking vehicular access to the gravel access road leading to the existing Day Use Area lot. This access road would then be raised to reduce the slope to meet the U.S Forest Service Trail Accessibility Guidelines for accessible trails.

N. Debris

107. The Applicant has provided little information on cleaning and disposal of trashrack debris and other Project-related debris. The Applicant notes that the Project is maintained daily including cleaning the trashracks and grounds keeping. The depositing or emission of debris and other solids to state waters violates Vermont's solid waste laws and Standards, Section 29A-303(1) and Section 29A-303(2). Debris may also impair aesthetics and boating.

O. Aesthetics

108. The Project's dam is a 92-foot-high, 275-foot-wide timber crib dam buttressed with a masonry wall on the downstream face. The dam spillway is capped with 196-foot-long reinforced concrete overflow spillway with a crest elevation of 392.0 feet, and a 5-foot high inflatable rubber dam

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with a maximum crest elevation of 397.0 feet. Currently, no spillage flow is required. As a result, water is only spilled at the dam when flows are below the minimum hydraulic capacity or above the maximum hydraulic capacity of the Project.

109. An aesthetic flow assessment was done to evaluate a series of spillage flows over the Project dam. The spillage flows assessed by the evaluation team were 0 cfs (leakage), 15 cfs, 50 cfs, 75 cfs, 150 cfs, and 217 cfs.⁵ A flow of 75 cfs spilled over the dam provided good aesthetic value, providing spillage over the full width of the dam at this flow with variability in the thickness of the veil.
110. The Applicant is proposing to spill 75 cfs between April 15 to December 15 during daylight hours, and no spill for the remainder of the year when flows are in control of the Applicant. Nighttime hours are defined as one half hour after sunset to one half hour before sunrise based on the middle date of each month (finding 37).

III. Analysis

111. A state's 401 certification determination shall include a statement from the state that "there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards." 40 C.F.R § 121.2(a)(3); Environmental Protection Rules, Chapter § 13.11(g). Accordingly, the Department may set forth limitations and other requirements necessary for it to find that there is reasonable assurance that the activity and project will be operated in a manner which will not violate the Vermont Water Quality Standards.
112. Continued operation of the Project may lead to violations of Standards. The aspects of operation that have the potential to cause violations of Standards are analyzed below to determine the limitations and requirements necessary to find that there is reasonable assurance that the discharge will not violate the Standards.
113. In addition to the specific items pertaining to the Application on review, if an activity was not presented in the Application and not consistent with the findings of this Certification, the Department reserves the right to review said activity to assure it will not cause a violation of Vermont Water Quality Standards (e.g., change in operation, maintenance drawdown, construction activity, etc.). In addition to specific operational conditions, other provisions like reporting, inspections, and flow monitoring will also be necessary to assure the discharge does not violate Vermont Water Quality Standards.

A. Water chemistry

114. Water quality sampling data gathered in the Project vicinity as part of the relicensing process indicate that Standards for dissolved oxygen were not met on occasion (finding 47-49) including areas upstream of the Project, within the impoundment, in the bypass reach in the tailrace, and downstream of the Project. DO in the bypass reach fell below Standards while the impoundment was drawn down for an extended duration due to maintenance activities. (Standards, Sections 29A-302(1)(B)(iii) and Section 29A-302(5)(A)). This indicates that when the bypass becomes stagnant dissolved oxygen falls below Standards.

⁵ Aesthetic Flow Study at Bolton Falls Dam. Updated Study Report. Bolton Falls Hydroelectric Project (FERC No. 2879). Gomez and Sullivan Engineers. December 2019.

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115. Other occasions when dissolved oxygen fell below Standards could have occurred, in part, due to biofouling of the sensors. This was indicated by the rapid rise in dissolved oxygen concentrations when the loggers were checked and redeployed⁶.
116. To ensure that Project operations to meet dissolved oxygen Standards, this certification is being conditioned (condition B) to provide flow into the bypassed reach year-round.

B. Aquatic Biota

117. The Applicant conducted a fish impingement and entrainment study at the Project. The study concluded immediate survival of fish ranged from 87.2 – 95.4% and the 48-hour survival was estimated to be 83.9 – 93.4%. Fish smaller in length (less than 8 inches) had an estimated immediate survival of 94.8% and a 48-hour survival of 93.4%.
118. Fish survival estimates change based on the assumed length of individuals and the burst speed of the species. Aquatic biota is a designated use pursuant the Standards. In addition to some fish species being a popular game fish, some are Glochidia hosts for the state-threatened Eastern pearlshell mussel.
119. While not currently planned, over the course of the license it is likely that there will be a need to replace the trashrack. This certification is being conditioned (condition D) to consult with the Department of Vermont Fish and Wildlife should the trashracks be replaced. This will assure that a replacement would limit fish impingement and entrainment.
120. Macroinvertebrate data has been collected sporadically from 1991 to 2015 in the vicinity of the Project (finding 45). The community assessment ranged from good- fair to very good during that time. The Department of Environmental Conservation, as part of the watershed management division monitoring program, will continue to monitor the macroinvertebrate communities in the Winooski River.

C. Aquatic Habitat

121. The Applicant proposes to operate the development in run-of-river mode. Instantaneous run-of-river operations with outflow equal to inflow on a near instantaneous basis except for short term deviations will protect the natural flow regime below the Project and will support aquatic habitat in the impoundment and below the tailrace (Standards, Section 29A-306(b)(3)). This Certification is being conditioned such that the operating mode will be instantaneous run-of-river (finding 70 and 71, condition B).

Bypassed Reach

122. The Applicant is proposing to provide a minimum bypass flow of 75 cfs, or inflow, whichever is less, via spillage over the dam during daylight hours from April 1 through December 15, with leakage being provided the remainder of the time.

⁶ Bolton Falls Hydroelectric Project Response to Agency Comments on the Initial Study Report and Meeting. Letter from GMP. March 11, 2019. Attachment A.

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123. The Applicant conducted a habitat study on two occasions to evaluate a range of spillage flows. The method used was a flow demonstration (finding 73). From 0 cfs (leakage) to 50 cfs, the broken water surface increased from 10-15% to 33%. The percent of reach with active circulation increased from 25% to 50%. At 50 cfs spillage, much of the bypassed reach remained stagnant.
124. At 75 cfs spillage, the percent of the reach with broken water surface increased to 40% and the percent of the reach with active circulation increased to 75%. At this flow on river left the whitewater current began to extend downstream from the base of the dam providing good conditions in terms of broken water surface and active circulation. However, on river right, the current did not extend very far downstream of the dam and did not provide much water circulation or broken water surface.
125. At 100 cfs spillage, the percent of the reach with broken water surface increased to 45% and active circulation increased to 83%. This flow provided an increase in active circulation and broken water surface which was especially apparent in the middle of the channel downstream of the dam where river left and river right channels converged closer to the dam face, in addition to increased circulation on river right. The Agency concludes that 100 cfs spillage provides high quality aquatic habitat in the bypassed reach of Bolton Falls.
126. With higher flows, the percent of reach with broken water surface and percent with active circulation continued to increase. At 150 cfs, there was a noticeable increase in turbulence at the base of the dam. The broken water surface and circulation at this flow extended downstream from the base of the dam on both river left and river right. At higher flows this trend continued.
127. The Agency is conditioning this certification (condition B) to pass 100 cfs continuously year-round into the bypassed reach for the protection of aquatic habitat. Additionally, the certification is being conditioned (condition C) to specify how this flow will be provided to the reach, including any seasonal considerations, within the flow management plan.

Water level fluctuation in the impoundment

128. The Applicant is proposing to operate the Project in an instantaneous run-of-river mode and maintain a steady impoundment at either 397.0 or 397.25 feet msl. However, maintenance activities will require lowering the water level in the impoundment. The Applicant has indicated that drawdowns could occur between 0 to 10 times annually. The duration of each would depend on the activity and vary from less than a day to a month and are not dependent on the season (finding 78 and 79).
129. Drawdown of the impoundment can impact aquatic habitat within the impoundment depending on season, additionally any impoundment lowering will have effects on mussel species specifically the state-threatened Eastern pearlshell (*M. margaritifera*). This certification is being conditioned (condition G) to develop a maintenance plan to address impoundment drawdowns for the protection of aquatic habitat within the impoundment.

D. Wetland and Wetland Habitat

130. With the Applicant proposing run-of-river operations, there is likely to be limited Project impacts on wetlands. Aquatic biota and wildlife in the wetlands will likely be affected during Project maintenance. The affect and severity of impacts will depend on the duration and

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drawdown extent of any activity. As such, this certification is being conditioned (condition G) to develop a maintenance plan to minimize any impacts that may occur on wetlands and wetland habitat.

E. Rare, Threatened, and Endangered Species

131. The Northern long-eared bat is listed at both the state and federal level. There are no known occurrences (finding 86) in the Project area. The Applicant is not anticipating any tree clearing at the Project. If tree clearing is needed, the Applicant will consult with VTFWD and USFWS to determine any necessary mitigation measures. No additional measures as suggested by the VTFWD Natural Heritage Program or the USFWS.
132. Eastern pearlshell mussels are located both downstream of the Project and within the impoundment (finding 87). The Applicant is proposing to operate the facility in a run-of-river mode. It is assumed that the reduced flow fluctuations downstream of the Project and within the impoundment will provide some protection. However, the Applicant draws down the impoundment periodically for maintenance purposes. The Applicant states maintenance drawdowns occur anywhere between 0 and 10 times annually, with varying durations from less than a day to one month depending on the activity.
133. The Vermont Wildlife Action Plan identifies actions for the protection of freshwater mussel populations (finding 42). One of the threats identified are hydropower dams that create an unnatural frequency of water level changes. For the protection of the state-listed Eastern pearlshell mussel, this certification is being conditioned (condition G) to create a maintenance and repair work plan which shall include provisions for the protection of freshwater mussels.
134. Mitigation measures will also be taken to protect creeping lovegrass. This plant was observed in the day use areas (finding 90). The Applicant is proposing, within the recreation and management plan, to create signage and focus foot traffic to limit access to certain areas. This will help mitigate impacts on the creeping lovegrass within the recreational day use area. This certification is being conditioned (condition E) to develop a recreation and management plan which will include a schedule of proposed recreational enhancements including protection of the rare/uncommon species.
135. Two additional rare and uncommon plants were observed, stout golden rod and hay sedge (finding 91 and 92). These two species were found either in informal recreation areas or in areas with active management that likely enhances the habitat for the rare species. As such, the Applicant is not proposing to provide additional protection measures for either species.

F. Erosion

136. The Applicant proposes to operate the facility in a run-of-river mode and maintaining the reservoir at either 397.0 feet elevation or 397.25 feet elevation, there will likely be limited erosion over and above what might naturally occur because of Project operations. This certification is being conditioned to operate in a run-of-river mode (condition B) which assumes that the Project does not operate out of storage (finding 70).

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G. Recreation

137. The Vermont Water Quality Standards require that waters achieve and maintain good quality that fully support boating, fishing, and other designated recreational uses. (Standards, Section 29A-306(d)(3)(A); Standards, Section 29A-306(e)(3)(A); and Standards, Section 29A-306(f)(3)(A)).
138. There are two recreation sites that are operated and maintained by the Applicant. As part of the Project relicensing, the Applicant conducted a recreation study and is proposing recreation enhancements (finding 98 - 102). These proposed changes are, in part, a result of the relicensing studies (improved signage, picnic tables, notice to remove litter) and flooding concerns (parking lot relocation).
139. Recreational users expressed concerns regarding access. Recreation is a designated use pursuant to the Standards. This certification is being condition (condition E) to develop a recreational management plan with approval from the Agency to assure the protection of creeping love grass (finding 90 and 134) and assure access for multiple user groups.

H. Debris Deposal

140. The Applicant removes debris from the trashrack daily (finding 107) but does not indicate how that debris is disposed. This Certification is being conditioned (condition F) to dispose of debris according to state laws and regulations.

I. Aesthetics

141. Aesthetics are a designated use that must be met continuously. The management objective for waters designated as Class B(2) for aesthetics is, “[w]aters shall be managed to achieve and maintain good aesthetic quality”. The criteria for rivers and streams are water character, flows, water level, bed and channel characteristics, and flowing and falling water of good aesthetic value (Standards 306(c)(3)(B)(i)).
142. The aesthetic flow assessment (finding 109) identified that 75 cfs of spillage over the dam provided good aesthetic value. Spillage at this flow created a full veil across the dam with variable thickness. In addition to the full veil, a cascade formed over the bedrock on river right.
143. In addition to the visual affects, spillage also offers an auditory experience during both the daytime and the nighttime hours. This certification is being conditioned (condition B) to provide 100 cfs continuous spillage to the bypassed reach to provide high quality aquatic habitat, which will also fully support the aesthetics use.

J. Antidegradation

144. Pursuant to the Antidegradation Policy set forth in Standards, Section 29A-105 and the Agency’s 2010 Interim Anti-Degradation Implementation Procedure (Procedure), the Secretary must determine whether a proposed discharge or activities are consistent with the Policy by applying the Procedure during the review of applications for any permit for a new discharge if during the application review process compliance with the Standards is evaluated pursuant to

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applicable state or federal law. (Procedure III(A)). This includes water quality certifications required by Section 401 of the federal Clean Water Act for a federal license or permit for flow modifying activities. (Procedure III(B)(3)).

145. In making the determination that proposed activities are consistent with the Policy, the Secretary is required to use all credible and relevant information and the best professional judgment of Agency staff. (Procedure III(D)). Section VIII of the Procedure governs the Agency's review of Section 401 applications for flow-modifying activities. (Procedure VIII(A)(1)). The Secretary may have to review a single waterbody under multiple tiers of review depending on whether a waterbody is impaired or high quality for different parameters.
146. Tier 3 review is required if the project will discharge to an Outstanding Resource Water. (Procedure VIII(D)). This Project does not affect any Outstanding Resource Waters and therefore does not trigger a Tier 3 review under Section VIII of the Procedure.
147. This Project affects waters classified as B(2) for all designated uses, which are assumed to be high quality waters for certain parameters that trigger a Tier 2 review under Section VIII of the Procedure. (Procedure VIII(E)(1)(c)). Under Tier 2, the Secretary must determine whether the proposed discharge will result in a limited reduction in water quality in a high quality water by utilizing all credible and relevant information and the best professional judgment of Agency staff. (Procedure VIII(E)(2)(b)).
148. When conducting a Tier 2 review, the Secretary may consider, when appropriate, one or more of the following factors when determining if a proposed new discharge will result in a reduction in water quality: (i) the predicted change, if any, in ambient water quality criteria at the appropriate critical conditions; (ii) whether there is a change in total pollutant loadings; (iii) whether there is a reduction in available assimilative capacity; (iv) the nature, persistence and potential effects of the pollutant; (v) the ratio of stream flow to discharge flow (dilution ratio); (vi) the duration of discharge; (vii) whether there are impacts to aquatic biota or habitat that are capable of being detected in the applicable receiving water; (viii) the existing physical, chemical and biological data for the receiving water; (ix) degree of hydrologic or sediment regime modifications; and (x) any other flow modifications. (Procedure VIII(E)(2)(d)).
149. The Secretary considered the foregoing factors during the review of the Project to determine if the Project will result in a reduction of water quality. The principal impacts of the Project are its effects on aquatic habitat in the bypassed reach of the Winooski River, aesthetics, and the impacts of the continued operation of the Project resulting from water level management within the impoundment. Discharge of pollutants is not an issue because the changes in project operation will not result in a discharge of additional pollutants. Other ambient water quality criteria will improve or remain unchanged. As a result, factors (i), (ii), (iii), (iv), (v), and (vi) are not at issue. The Project has not supported the designated uses of aquatic habitat and aesthetics due to current water level management of the impoundment and lack of an adequate bypass flow. Condition B requires water level and flow management to operate in a true run-of-river with a continuous bypass flow. Additionally, Condition G requires the Applicant to develop a maintenance plan for impoundment drawdowns. These conditions and operational change will reduce the impacts on aquatic habitat and aesthetics at the facility.
150. This Certification does not authorize any activities that would result in a lowering of water quality for those parameters that are exceeding water quality Standards.

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151. For those parameters for which the Winooski River is not exceeding water quality Standards, the Secretary must conduct a Tier 1 review. (Procedure VIII(F)).
152. Under Tier 1 review, the Secretary may identify existing uses and determine the conditions necessary to protect and maintain these uses. (Procedure VIII(F)). In determining the existing uses to be protected and maintained, the Secretary must consider the following factors: (a) aquatic biota and wildlife that utilize or are present in the waters; (b) habitat that supports existing aquatic biota, wildlife, or plant life; (c) the use of the waters for recreation or fishing; (d) the use of the water for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality; and (e) evidence of the uses' ecological significance in the functioning of the ecosystem or evidence of the uses' rarity. (Procedure VIII(F)(2)).
153. The Secretary considered all factors listed above and based on information supplied by the Applicant and Agency staff field investigations, identified the following existing uses: aquatic biota and wildlife; aquatic habitat; aesthetics; and recreation.
154. The existing dam and impoundment have changed the natural condition of the river at the Bolton Falls Hydroelectric Project. Currently, aquatic biota, wildlife and aquatic habitat, aesthetics and recreation are impacted within the impoundment, bypassed reach, and downstream of the facility due to flow fluctuations and insufficient flows in the bypass. However, the modifications to the project conditioned under this Certification will result in improvements to water quality and will protect and maintain existing uses, by assuring that adequate conservation flows are passed consistently and the water level within the impoundment and flow downstream are not fluctuated for the purpose of generation. These modifications include instituting bypass flows and true run-of-river operations at the Bolton Falls Hydroelectric Project.
155. The Secretary finds that development and operation of the Project as conditioned by this Certification will comply with the Vermont Water Quality Standards. Accordingly, the Secretary finds that the Project, as conditioned, meets the requirements of the Policy and Procedure relating to the protection and maintenance of high quality waters.

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IV. Decision and Certification

The Department has examined the Project application and other pertinent information deemed relevant by the Department in order to issue a decision on this certification application pursuant to the Department's responsibilities under Section 401 of the federal Clean Water Act. After examination of these materials, the Department certifies that there is reasonable assurance that operation of the Project, when done in accordance with the following conditions will not violate Standards; will not have a significant impact on use of the affected waters by aquatic biota, fish or wildlife, including their growth, reproduction, and habitat; will not impair the viability of the existing populations; will not result in a significant degradation of any use of the waters for recreation, fishing, water supply or commercial enterprises that depend directly on the existing level of water quality; and will be in compliance with sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act, 33 U.S.C. section 1341, and other appropriate requirements of state law:

- A. **Compliance with Conditions.** The Applicant shall operate and maintain this Project consistent with the findings and conditions of this certification. The Applicant shall not make any changes to the Project or its operations that would have a significant or material effect on the findings, conclusions or conditions of this Certification without approval of the Department.

See finding 113 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-101.

- B. **Flow Management.** The Project shall be operated in instantaneous run-of-river mode with outflow equal to inflow on an instantaneous basis. Instantaneous run-of-river operation means no utilization of impoundment storage and that outflow from the facility is equal to inflow to the impoundment on an instantaneous basis except for short term deviations, as further described in Finding 70 and incorporated by reference. When generating, the Project shall spill 100 cfs continuously year-round in the bypass reach unless otherwise indicated in the flow management and monitoring plan (Condition C). When the Project is not operation, all flow shall be spilled at the dam.

See finding 70, 71, 74, 76, and 123-127 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-304 & § 29A-306 (b) & § 306 (c)(3)(B)(i).

- C. **Flow Management and Monitoring Plan.** The licensee shall develop within 180 days of the effective date of the FERC license, a flow management plan detailing how the Project will operate in a true run-of-river mode and seasonal flow management to comply with the conservation flow. The plan will also include a method for continuous monitoring and reporting (to allow records to be furnished upon request) of flow releases at the Project (conservation flow, spillage, and turbine discharge), impoundment levels, and inflows. The plan shall include provisions for the flow data to be available on a near real-time basis.

The plan will include procedures for reporting deviations from prescribed operating conditions to the Department. Reports shall be made within 15 days after a deviation and will include, if possible, the causes, severity and duration of the deviation, observed or reported adverse environmental impacts from the incident, pertinent data, and measures to be taken to avoid recurrences.

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The plan shall be subject to Department approval. The Department reserves the right to review and approve any material changes made to the plan.

See finding 113 and 127 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-304 & § 29A-306(b).

- D. **Trashracks.** Prior to the next replacement of the trashracks at the Project, the Applicant shall consult with the Fish and Wildlife Department with respect to the trashrack design and placement, to determine the appropriate bar clearance spacing and location. The Applicant shall file the trashrack design information with the Department of Environmental Conservation for approval prior to commencement of work.

See finding 57-63, and 119 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-306(a).

- E. **Recreational Facilities.** The Applicant shall develop within 180 days of the effective date of the FERC license, a plan and implementation schedule for recreation enhancements. The plan and schedule shall be developed in consultation with relevant stakeholders and shall be subject to approval by the Agency prior to implementation.

See finding 90, 102, 105, 134, 138, and 139 for a statement of necessity. 10 V.S.A § 5403 & 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A- 103(b)(1)(G).

- F. **Debris Disposal.** Debris associated with Project operations shall be disposed of in accordance with state laws and regulations.

See finding 107 and 140 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-303(1).

- G. **Maintenance Plan and Repair Work.** The licensee shall develop within 180 days of the effective date of the FERC license, a water level management plan for when drawdowns are needed for planned maintenance activities at the Project. The plan shall include provisions that will be taken to protect freshwater mussels from being dewatered during these activities, and will protect aquatic biota and wildlife in wetlands impacted by maintenance-related drawdowns. The plans shall be subject to review and approval by the Agency prior to being submitted to FERC. Additionally, any Project maintenance or repair work, including drawdowns below the normal operating range to facilitate repair/maintenance work, shall be filed with the Department for prior review and approval, if said work may have a material adverse effect on water quality or cause less-than-full support of an existing use or a beneficial value or use of State waters.

See finding 80, 80, 87, 88, 129 and 133 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-103(a), § 29A-306(b) and § 29A-304(b).

- H. **Compliance Inspection by Department.** The Applicant shall allow the Department to inspect the Project area at any time to monitor compliance with certification conditions.

See finding 113 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § § 29A-104(a).

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- I. **Posting of Certification.** A copy of the certification shall be prominently posed within the Project powerhouse.

See finding 113 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-104(a).

- J. **Modification of Certification.** The conditions of this certification may be altered or amended by the Department to assure compliance with the Vermont Water Quality Standards and to respond to any changes in classification of management objectives for the waters affected by the Project, when authorized by law, and, if necessary, after notice and opportunity for hearing.

See finding 113 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-104(a).

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Effective Date and Expiration of Certification

This certification shall become effective on the date of issuance, and the conditions of any certification shall become conditions of the federal permit (33 U.S.C. § 1341(d)). If the federal authority denies a permit, the certification becomes null and void. Otherwise, the certification runs for the terms of the federal license or permit.

Enforcement

Upon receipt of information that water quality standards are being violated as a consequence of the project's construction or operation or that one or more certification conditions has not been complied with, the Secretary, after consultation with the Applicant and notification of the appropriate federal permitting agency, may, after notice and opportunity for a public hearing, modify the Certification and provide a copy of such modification to the Applicant and the federal permitting agency.

Certification conditions are subject to enforcement mechanisms available to the federal agency issuing the license and to the state of Vermont. Other mechanisms under Vermont state law may also be used to correct or prevent adverse water quality impacts from construction or operation of activities for which certification has been issued.

Appeals

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. An aggrieved person shall not appeal this decision unless the person submitted to the Secretary a written comment during the applicable public comment period or an oral comment at the public meeting conducted by the Secretary. Absent a determination to the contrary, an aggrieved person may only appeal issues related to the person's comments to the Secretary as prescribed by 10 V.S.A. § 8504(d)(2). The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the Applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address for the Environmental Division is 32 Cherry Street, 2nd Floor, Suite 303; Burlington, VT 05401 (Tel. 802.951.1740).

Dated this 19th day of January 2022

Peter Walke, Commissioner
Vermont Department of Environmental Conservation

By



Digitally signed by Peter LaFlamme
DN: cn=Peter LaFlamme, o=VTDEC,
ou=Watershed Management Division,
email=pete.laflamme@vermont.gov, c=US
Date: 2022.01.19 07:54:29 -05'00'

Peter LaFlamme, Director
Watershed Management Division

VERMONT AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Bolton Falls Hydroelectric Project – Water Quality Certification

Response to Public Comments

January 19, 2022

The Agency of Natural Resources' Department of Environmental Conservation (Department) placed its tentative decision and draft water quality certification on public notice from December 3, 2021 – January 7, 2022, for the purpose of receiving written statements and data bearing on the issuance of a water quality certification to Green Mountain Power Corporation in connection with a license application before the Federal Energy Regulatory Commission for the Bolton Falls Hydroelectric Project, located on the Winooski River in Bolton and Duxbury, Vermont. The Department also conducted a public hearing on January 5, 2022, for the purpose of receiving oral testimony. The public hearing was held in person with an online option.

A total of five persons, excluding Agency staff, representing themselves or organizations attended the hearing. No person provided oral testimony on the draft certification. Written comments were received from Green Mountain Power Corporation (GMP) and Friends of the Winooski River.

The following is a summary response to the substantive comments received. Some of the comments have been paraphrased. The full text of written comments are available upon request for review at the Vermont Department of Environmental Conservation – Watershed Management Division. A copy of the recorded hearing is available upon request.

The Department notes that there may be changes to the certification related to its continuing review and not related to the public comments. Interested persons should carefully review the final decision.

Recreation

Comment 1: The Friends of the Winooski River while supportive of the requirement for the Applicant to develop a recreational management plan were concerned that the Department did not provide any specific requirements for the recreational management plan. Friends of the Winooski River requested that the Department include expectations and improvements in the recreational management plan including an implementation schedule.

Response 1: Condition E has language that the recreational plan should include an implementation schedule. The Department does not typically include specific recreational improvement measures within the condition as those are best determined through a living document as this allows for evolution of ideas and consultation with stakeholder groups to reach consensus.

Comment 2: Friends of the Winooski River noted that the certification does not include a mechanism for public involvement of the recreation management plan and requested the Department include an opportunity for public comment.

Response 2: Condition E of the certification has been modified to include language on consultation with stakeholders.

Comment 3: GMP noted that finding 105 did not include additional details on the analysis conducted by GMP that allowed the Applicant to come to the determination on the alternative parking lot area. Additionally, they provided clarification that the access road would be modified to meet U.S. Forest Service Trail Accessibility Guidelines.

Response 3: An additional finding has been added for clarification as noted by Green Mountain Power.

Water Quality Standards

Comment 4: GMP in two locations within the certification noted that in addition to locations of low dissolved oxygen also included upstream of the project impoundment and requested that be included in the list.

Response 4: Upstream of the impoundment has been added to the findings in the locations noted by Green Mountain power.

Comment 5: GMP proposed alternative language to describe the patterns of water temperature observed at the Project in two locations within the certification.

Response 5: The language proposed by GMP has been added to the certification.

Comment 6: GMP clarified that when bypass flows became stagnant during impoundment drawdowns, all water was being passed at the dam, so there was water flowing in the bypass at that time. GMP asked that language be corrected.

Response 6: GMP provided the Department with the 2018 water quality data in an excel format in early January 2019. In a response to AIR's GMP indicated that between May 29, 2018 and June 28, 2018 the impoundment was drawdown for maintenance. The water quality data showed that in early June 2018 (e.g. 6/1/18-6/2/18) the bypass did not meet the 70% saturation for dissolved oxygen, it also indicates that there was generation occurring generally between 1 -2 MW range, which indicates not all water was being passed at the dam. However, the Department recognizes that some water may have been passed at the dam, via leakage, or over the dam via spillage. With the data provided and without knowing the impoundment elevation relative to the bladder inflation height the Department is unable to have a determination as to how much flow was entering the bypass.

Aesthetics

Comment 5: GMP requested clarification on finding 142 where the Department notes that aesthetic spill offers an auditory experience in addition to aesthetics.

Response 5: Aesthetics is a designated use of the Vermont Water Quality Standards that must be met continuously. In addition to the visual nature of aesthetics, spillage also provides an auditory experience. Noting the auditory experience in the Agency's analysis has been established in case law by the Water Resources Board in the Clyde River Hydroelectric case, in addition to the

Lamoille Hydroelectric case as it is a characteristic of falling water¹. Staff additionally noted the sound on the aesthetics evaluation form, which is standard practice during aesthetic evaluations.

Condition Language

Comment 8: GMP suggests rewording Condition B to read “When generating, the Project shall *pass* 100 cfs continuously year-round in the bypass reach. When the Project is not operation, all flow shall be *released* into the bypassed reach.”

Response 8: The Department understands the intent of the proposed rewording and has altered the language to read “When generating, the Project shall spill 100 cfs continuously year-round into the bypassed reach *unless otherwise indicated in the flow management and monitoring plan (Condition C)*.”

¹ *Clyde River Hydroelectric Project*, WQ-02-08(A) and (B) (Consolidated), Amended Water Quality Certificate: Findings of Fact, Conclusions of Law and Order, (July 11, 2003). *Lamoille River Hydroelectric Project § 401 Water Quality Certificate* Docket Nos. WQ-94-03 and WQ-94-05, Findings of Fact, Conclusions of Law, and Water Quality Certificate (Nov. 5, 1996).

APPENDIX D: 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

Washington County, Vermont



Local office

New England Ecological Services Field Office

☎ (603) 223-2541

📠 (603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

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 species¹ 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 Fisheries²).

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 <i>Myotis septentrionalis</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> 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 Act¹ and the Migratory Bird Treaty Act².

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats³, should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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>

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*

Breeds Dec 1 to Aug 31

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.

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.

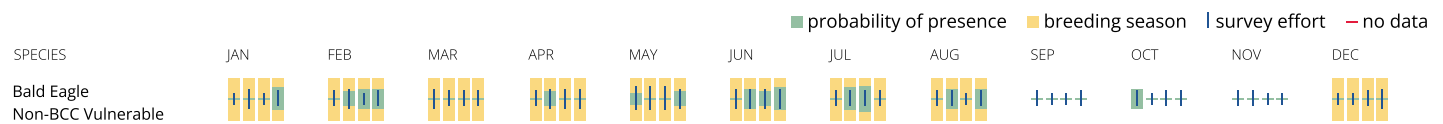
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

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 Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats³ 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 <i>Haliaeetus leucocephalus</i> 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 Dec 1 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> 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
Bobolink <i>Dolichonyx oryzivorus</i> 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 <i>Cardellina canadensis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cape May Warbler <i>Setophaga tigrina</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Jun 1 to Jul 31
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Evening Grosbeak <i>Coccothraustes vespertinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Olive-sided Flycatcher <i>Contopus cooperi</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Wood Thrush <i>Hylocichla mustelina</i> 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.
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.

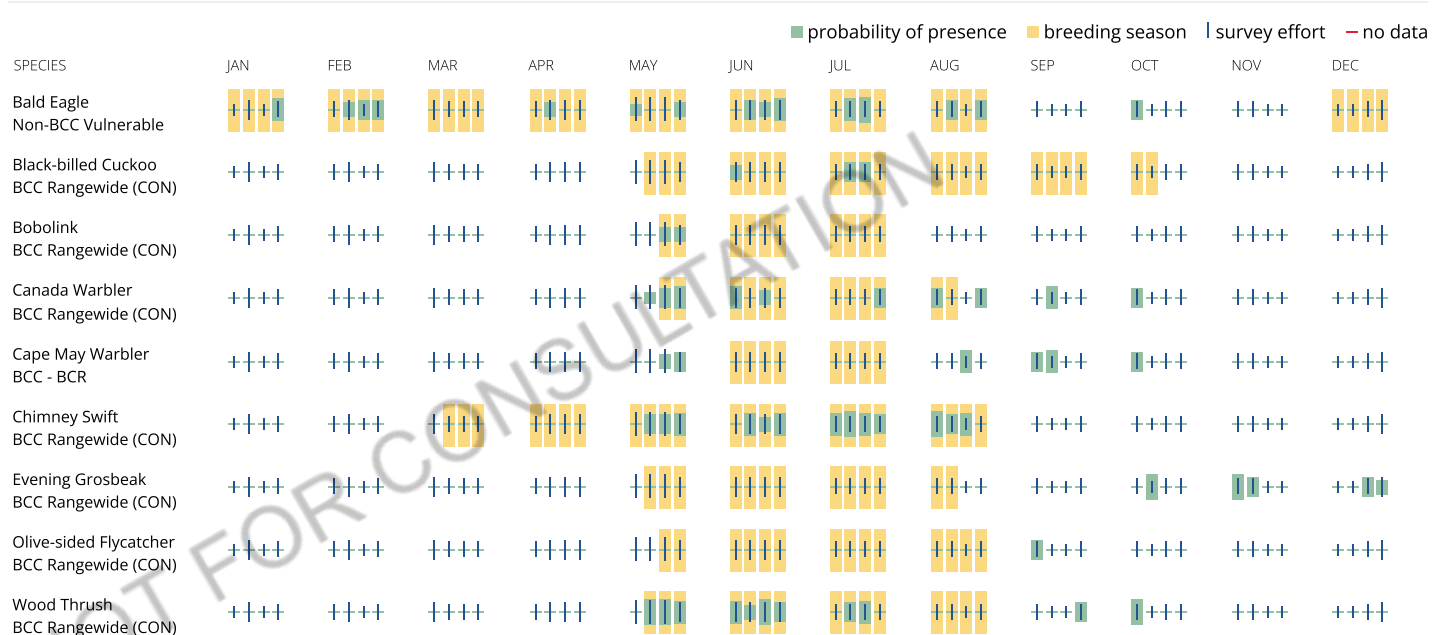
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

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.



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

[PEQ1C](#)

[PFO1A](#)

LAKE

[L1UBH](#)

RIVERINE

[R3UBH](#)

[R5UBH](#)

[R3USC](#)

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 tubercid 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.