

REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE FIFTEEN MILE FALLS HYDROELECTRIC FACILITY, LIHI #39

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May 19, 2022, updated July 21, 2022

I. INTRODUCTION

This report summarizes the review findings of the recertification application submitted by Great River Hydro LLC, (GRH) to the Low Impact Hydropower Institute (LIHI), for the Fifteen Mile Falls Hydropower Project (FMF or the Project). The Project holds a Major License, P-2077, from the Federal Energy Regulatory Commission (FERC). The Fifteen Mile Falls Project, LIHI #39, is located on the upper Connecticut River in New Hampshire and Vermont. The Project consists of three developments: Moore, Comerford, and McIndoes¹ (see Figure 1). It currently has a total installed capacity of 333.16 MW. An additional minimum flow unit is planned at the Moore Development which would bring this total to 337.86 MW. On May 15, 2016 LIHI was notified that TransCanada Hydro Northeast Inc. was converted to a limited liability company on April 7, 2017, becoming TransCanada Hydro Northeast LLC. On April 19, 2017, the company was sold, and the name was changed from TransCanada Hydro Northeast LLC to Great River Hydro, LLC.

The 15-Mile Falls Hydroelectric Project was first certified as low impact for a five-year term, on June 25, 2009, effective December 15, 2008 and expiring December 15, 2013. On July 10, 2015 the Fifteen Mile Falls Project was recertified as low impact for a five-year term effective December 15, 2013 and expiring December 15, 2018. On January 24, 2017 an additional three years was added to the certification term bringing the expiration date to December 14, 2021 which was extended to April 30, 2022 and again to June 30, 2022. The additional years were added after Condition 3 of the certification was satisfied. The past reviewer's reports can be found on the LIHI website.

¹ McIndoes Development is also referred to as the McIndoe Development.



Figure 1 - Overview of Fifteen Mile Falls Project Location

The Project's 2015 certification had three conditions listed below, along with a brief discussion of their status. See the applicable criterion assessments for more detailed discussion of these conditions and their status.

Condition 1: Pertaining to the trap and truck operation for downstream passage of Atlantic salmon smolts stocked upstream of the Moore Dam, the facility owner shall remain in full compliance with its FERC license and the associated Settlement Agreement (SA) and Water Quality Certificate. If the licensee requests to amend the FERC license or the WQC, or reopen the SA, with regard to use of this operation, the facility owner shall notify LIHI within seven days, including a description of the proposed changes and schedules for pursuing them. LIHI shall also be provided a copy of any amendments, along with resource agency comments, to confirm continued compliance with LIHI's criterion.

Satisfied - In 2016, license Articles 409, 410, and 413 related to the trap and truck operation and effectiveness monitoring described in Condition 1, were suspended by FERC (discussed under Upstream Fish Passage). The requirements under this condition were submitted via letter to LIHI dated January 28, 2016 and was found to be satisfied by LIHI in 2016 given FERC decision with agency concurrence to suspend license Articles 409, 410 and 413.

Condition 2: As part of the required annual Compliance Statement to LIHI, the facility owner shall identify any violations of FERC operating requirements and will include copies of all agency and FERC notifications and reports of deviations of said operating requirements that have occurred in the previous year. This report shall be submitted by March 31 for the previous year's events. This report shall reference and include copies of all notifications made to the FERC during the previous year. Unless otherwise included in the FERC notifications themselves, the report to LIHI shall describe for each instance:

1. The cause of the event/deviation;
2. The date, duration and magnitude of the deviation;
3. Confirmation that the required 24-hour notices have been made to NHDES and VDEC of such events (list the date of and to whom all notifications were sent);
4. Ways to minimize future repeat occurrences to the extent possible by the licensee;
5. Any proposed mitigation measures and a schedule by which such measures will be implemented; and
6. Status or confirmation that the previously developed mitigation measures (for the previous year) have been implemented according to the proposed schedule.

The owner shall maintain a proactive approach to reducing the frequency and severity of such deviations to the extent reasonably possible. LIHI shall be informed of the capital improvement Projects that are underway and planned for the future to minimize the occurrence of deviations or plant outages. The annual compliance report to LIHI will be used as confirmation that the facility owner is conducting the necessary actions to minimize such events and ensure compliance with LIHI's flow and water quality criteria.

Remains Open – Review of the Annual Compliance Reports showed compliance with the reporting

of deviations to LIHI and that GRH has been implementing appropriate measures to reduce the occurrence of deviations and/or plant shut-downs. Such actions are described in the reports submitted by GRH to FERC when deviations are reported. See Ecological Flow Regime criterion.

Condition 3: The facility owner shall provide LIHI with a description of the current status and use of funds from the Mitigation and Enhancement Fund that was part of the Settlement Agreement for the most recent FERC licensing. In particular, this description shall identify the lands and waters that are benefiting from the funds, the current fund balance, and continuing payment schedule, and be sufficient to determine if these funds are achieving the ecological and recreational equivalent of land protection of the buffer zone referred to in Question D.1. This information will be used by LIHI staff to determine if the Fifteen Mile Falls certification qualifies for three additional years in its term. The facility owner may or may not take advantage of this opportunity to request an extended term of their new certificate; if they do not provide this additional information, it will not affect the new five-year term.

Condition was satisfied in 2018, with an extended term granted via a LIHI letter dated January 23, 2018. See Shoreline and Watershed Protection criterion.

II. RECERTIFICATION PROCESS AND MATERIAL CHANGE REVIEW

Under the 2nd Edition LIHI Handbook, recertification reviews are a two-phase process starting with a limited review of a completed LIHI application, focused on three questions:

- (1) Is there any missing information from the application?
- (2) Has there been a material change in the operation of the certified facility since the previous certificate term?
- (3) Has there been a change in LIHI criteria since the Certificate was issued?

In accordance with the Recertification Standards, all Projects currently applying for renewal must go through a full review unless their most recent certification was completed using the 2nd Edition Handbook. FMF's last review was done under the 1st Edition Handbook, thus, this Stage II full report was required for the Fifteen Mile Falls Project.

A review of the initial application, submitted on December 3, 2021, resulted in a Stage I Report on an expedited schedule requested by the Applicant, and dated December 8, 2021. The Stage I report noted that data was missing for a number of criteria that was required to complete a full review, and two operational material changes have occurred since the last certification.

A revised application was submitted to LIHI in January 2022. This updated LIHI application provided clear descriptions of this very complex Project, comprehensive discussion of activities and issues important to demonstrating compliance with each criterion, and all-inclusive linking of supporting documents. "Material changes" identified in the updated application included:

1. Generator rewinds and Phase 2 runner replacements at Comerford Units 2, 3, and 4 with resultant 0.57% improved efficiency of the three-development Project. In an Order dated June 20, 2013, FERC certified the incremental hydropower generation for a production

- tax credit.
2. Upgrades to the McIndoes switch yard/transformer yard completed in 2017.
 3. Conveyance of an easement to New England Power Company, dba National Grid, for the purpose of modifying the existing non-Project switching station at the Comerford Development. A new switchyard would be constructed next to the existing switchyard and the existing switchyard would be restored to grass.
 4. Amendment of the Plan for the Long-Term Monitoring of Mercury in Fish Tissue at Moore and Comerford Reservoirs which reduces the number of species and individuals that must be collected for mercury testing. This was approved by FERC on February 9, 2016.
 5. Suspension of downstream passage and monitoring requirements under Articles 409, 410 and 413 at all three facilities via a FERC Order issued May 2, 2016.

Review of documents associated with the above changes indicated that none of these significantly affected satisfaction of the LIHI criteria. The two switchyard projects are briefly discussed under Cultural Resource Protection. Details of the last two items are discussed under Water Quality Protection and Downstream Fish Passage Protection, respectively.

A sixth material change, the planned installation of a minimum flow unit (4.7 MW) at the Moore Development required more detailed review, but is included in this overall assessment. The non-capacity license amendment application was filed by GRH on January 21, 2020. Comments on the draft amendment were received from New Hampshire Department of Environmental Services (NHDES), Vermont Department of Environmental Conservation's (VDEC), Agency of Natural Resources (VANR), Vermont State Historic Preservation Office (VT SHPO) and US Fish and Wildlife Service (USFWS) and incorporated into the final application. In letters dated August 27, 2021 and August 31, 2021, the VDEC and NHDES, respectively, waived Section 401 water quality certification authority. All three documents are linked to GRH's LIHI application. An Environmental Assessment was issued by FERC on January 28, 2022² concurrent with their order to approve the new unit via a license amendment.³ This Order notes that no comments or motions to intervene were received on the license amendment application. The LIHI application notes that construction and operation are expected in 2022. Details of this planned Project are described under the Project and Immediate Site Characteristics section of this report. Potential effects on criteria satisfaction, based on the amendment application and Environmental Assessment, are discussed under each criterion. Construction of this unit began on February 14, 2022.

On May 10, 2022 the Applicant submitted additional information addressing several questions identified during this review including two relicensing aquatic habitat studies discussed in Section VIII below which are posted on the LIHI website. The remainder of the response is included in Appendix A. This Stage II assessment reviewed the application package, public records in FERC's eLibrary since 2013, LIHI compliance statements, follow-up communication with the Applicant and stakeholder comments. Because the initial application was submitted in December 2021, the full Project review was conducted using the 2nd Edition Handbook rev 2.04, dated April 1, 2020.

² Environmental Assessment <https://elibrary.ferc.gov/eLibrary/filedownload?fileid=7f54a0e0-9d29-c693-960b-7ea0f7100000>

³ FERC license Order <https://elibrary.ferc.gov/eLibrary/filedownload?fileid=34e6873f-9ea3-c996-8836-7ea132300000>

III. PROJECT'S GEOGRAPHIC LOCATION

The Connecticut River originates at the mouth of the Fourth Connecticut Lake in Pittsburg, New Hampshire near the Canadian border at an elevation of 2,670 feet above mean sea level (msl), then widens as it delineates 255 miles of the border between New Hampshire and Vermont making its way southward a total of 410 miles to its mouth on Long Island Sound. The majority of the Connecticut River bordering Vermont and New Hampshire conforms to the regional topography and flows roughly north-south. Slicing against, rather than with regional topography apparently led to the development of a deep, narrow, pre-glacial gorge, carved through bedrock, known as Fifteen Mile Falls. The Fifteen Mile Falls Project spans a 26-mile reach of the upper Connecticut River, including three reservoirs and about a 1.5-mile riverine reach between the Comerford and McIndoes reservoirs, as shown on Figure 1. FMF is located in the towns of Littleton and Monroe, in Grafton County New Hampshire, and the towns of Waterford and Barnet, in Essex and Caledonia counties Vermont.

As shown on Figure 1, there are numerous dams above and below FMF. Dams on the Connecticut River (from upstream to downstream), including the three developments of FMF (noted in bold) are shown below. GRH noted that none of the upstream dams have downstream fish passage. All downstream dams have upstream passage except at Dodge Falls, owned by Dodge Falls Associates.

- 2nd CT Lake, GRH, RM 390
- 1st CT Lake, GRH, RM 382
- Murphy, Lake Francis NHDES, RM 374
- Canaan, CRP NH Canaan LLC, P-7528, RM 363
- Gilman, Ampersand Energy Partners, P-2392, RM 295
- **Moore, GRH, P-2077, RM 283**
- **Comerford, GRH, P- 2077, RM 275**
- **McIndoes, GRH, P-2077, RM 268**
- Dodge Falls, Dodge Falls Associates (Essex Hydro), Exempt, RM 264.7
- Wilder, GRH, P-1892, RM 212
- Bellows Falls, GRH, P-1855, RM 174
- Vernon, GRH, P-1904, RM 142
- Turners Falls, FirstLight, P-1889, RM 122⁴
- Hadley Falls, City of Holyoke, P-2004, RM 87

Other LIHI certified Projects on the river include:

- Canaan, LIHI # 60, Certificate expiration 5/1/2029
- Gilman, LIHI #108, Certificate expiration 12/3/2027
- Dodge Falls, LIHI #42, Certificate expiration 05/31/2029
- Vernon, LIHI #40, Certificate expiration 12/31/2022
- Hadley Falls is part of the Holyoke Project, LIHI #89, Certificate expiration 1/2/2030

⁴ Another Turners Falls project owned by Turners Falls Hydro LLC (Eagle Creek), P-2622, is located between the Connecticut River and the power canal for FirstLight's Turners Falls project.

The Vernon certification was extended from 2018 to December 31, 2022 in order to allow for LIHI to address the unique situation of a recertification taking place at a time within a FERC relicensing when studies have been completed but no agency recommendations are yet available.

IV. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Project has a current total installed capacity of 333.16 MW. All dam and generation operations of FMF are controlled remotely from the Renewable Operations Center in Wilder, Vermont. The following summarizes each Development and the proposed Moore Unit #5. The application includes photographs in addition to those here. A copy of a spreadsheet containing LIHI application required data for the Project is linked below.⁵ The average annual generation values shown below are 2010-2019 values. The following descriptions are from the LIHI application.

Moore Development

The existing Moore Development is located at River Mile (RM) 283 and consists of: (1) an 11-mile-long reservoir with a surface area of 3,490 acres and 223,722 acre-feet of gross storage at a normal maximum operating level of 815 feet msl; (2) an earth and concrete gravity dam with an overall length of 2,920 feet and a height of 178 feet; (3) a 373-foot-long concrete spillway with a 15-foot-wide by 20-foot-high sluice gate, four 50-foot bays of 17-foot-high stanchions, and three bays of 36 foot-wide by 30-foot-high Tainter gates; (4) four steel penstocks each 296 feet long; and (5) a primary powerhouse with four Francis type turbine-generator units. Under a design head of 150 feet, turbine units 1-4 are each rated at 56,400 horsepower, equal to 42,300 kW. The combined rated discharge of the four units is 13,330 cfs. Unit 1 and 4 generators are rated at 39,000 kilovolt ampere (kVA) and a 0.9 power factor, yielding rated capacities of 35.1 MW. Unit 2 and 3 generators were recently rewound and are now rated at 53,000 kVA and a 0.9 power factor, yielding rated capacities of 47.7 MW. The authorized capacity, considering the lesser of the nameplate ratings of the four turbines and generators, is 154.8 megawatts (MW).

⁵ <https://lowimpacthydro.org/wp-content/uploads/2022/01/3-PUBLIC-FMF-Revised-Table-2-Facility-Information.xlsx>



Figure 2 – Moore Development

Based on the FERC Order approving it, installation of the new 4.7 MW Francis type turbine-generator Unit #5, involves the following structural modifications: (1) a new modified intake with a submerged trashrack and headgate providing flow to a new 335-foot-long penstock that would be installed on the upstream face of the dam in the original intake location adjacent to the existing Unit 1 intake; (2) a new 7-foot-diameter steel pipe that would exit the downstream face of the dam on the Vermont side of the existing transmission substation; (3) a new 42-foot by 30-foot reinforced concrete powerhouse constructed adjacent and connected to the Vermont side of the existing powerhouse; (4) a new dissolved oxygen (DO) enhancement system consisting of a pipe with aeration devices that discharges water into the new powerhouse tailrace, and; (5) a new tailrace channel that would extend into the existing tailrace bound by concrete or sheet pile retaining walls on either side. With the proposed modifications, the maximum hydraulic discharge capacity would increase by 420 cfs, from 13,300 cfs to 13,720 cfs, and the authorized installed capacity of the Moore Development would increase from the current 154.8 MW to 159.5 MW. The licensee does not propose any changes to the Project's existing operation regime, except for operating Moore Unit 5 as the priority unit to pass the required minimum flow.

Comerford Development

The Comerford Development is located at RM 275 and consists of: (1) a 7-mile-long reservoir with a surface area of 1,093 acres and 32,270 acre-feet of gross storage at a normal maximum operating level of 650 feet msl; (2) an earth and concrete gravity dam with an overall length of 2,253 feet and a height of 170 feet; (3) an 850-foot-long concrete spillway with six 7-foot-wide by 9-foot-high sluice gates, four bays of 8-foot-high flashboards and seven 10-foot-high stanchion bays; (4) four steel penstocks each 150 feet long; and (5) a powerhouse with four Francis type turbine-generator units. Unit 1 turbine is rated at 22.0 MW under a design head of 172 feet and Units 2-4 each are rated at 49.6 MW under a design head of 172 feet. The combined rated discharge of the four units is 12,990 cfs. Unit 1 generator is rated at 39,000 kVA and a 0.9 power factor, yielding rated capacities of 35.1 MW. Unit 2-4 generators, having been recently rewound, are rated

at 54,000 kVA and a 0.9 power factor, yielding rated capacities of 48.6 MW. The overall rated plant generator capacity is 180.9 MW. Maximum station output at full load is 162,960 kW under a net head of 174 feet and combined turbine discharge of 13,300 cfs.



Figure 3 – Comerford Development

McIndoes Development

The McIndoes Development is located at RM 268 and consists of: (1) a 5-mile-long reservoir with a surface area of 465 acres and 4,500 acre-feet of gross storage at a normal maximum operating level of 451 feet msl; (2) a concrete gravity dam with an overall length of 730 feet and a height of 25 feet; (3) a 520-foot-long concrete spillway with a 12-foot-wide by 13-foot high skimmer gate, three 24-foot-wide by 25-foot-high Tainter gates, a 300-foot-long spillway flashboard section with 3-foot-high flashboards, and two 50-foot-wide by 14-foot-high stanchion bays; and (4) a powerhouse with four Kaplan type turbine-generator units. The turbines have a combined power rating of 2.85 MW each under a design head of 29 feet. The combined rated discharge of the four units is 5,800 cfs. Each generator is rated at 2.64 MW, yielding an overall rated capacity for the station of 10.56 MW. Maximum output at full load is 11,000 kW, under a net head of 23 feet and a maximum turbine discharge of 6,180 cfs.



Figure 4 – McIndoes Development

V. ZONES OF EFFECT AND STANDARDS SELECTED

Six Zones of Effect (ZOE) were designated by the Applicant, although the reviewer in the Stage 1 report suggested that Comerford and McIndoes appeared to each have a bypass reach based on aerial photographs included in the initial application. GRH subsequently provided documents with the final LIHI application, including historical photographs that showed these two “bypass reaches” were in fact never part of the Connecticut River. This finding was also supported by the fact that during licensing, no agency ever requested an evaluation of available habitat or consideration of flow requirements in either of these areas and neither have been identified as bypasses in any agency document. Because the Comerford impoundment backs up to the Moore dam, with no riverine reach between, the two reaches are combined in one Zone of Effect.

- Zone 1 – Moore impoundment – from RM 294 to the Moore Dam (RM 283).
- Zone 2 – Moore tailrace and Comerford impoundment – from Moore Dam to Comerford Dam (RM 275).
- Zone 3 – Comerford tailrace – approximately 1,200 ft below the Comerford Dam.
- Zone 4 – Comerford downstream reach – from the Comerford tailrace (approximately RM 275) to the McIndoes impoundment (RM 273).
- Zone 5 – McIndoes impoundment – from RM 273 to the McIndoes Dam (RM 268).
- Zone 6 – McIndoes tailrace – approximately 1,200 ft below the McIndoes dam.

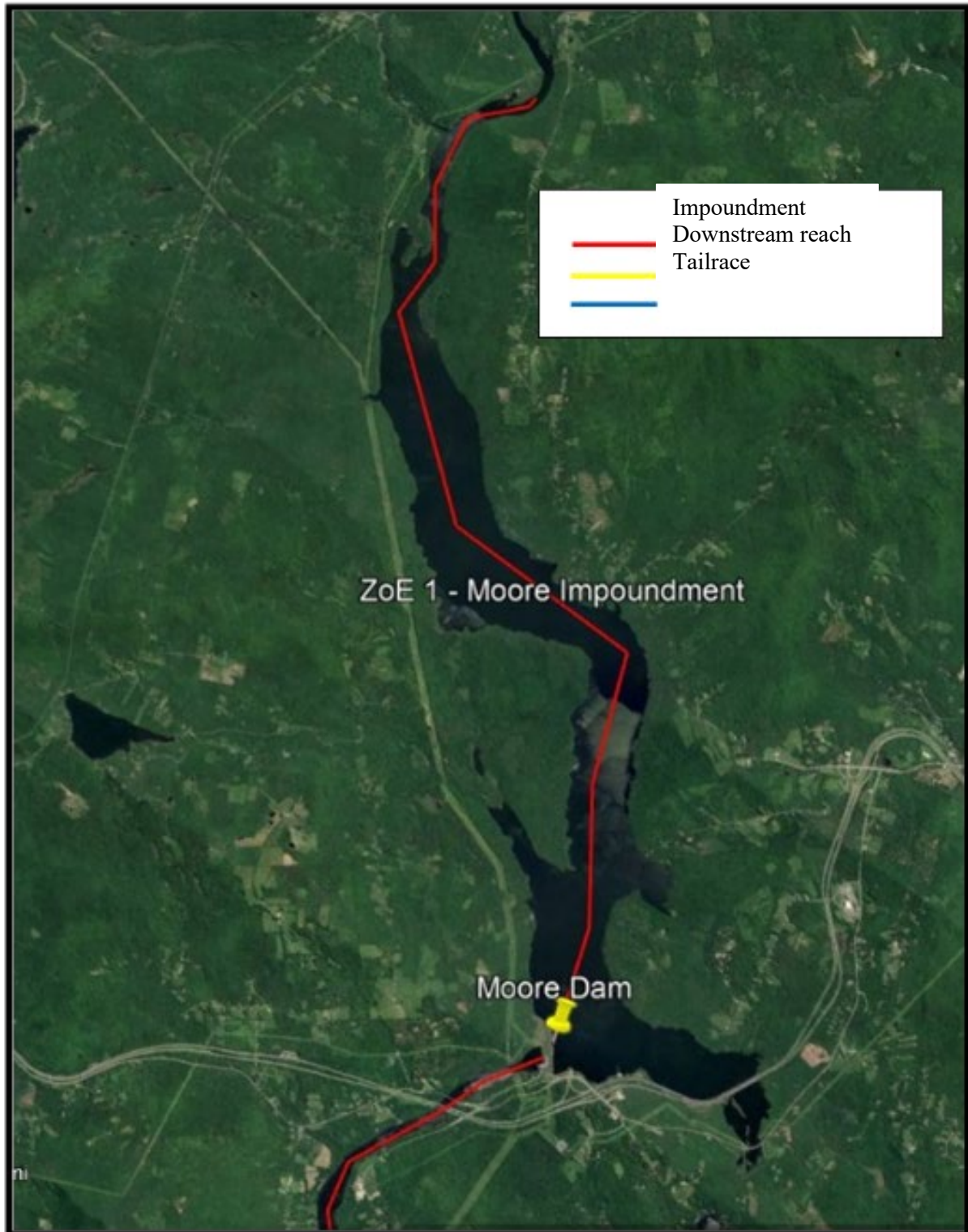


Figure 5 – Moore Development ZOE

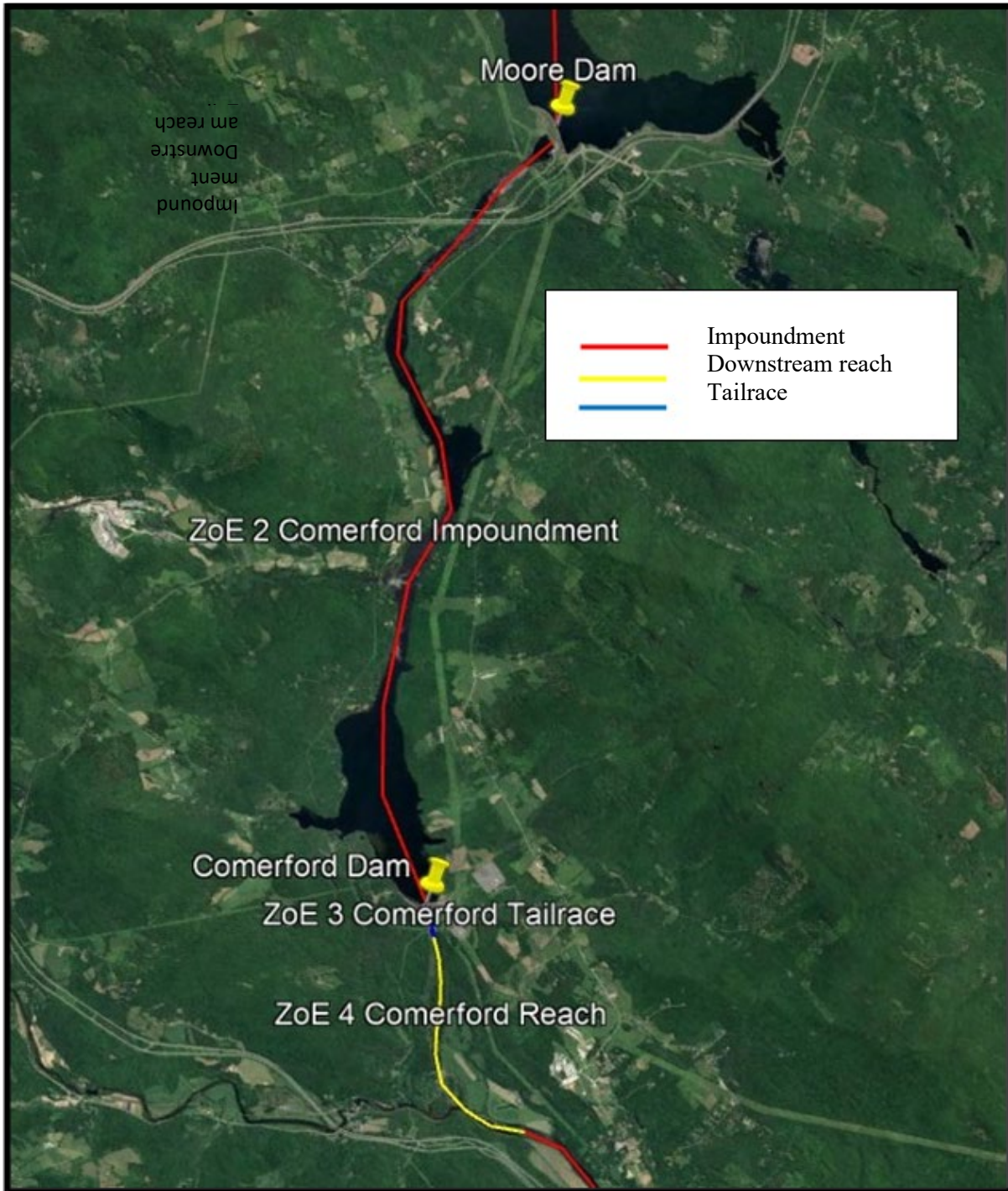


Figure 6 – Comerford Development ZOE

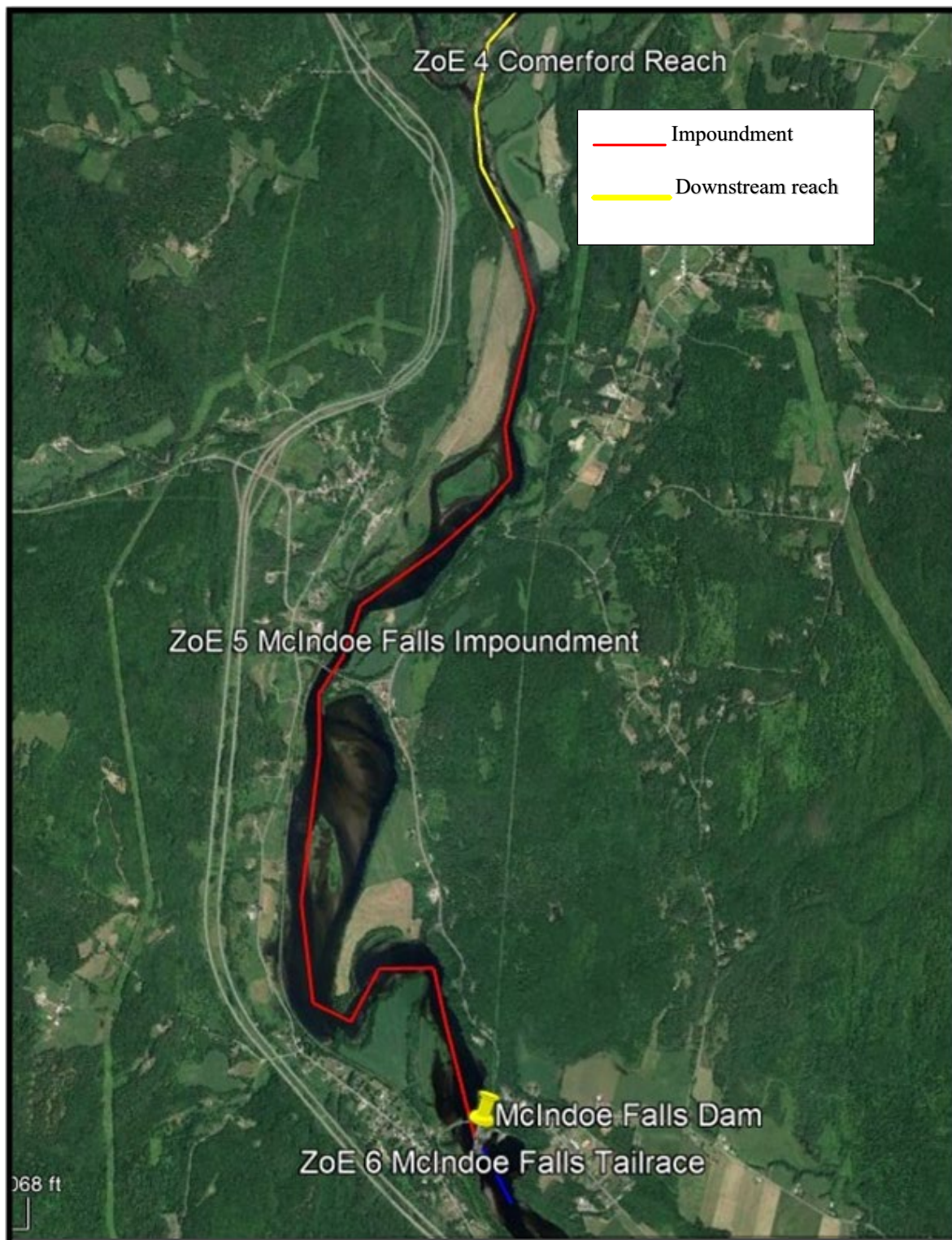


Figure 7 Comerford Tailrace and McIndoes Development ZOEs

The Standards identified in the final application for each ZOE are shown on the table below. Details of compliance with the criteria are presented in Section VIII.

| Zone No., Zone Name, and Standard Selected (including PLUS if selected) | Criterion | | | | | | | |
|---|---------------------|------------------|-----------------------------|----------------------------|--|---|---|---------------------------|
| | A | B | C | D | E | F | G | H |
| | Ecological Flows | Water Quality | Upstream Fish Passage | Downstream Fish Passage | Shoreline and Watershed Protection | Threatened and Endangered Species | Cultural and Historic Resources Protection | Recreational Resources |
| 1: Moore impoundment | 1 | 2 | 1 | 2 | 2+ | 2 (4) | 2 | 2 |
| 2: Moore tailrace and Comerford impoundment | 2 | 2+ | 4, (2) | 2 | 2+ | 2 (4) | 2 | 2 |
| 3: Comerford tailrace | 2 | 2 | 4, (2) | 1 | 2+ | 2 (4) | 2 | 2 |
| 4: Comerford downstream reach | 2 | 2 | 1 | 1 | 2+ | 2 (4) | 2 | 2 |
| 5: McIndoes impoundment | 1 | 2 | 1 | 2 | 2+ | 2 (4) | 2 | 2 |
| 6: McIndoes tailrace | 2 | 2 | 4, (2) | 1 | 2+ | 2 (4) | 2 | 2 |

I believe that **Standard C-2, Agency Recommendation** is more appropriate for Upstream Fish Passage in the tailraces zones and **Standard F-4, Acceptable Mitigation** (shown in red in the table) is more appropriate for Threatened and Endangered Species as discussed in more detail under those criteria.

VI. REGULATORY AND COMPLIANCE STATUS

FERC License

As noted in the original 2009 LIHI certification report, FMF was relicensed by FERC via a major license (P-2077) issued on April 8, 2002⁶ with an expiration date of April 8, 2042. The current license includes terms and conditions stipulated in the Settlement Agreement (SA) filed with the license application on July 29, 1999⁷. The Settlement Agreement addresses issues pertaining to Project operations, reservoir levels, minimum flows, fish and wildlife protection and enhancement measures, and land protection. The process of reaching this agreement included examination of the power and non-power tradeoffs and effects of a variety of operational scenarios. This negotiation process, after careful consideration of alternatives, resulted in a balancing of power and non-power interests associated with the Project. The signatories were the Project's owner at the time, New England Power Company, and the following stakeholders:

- The State of New Hampshire
- The State of Vermont
- New Hampshire Fish and Game Department (NHFG)
- New Hampshire Department of Environmental Services (NHDES)
- Vermont Agency of Natural Resources (VANR)
- United States Fish and Wildlife Service (USFWS)
- United States Environmental Protection Agency (EPA)
- National Park Service (NPS)
- Appalachian Mountain Club
- Connecticut River Joint Commissions
- Connecticut River Watershed Council (now known as Connecticut River Conservancy)
- North Country Council
- New Hampshire Rivers Council
- Northeastern Vermont Development Association
- New Hampshire Council of Trout Unlimited

Parties concurring with and endorsing the SA included Trout Unlimited Vermont and the Conservation Law Foundation.

Key requirements of the SA applicable to LIHI certification include:

- Flows and Reservoir Levels: Water management protection, mitigation, and enhancement measures, including changes to operational modes, and minimum flow releases for the three developments.
- Direct Donation of Conservation Easements: Dedication by the licensee of easements on 4,000 acres of Project land and 4,200 acres of non-Project land to protect the scenic, forestry, and natural resources values of the lands. (The FERC license requires dedication only of the acreage on Project land.)
- Mitigation and Enhancement Fund: Establishment of an Upper Connecticut River Mitigation and Enhancement Fund (MEF) to address impacts of the Project, financed from Project revenues capped at \$15 million, and available to fund river and wetland restoration,

⁶ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20020409-0276&optimized=false

⁷ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19990730-0868&optimized=false

protection, and enhancement; acquisition of conservation easements; and mitigation of tax revenue impacts to communities. (The FERC license establishes the fund but limits its enforcement to activities directly tied to Project impacts.) Note that this fund, which allocates grants, is separate from a pool of money set aside for studies and management plans (see following).

- **Management Plans and Study Fund:** Studies and/or the development of management plans related to fisheries mitigation, water quality, wildlife management, rare and unusual plant communities, threatened and endangered animal and plant species or communities, recreation, and cultural resources. Under the Settlement Agreement the licensee set aside a total of \$3 million for a “Study Fund” to underwrite the costs of conducting pre- and post-licensing studies, developing plans, and implementation (except for fish passage implementation).

A separate agreement dated July 26, 2000⁸ clarified aspects of the original Settlement Agreement Article VI related to expenditures for studies, plans and mitigation measures including up to \$500,000 allocated for mercury mitigation. Two supplemental agreements were also reached – the Connecticut Lakes Supplementary Agreement and the Lake Francis Memorandum of Agreement dated August 14, 1997.⁹ Both agreements served to “increase flows from the Connecticut Lakes and Lake Francis to augment downstream flows and improve conditions for aquatic life” (FERC EA, p. 9¹⁰).

A copy of the SA, FERC license, amendments (since 2012) and Water Quality Certifications (WQC) and amendments referenced below are contained or linked in the LIHI application. The only exception is the Order dated January 28, 2022, which was issued after application submission, and is linked in this report.

Since last certified by LIHI, the license was amended twice:

- December 13, 2017 – denoting the capacity changes resulting from Phase 2 runner replacements and generator rewinds at Comerford Units 2, 3, and 4.
- January 28, 2022 - approval of the installation of Unit 5 at the Moore Development.¹¹

Other key FERC Orders issued that address LIHI criteria are:

- February 9, 2016 – FERC approved an Amendment of the Plan for the Long-Term Monitoring of Mercury in Fish Tissue at Moore and Comerford Reservoirs.
- May 2, 2016 – FERC approved suspension of downstream passage and monitoring requirements at all three developments.

Water Quality Certification

A Water Quality Certification (WQC) was issued on April 16, 2001 by NHDES¹². Conditions of this WQC were adopted into the license. On July 13, 2001, VANR waived its WQC. The LIHI

⁸ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20011217-0059&optimized=false

⁹ Neither of these agreements were found on the FERC e-Library but were provided to LIHI by GRH.

¹⁰ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20011120-0207&optimized=false

¹¹ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220128-3021&optimized=false

¹² https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20010425-0290&optimized=false

application noted that in their letter Vermont concurred with the conclusions and conditions of the New Hampshire certificate stating: “Vermont and New Hampshire jointly reviewed the Project with an understanding that a single certification would be issued by the State of New Hampshire with conditions sufficient to assure that the Project would conform to the water quality standards of both states.” “Vermont supports the certification and affirms that the conditions of the certification are sufficient to provide reasonable assurance that the Project will not cause a violation of Vermont Water Quality Standards and will comply with other appropriate requirements of Vermont law.”

On August 31, 2021, NHDES waived the need for an amended or new WQC regarding installation of the new Moore Unit #5, stating that neither are necessary provided NHDES has assurance from GRH that the Moore Minimum Flow Project will be constructed and operated in accordance with the WQC certification request, and that the August 26, 2021 Moore Development Dissolved Oxygen Monitoring Plan, approved by NHDES on August 27, 2021, will be implemented. On August 30, 2021, GRH and NHDES signed an agreement that provided the requested assurance.

A number of deviations from FERC license requirements associated with flows were identified in the application from January 2014 thru January 2022 when the application was filed. Review of the FERC eLibrary from 2014 through May 13, 2022 did not identify any additional ones. Only one minimum flow deviation at McIndoes was found to be a license violation. A summary of these issues is discussed under Ecological Flow Regime. No other license compliance issues were found.

VII. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The deadline for submission of comments on the LIHI recertification application was March 22, 2022. The following stakeholders issued comments which are linked on LIHI’s website.¹³

- Vermont Department of Environmental Conservation (VDEC)
- Connecticut River Conservancy (CRC)
- Riverbend Local River Subcommittee of the Connecticut River Joint Commissions (CRJC)

The table below lists the issues they identified which I believe are relative to LIHI review and are discussed under the applicable criteria. The letters also included other comments, which may be meaningful suggestions that could provide resource or data value. However, I believe these are unrelated to my review for criteria satisfaction, and therefore are not addressed in this report.

| Issue | Criterion | Stakeholders | | |
|---|-----------|--------------|-----|------|
| | | VDEC | CRC | CRJC |
| Negotiated minimum flows during drought not science based | A | X | | |
| Minimum flows are not science based | A | | X | |
| Concerns over high levels of methyl mercury found in Comerford and Moore reservoirs | B | X | X | X |
| Outstanding resolution of Moore 2009 and Comerford 2013 DO issues | B | X | X | |
| Proposed Moore Unit #5 DO Enhancement System does | B | X | X | |

¹³ <https://lowimpacthydro.org/lihi-certificate-39-fifteen-mile-falls-project-vermont-and-new-hampshire/>

| Issue | Criterion | Stakeholders | | |
|--|-----------|--------------|-----|------|
| | | VDEC | CRC | CRJC |
| not meet PLUS standard | | | | |
| Presence/absence of American eel must be investigated | C | | X | |
| No confirmation of Land Management Plan conformance and forestry procedures may not address current state Best Management Practices | E | X | X | |
| MEF should not meet PLUS standard since funding has stopped | E | X | X | |
| Agency documentation of “no impact” to listed species not provided. (lynx, bat and mussels) | F | | X | |
| Avoid tree removal during April 1 and October 31 to avoid any roost disruption of the Northern long-eared bat. | F | X | | |
| New surveys should be conducted for the federally endangered dwarf wedgemussel | F | X | X | |
| Confirmation that Recreational Plan commitments have been built, maintained and adequacy assessed. | H | | X | X |
| Provide signage for invasive species and fish consumption advisories and enhancements to improve public knowledge of the recreational facilities | H | | | X |
| Increase public knowledge of recreational assets and add new ones. | H | | X | X |

It is important to note that many of the concerns raised by the stakeholders address what they suggest are not indicative of “low impact”. LIHI’s criteria and standards were designed with significant stakeholder input, expressly to meet the criteria and support the criteria goals of what would constitute “low impact”. It is my interpretation of the LIHI Handbook, that by complying with the existing and still current agency recommendations (i.e., WQC and license requirements), and complying with the LIHI Handbook “science-based or technical basis” requirements, that a Project satisfies LIHI’s requirements for “low impact” certification, despite the fact that there may be some real or perceived impact. That is, LIHI’s certification only requires a Project to be “low impact”, not “no impact”. The VDEC did not issue a WQC but instead a single one was issued by NH DEC representing requirements for both states. Also, the WQC has a re-opener clause that would allow the respective agencies to request a re-opening of the FERC license if it was found that license or permit modifications are required to ensure compliance with the specific state water quality standards. The NH WQC includes requirements that affect multiple criteria, including flows, water quality and fish passage. If either state felt existing requirements are no longer appropriate, they could issue such a request. To date, no such request has been made. As recently as August 31, 2021, NHDES with endorsement of VDEC, waived the need to modify or re-issue a new WQC during their review of the addition of the new Unit #5 at the Moore Development.

VIII. DETAILED CRITERIA REVIEW

A. ECOLOGICAL FLOW REGIMES

Goal: The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

Assessment of Criterion Passage

The Applicant selected **A-1 Not Applicable/De Minimis Effect** for the Comerford and Moore impoundments, as allowed for by the LIHI Handbook and **A-2 – Agency Recommendation** for the McIndoes impoundment and all downstream reaches. However, as the impoundments do have agency water-management requirements, compliance with these are briefly discussed below. There have been no changes in flow related requirements since last certified by LIHI.

Operation

Both the Moore and Comerford Developments are seasonal storage developments generally operated in a daily peaking mode for generation purposes as well as providing water for downstream minimum flow requirements at the downstream McIndoes Development. The Comerford Development is essentially passing discharge from the Moore station with the exception of storing a portion of inflow from Moore to provide hourly minimum flows. The reservoirs are drawn down in the winter prior to the spring freshet to capture local spring runoff and any extra flow passed as spill from Moore into the Comerford impoundment. The McIndoes Development operates on a daily cycle and is used primarily to smooth the discharge from the entire Project by discharging at a more constant rate throughout each day than the two upstream Developments. This entails daily cycling of the headpond. The minimum elevation at the beginning of each day is determined by scheduled generation at Comerford upstream and predicted inflow. This determines the McIndoes generation schedule to build the headpond throughout the day and draw it back down over night. No changes are proposed to this operating regime at the Moore Development with installation of the new minimum flow unit, except that the new unit will be the priority unit to provide minimum flow.

The Project operates in compliance with flow conditions and reservoir elevations for fish and wildlife protection, mitigation and enhancement for reaches below all tailraces and the Comerford downstream reach. Flows and reservoir elevations are monitored continuously. Hourly flow and elevation data for each month at each Project development are reported annually to FERC and the resource agencies. Management of flows is described in the Fifteen Mile Falls Reservoir and Minimum Flow Operations and Monitoring Plan (“Ops Plan”) filed [March 7, 2002](#), approved [July 24, 2003](#). The Ops Plan was prepared in consultation with NHDES, NHFG, USFWS, and VDEC. The purpose of the plan is to address how storage at the Project will be used to provide required seasonal minimum flows and protect littoral spawning habitat and submerged aquatic vegetation at the Project developments, while minimizing the effects on the environment and public use. The Ops Plan addresses applicable reservoir storage requirements, guaranteed minimum flows and a schedule of implementation addressing agency input, monitoring protocols and reporting requirements.

Water Management at the Impoundments

Standard A-1 was selected for the Moore (ZOE #1) and McIndoes (ZOE #5) impoundments as permitted by the LIHI Handbook, although there are reservoir elevation limits established in the SA and adopted into the FERC license. Discussion of the assessments used to determine these limits is included in the discussion below under Tailrace/Downstream Reaches, as most of the studies performed focused on flows needed to ensure healthy aquatic habitats in these riverine sections. **Standard A-2** was selected for the Comerford impoundment (ZOE #2) as it backs up to the Moore dam and includes the Moore tailrace. This standard was selected as there are also minimum flow requirements for this section of the river.

License Article 401 adopted the requirements of the SA, and establishes the “conservation flow” (i.e., minimum flows released to the downstream reach of each development) and the seasonal reservoir level management requirements. Articles 402 and 403 require the approval of how the flows and impoundment levels will be monitored, to be incorporated into the Fifteen Mile Falls Reservoir and Minimum Flow Operations and Monitoring Plan. These requirements are likewise incorporated into the WQC.

The total impounded storage at Moore is 223,722 acre-feet, of which 114,176 acre-feet represents the available usable storage within a 40-foot drawdown range. Maximum reservoir elevation is 809 feet msl and minimum elevation for winter drawdown is 769 feet msl. For spring fish spawning, particularly littoral species, the reservoir is brought up to an elevation of at least 802 feet msl, with a target of 804 feet msl, by May 21 of each year and through June 30 the reservoir is not drawn down more than 2 feet below any elevation previously attained in the same period. The Comerford total impounded storage is 32,270 acre-feet which represents the available usable storage within a maximum 40-foot drawdown range, although only a small portion of that is typically used during normal operation. Maximum reservoir elevation is 650 feet msl and minimum elevation for winter drawdown is 624 feet msl. For spring fish spawning, particularly littoral species, the reservoir is brought up to an elevation of at least 645 feet msl, with a target of 640 feet msl, by May 21 of each year and through June 30 the reservoir is not drawn down more than 2 feet below any elevation previously attained in the same period. As found in studies performed during re-licensing, this stabilized elevation in both impoundments provides greater protection of the aquatic ecosystem and ensures that nests and eggs of littoral species, typically found below two feet from the water surface are not dewatered during these critical life stages when they’re not as mobile as in later life stages. Moore and Comerford reservoir operations follow historic patterns and ranges outside of the spawning period.

The total impounded storage at McIndoes is 5,988 acre-feet, of which 4,080 acre-feet represents the available storage within a 10-foot drawdown range, of which 3.5 feet can be used for normal operation. Reservoir elevation stabilization provides for the enhancement of available salmonid habitat in the McIndoes impoundment by facilitating the use of near shore habitat and extensive submerged aquatic vegetative cover in the reservoir, in addition to protecting less mobile littoral species and life stages from desiccation. The maximum reservoir elevation is 451.0 feet msl and minimum reservoir elevation is 447.5 msl. Reservoir elevation may exceed 451.0 feet msl if the inflow to the McIndoes reservoir exceeds the discharge capacity of the McIndoes dam.

Based on data provided in the application and review of FERC eLibrary records, since last certified in 2014, there were three headpond elevation deviations, all at McIndoes (see Appendix B). Two of the three were not considered violations by FERC as the causes of the deviations were beyond the owner's control. The third deviation occurred December 18, 2021 and was deemed by GRH to be caused by operator error. FERC has not yet issued its determination. There were also two planned events, a 2018 McIndoes drawdown to repair the flashboards de-icing system and a 2021 short-term lowering of the headpond at Moore to ensure that the minimum flow at Comerford could be passed. Both events were approved by the resource agencies (See Appendix B).

Water Management at Tailwater / Regulated Reaches

FERC license Articles 401, 402 and 403, which adopted the SA requirements, address the flows that must be released to downstream riverine reaches. As noted in the LIHI application, to inform settlement discussions, the licensee conducted studies and collected information in cooperation with stakeholders, resource agencies, and NGOs, concerning the characteristics of the riverine aquatic habitats associated with the Project. These study results influenced the content of the Settlement Agreement and were reported in four reports: (1) Draft Riverine Habitat Mapping Report (Gomez and Sullivan 1997a); (2) Demonstration Flow Study for the Nine Islands Reach of the Connecticut River (Gomez and Sullivan 1997b); (3) Flow Effects on Riverine Habitat in the Main Stem of the Connecticut River (Gomez and Sullivan 1998); and (4) Final Riverine Habitat Report (USGenNE 1999). The studies examined the effects of proposed Project flow releases or operations on five different stream habitat reaches: the mainstem of the Connecticut River from the tailrace of the Comerford Development to the upstream end of the McIndoes Development impoundment; the mainstem of the Connecticut River stream habitat downstream of Dodge Falls Dam (downstream of McIndoes); and the riverine portion of the Upper Moore impoundment. The tailrace areas of the Moore and McIndoes Developments were not included in the studies because the discharges from both these developments enter impoundments formed by the downstream Comerford Development and Dodge Falls Project, respectively, and these areas are primarily pool habitat with very little to no riverine habitat.

The studies suggested the implemented operations, such as limiting water level fluctuations and drawdown in the reservoirs, would better mimic natural flow patterns, and would benefit many species of fish and invertebrates that utilize the reservoir littoral zone for spawning and other life stages. These studies suggested that minimum flow releases, identified in the SA, would work to "mask" or dampen the range of flow fluctuations downstream of the powerhouses. The minimum flow releases would also create more natural streamflow conditions and benefit aquatic macroinvertebrates and fishes by providing more stable habitat conditions in areas where suitable habitat conditions exist. Aquatic biota would no longer be exposed to existing flow fluctuations that had resulted from intermittent periods of high flows and nearly dewatered conditions. With the proposed minimum flows, macroinvertebrate production and fish utilization would be expected to increase in reaches receiving the minimum flows and where suitable habitat exists. Minimum flow at Moore and seasonal minimum flows at Comerford were established to enhance and protect salmonid habitat in the tailraces of the Moore and Comerford dams, and in the McIndoes Development, ensuring water quality sufficient to sustain a rainbow and brown trout fishery.

In addition to minimum flow release effects on aquatic riverine habitat, the McIndoes impoundment elevation limit was also important because the lower impoundment elevation limit selected during settlement negotiations would create additional riverine habitat at the upstream end of the McIndoes impoundment as well as expand emergent and submergent wetlands. The minimum flow requirements for the spring for the McIndoes Development identified in the SA were also analyzed and suggested improved spawning and egg incubation flows for walleye.

Final required flows identified in the SA were based on agency recommendations during settlement discussions, the basis for which were seasonal New England aquatic base flows (NEABF) recommended by the USFWS. Those recommended flows, by volume (cubic feet per second (cfs)) and NEABF (drainage area), which were adopted in the SA, FERC license and WQC are as follows:

Moore minimum flow was set by agreement among parties to represent a year-round low flow minimum due in part to a number of factors including:

- Lack of riverine habitat below the Moore Dam (backwatered by Comerford Reservoir).
- Habitat below Moore is adequately protected by its required minimum flow and the impoundment operation at Comerford.
- Daily averaged flow would be equal to or greater than the minimum flow downstream at Comerford due to the guaranteed minimum flow from storage requirement at Moore.

Comerford minimum flows, guaranteed from storage:

- 818 cfs from June 1 through September 30 or 0.5 cfs/square mile of drainage area
- 1,145 cfs from October 1 through March 31 or 0.75 cfs/square mile of drainage area
- 1,635 cfs from April 1 through May 31 or 1.0 cfs/square mile of drainage area.

It should be noted there are extended periods when the minimum flows significantly exceed actual flows in the basin, suggesting the NEABF flows exceed site-specific flows.

McIndoes minimum flows are similar to Comerford relative to NEABF, but include an “or inflow” caveat and higher flows in the winter and spring (providing higher flows below the overall FMF Project):

- 1,105 cfs or inflow from June 1 through September 30 or 0.5 cfs/square mile of drainage area
- 2,210 cfs or inflow from October 1 through March 31 or 1.0 cfs/square mile of drainage area
- 4,420 cfs or inflow from April 1 through May 31 or 2.0 cfs/square mile of drainage area for spring fish spawning and incubation.

McIndoes also has a maximum flow restriction. Maximum discharge from the McIndoes Development cannot exceed maximum station discharge capacity of 5,800 cfs for more than 7 percent of the hours during the period June 1 through February 28. The restriction does not apply to periods when the Moore and Comerford reservoirs are near their maximum operating elevations,

or when the sum of the flow at the Dalton gauge, above the Moore impoundment, and the prorated Passumpsic gage¹⁴ exceeds 8,000 cfs or include flows required for downstream fish passage in the 5,800 cfs limit. FERC Order dated July 24, 2003 changed the maximum station discharge at McIndoes from 5,800 cfs to 6,180 cfs.

As is typical in most FERC licenses, minimum flows can be temporarily modified if required by operation emergencies beyond the licensee's control, or for short periods upon agreement between the licensee and the state resource agencies. If such an emergency occurs, the licensee notifies NHDES and VDEC within 24 hours and a written report is provided to FERC within 10 days.

Based on available data, there were 14 unplanned minimum flow deviations at McIndoes and six at Comerford since 2014; all but one were not considered violations by FERC, as all were short-term deviations caused by events outside the control of GRH or its predecessor, and remedial actions to minimize such events were implemented (see Appendix B). The single event determined by FERC to be a license violation, which did not include enforcement action, occurred at McIndoes on February 3, 2016 when one of two units was shut down for 3.5 hours. With only one unit running, total station discharge fell below the required calculated inflow (approximately 1,895 cfs at the time) by as much as 551 cfs in the first hour, and as little as 40 cfs in the last hour of the deviation. However, due to the backwater effects of the downstream Dodge Falls impoundment, the deviation only resulted in a tailrace elevation change of approximately 0.2 feet. The owner at the time investigated the incident and determined the cause to be operator error. Following the investigation, the owner undertook an internal assessment of its compliance alarm system and notification procedures within the control room. As a result, a \$46,000 project was undertaken to install audible and visual alarm indications and notification enhancements for all of its hydroelectric developments to reduce the likelihood of such an operator error in the future and to improve overall attentiveness to license compliance alarms.

There were also five planned minimum flow deviations at Comerford and three at McIndoes. All were pre-discussed with and approved by the state resource agencies. The most recent planned deviation occurred from October 1 through 26, 2021 at both McIndoes and Comerford due to drought conditions. Continuation of summer flows rather than winter flows were approved to allow for storage recovery to normal historic operations at Moore reservoir.

Comments, Assessment and Conclusion

The VDEC commented that in recent years, situations occurred where minimum flows¹⁵ out of Comerford begin to conflict with the impoundment water levels. In such cases the owner proactively reached out to the VDEC and other parties to discuss reducing minimum flows out of the Comerford facility and/or continuing to drawdown the impoundment. Resolution was always reached. However, VDEC stated it would be beneficial to have new site-specific flow aquatic habitat studies for critical areas in the reach below the Comerford facility to help make these decisions.

¹⁴ The Passumpsic River discharges to the Connecticut River downstream of Comerford Dam.

¹⁵ The seasonal minimum flows were established by the USFWS based on the New England Aquatic Base Flows

My review of deviation reports showed such events occurred the following times and durations:

- October 1 to 21, 2014 – 21 days
- April 1 to 5, 2015 – 5 days
- October 16 to 25, 2017 – 10 days
- September 25 to October 18, 2020 – 24 days
- October 1 to 26, 2021 – 26 days

The maximum number of days the minimum flow was not met in any year was 26 days. In all cases unusually dry weather conditions caused the situation. While new studies could provide some useful data, I do not believe such studies are warranted at this time. Each event may have unique characteristics, and decisions have been successfully reached with no apparent harm to the environment experienced to date.

CRC made the comment that “negotiated” minimum flows incorporated into the Settlement Agreement were not scientifically based, since in the LIHI application, GRH reflected on the fact that *“The process of reaching this agreement included examination of the power and non-power tradeoffs and effects of a variety of operational scenarios. This negotiation process, after careful consideration of alternatives, resulted in a balancing of power and non-power interests associated with the Project through the Settlement Agreement.”*

In response to my inquiry, GRH responded that *“no habitat trade-offs from negotiations were made as a result of instream flow studies in determining minimum flows below the three developments within the Fifteen Mile Falls Project. The required minimum flows were largely established on the basis of the New England Flow Policy, an internal U.S. Fish and Wildlife Service directive NE Interim Regional Policy for New England Streams Flow Recommendations and information on available habitat, identified through field studies. The recommended flows, as prescribed in the FMF Settlement Agreement, were then assessed in a subsequent field group assessment with participants from State and Federal agencies and NGO’s.”* More detailed discussion of GRH’s studies are contained in Appendix A. A copy of the referenced Riverine Habitat Report and the Flow Effects Report for the Fifteen Mile Falls Project are linked on the LIHI website¹⁶.

Based on review of the application, follow-up data from GRH, comment letters and FERC eLibrary, I believe that the Project continues to conditionally satisfy this criterion. The FMF has had a good operating record in passing its required minimum flows and maintaining the three reservoirs within required elevations. While a number of deviations have occurred since 2016, all were considered to be beyond the control of GRH with the exception of one headpond deviation and one minimum flow deviation.

The proposed Unit #5 at the Moore Development will not change any flow-related requirements. Based on the GRH filings and the FERC Environmental Assessment (EA) prepared for this new unit, it is not expected that its use will result in any changes to GRH’s capability to comply with the ongoing requirements. As noted in the January 28, 2022 FERC Order approving this new unit, “the Moore Unit 5 would be designed to efficiently pass the required minimum flow across the

¹⁶ <https://lowimpacthydro.org/lihi-certificate-39-fifteen-mile-falls-project-vermont-and-new-hampshire/>

operating range of head (i.e., 150-110 feet of head). Minimum flow at the Moore Development would be exclusively provided by Moore Unit 5 unless routine inspection and maintenance or emergencies dictate the use of another unit or through surface sluice gate or low level Tainter gate spill.” This Order as notes:

“the proposed increase in discharge capacity of 420 cfs represents the maximum discharge capacity of Moore Unit 5. The increase would not result in any significant change in normal operation and flood flow operation. The licensee states that the percentage of time it would operate Moore Units 1 through 4 at maximum generation is low, as it is rare to experience inflow exceeding current station discharge capacity and at the same time have the reservoir full. However, under a scenario where Moore Units 1 through 5 are at maximum discharge and additional flow remains, Moore Unit 5 would operate to replace what would otherwise have been spilled under current operation at the Moore Development. Otherwise, the licensee would continue to operate the Moore Development and the Project as required by the existing license and the water quality certification. As such, effects to water quantity and flows due to the proposed amendment are minor and should not vary significantly from those previously addressed during Project relicensing.”

Given this assessment, and lack of concerns about this new unit from commentors to LIHI, I believe the Project’s satisfaction of this criterion will continue. However, I am recommending a general condition associated with the need to notify LIHI in the event deviation from the planned operation of the new unit occurs once commissioned, as well as status reporting on updating of the documents due to the new unit specified in this Order, such as the *Reservoir and Minimum Flow Operations and Monitoring Plan*.

The Project Conditionally Passes Criterion A – Ecological Flow Regimes

B. WATER QUALITY

Goal: Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

Assessment of Criterion Passage

The Applicant appropriately selected **Standard B-2 Agency Recommendation** for all ZOE as Project operations are governed by water quality conditions included in the WQC issued by the NHDES. GRH also requested PLUS certification for ZOE #2, the Moore tailrace/downstream reach and Comerford impoundment.

The boundary between New Hampshire and Vermont is the low water mark of the Connecticut River on the western (Vermont) side, as it existed before the creation of the reservoirs. Project facilities and reservoirs are located in both states, and the discharge affects waters of both states. Consequently, under the provisions of Section 401 of the Clean Water Act, the Project is subject to the water quality standards of both states. As previously noted, one WQC was issued in 2001 by the NHDES to address compliance with both state requirements, and was agreed to by VANR. Both state agencies are also signatories to the SA, so applicable provisions of it are also reflected in the WQC.

Subsequently the FERC license adopted the WQC requirements, as reflected in Articles 404 and 405. Article 404 required the development/approval of a Plan to monitor all impoundments and tailraces for dissolved oxygen and temperature for five years. The Comerford results indicated that standards were being met. At Moore, these studies showed that discharge through Moore generating units greatly improved DO levels compared with levels detected in the water drawn from the reservoir through the deep-water intake.

Article 405 required development/approval of a plan for Long-Term Monitoring of Mercury in Fish Tissue at Moore and Comerford Reservoirs. This involves collection of fish and reporting of mercury levels found in a report every five years during the license term. The results are provided to Vermont and New Hampshire for updating their fish consumption advisories. As previously noted, based on monitoring conducted since 2003, this Article was modified in 2016 to reduce the number of species and individuals that must be collected. The modification was supported by NHDES and VDEC, as well as Vermont's Fish Contaminant Monitoring Committee (FCMC) who is responsible for assessing fish mercury concentrations and maintaining Vermont's fish advisories. The most recent report of mercury monitoring was filed with FERC on August 2, 2019.

Also as previously noted, the NHDES stated that neither a new WQC nor modifications to the existing one was needed for installation and operation of the new Moore Unit #5. This was in part, due to a GRH commitment to install a dissolved oxygen enhancement system consisting of a pipe with aeration devices that discharge water into the new powerhouse tailrace to offset potential loss of the DO enhancement currently provided by the entrained air through the vacuum pressure prevention system that is opened while passing minimum flow inefficiently through the larger units. GRH will also be conducting DO monitoring for two years, as approved by the NHDES on August 27, 2021, to evaluate the efficacy of the enhancement system's ability to meet New Hampshire and Vermont's current DO standards in the downstream reach of the Connecticut River. Given this very recent review by NHDES, and lack of comments on the draft FERC license amendment from either NHDES or VANR, it can be assumed that the conditions of the existing WQC for the entire Project remain valid and in effect. In addition, water quality monitoring was conducted, and will be conducted at Moore, which also supports Standard B-3, Site-Specific Studies for the measured parameters of temperature and DO.

New Hampshire's surface water quality regulations identify five designated uses for all state surface waters, with a sixth applicable only to tidal waters. The five designated uses pertinent to FMF are: aquatic life integrity, fish consumption, potential drinking water supply, swimming and other recreation in and on the water, and wildlife. The designated use of "swimming and other recreation in and on the water", is further assessed for primary contact recreation (i.e., swimming) and secondary contact recreation (i.e., boating). All surface waters of the State are either classified as Class A or B, with the majority of waters being Class B, including waters affected by FMF. Class B waters are considered acceptable for fishing, swimming and other recreational purposes, and, after adequate treatment, for use as water supplies.

Vermont water quality standards also rated the reaches of the Connecticut River affected by the Project as Class B waters. Class B waters are managed to achieve and maintain a high level of quality compatible with certain beneficial values and uses. Values are high quality habitat for aquatic biota, fish and wildlife and a water quality that consistently exhibits good aesthetic value; uses are public water supply with filtration and disinfection, irrigation and other agricultural uses,

swimming, and recreation, including fishing.

It should be noted that water quality standards differ between the two states. The NH DO standard is not less than 5 mg/l instantaneous **and** not less than 75% saturation **daily average**. The VT standard is not less than 6 mg/l **instantaneous or** not less than 70% saturation **instantaneous**

The following assessment of compliance with New Hampshire and Vermont water quality standards is taken from the LIHI application:

“As specified in the [Vermont Water Quality Standards](#) and summarized in Tactical Basin Plans for [Basin 16](#) (Moore and Comerford reservoirs) and [Basin 14](#) (McIndoes reservoir) all surface waters are managed to support designated uses that include: swimming, boating, fishing, aquatic biota, aquatic habitat, aesthetics, public water source, and irrigation. All waters at or below 2,500 feet altitude, National Geodetic Vertical Datum (NGVD), are designated Class B(2) for all uses, unless specifically designated as Class A(1), A(2), or B(1) for any use. The Project waters are all below 2,500 feet NGVD and have not been otherwise specifically designated for any use (see Chapter 2 of each Tactical Basin Plan). Additionally, the Project waters are designated cold-water fish habitat by default because they are not specifically designated warm-water fish habitat.

Some areas within the Project are identified by New Hampshire in its Clean Water Act Section [303\(d\)](#) List of Impaired Waters, however no Project facilities are identified as causing these water quality impairments¹⁷ (see Assessment Unit ID NHLAK801030202-01, NHRIV801030203-01, and NHRIV801030205-02 on the 303(d) list). The Moore reservoir is impaired for dissolved oxygen saturation, and the Moore and Comerford tailraces are impaired for pH (acidity). The sources of impairment are classified as “unknown”. Baseline relicensing studies to characterize water quality in the FMF reservoirs confirmed late August stratification and the presence of low DO levels in the deeper waters of the Moore Reservoir. The studies concluded that the Moore Reservoir was meso/eutrophic, reflecting nutrient input from a source further upstream in the watershed and that: 1) Moore Reservoir was prone to stratification, exhibiting the highest DO levels in the photic zone and some oxygen depletion at depth; 2) the introduction of air into discharges from the Moore powerhouse would optimize DO levels below the powerhouse; 3) Project operations did not appear to influence Moore Reservoir temperature and DO profiles (Normandeau 1997, 1999, Louis Berger 2000).

Low pH, or acidic conditions are common in New Hampshire where 70% or 3,821 miles of assessed rivers and streams are categorized as impaired for unbalanced acidity (pH levels), as are 88% or 140,736 acres of assessed lakes and reservoirs (EPA 2021). Acidity in waterways is influenced by rock and soils, as well as human sources such as industrial and car emissions, mining, and agricultural runoff.

No Project areas are identified in Vermont’s [303\(d\)](#) list. However, in New Hampshire and Vermont all fresh waters are identified as impaired for mercury and both states follow the

¹⁷ My review of this document indicated that causes of impairment are not listed, not that the Project was uniquely noted as not being the cause.

Northeast Regional Mercury TMDL strategy. Mercury occurs naturally in rocks and coal. Most of the mercury in the environment is released into the air, but it reaches waterbodies through atmospheric deposition. Airborne mercury is converted in water by bacteria into a toxic form called methyl-mercury which accumulates in the food-chain. Mercury can build up in fish, which then poses health risks to people and animals that eat fish.”

Comments, Assessment and Conclusion

The following concerns were identified by one or more stakeholders in their comments:

- Concerns over high levels of methyl mercury (meHg) found in Comerford and Moore reservoirs;
- Outstanding resolution of Moore 2009 and Comerford 2013 DO issues; and
- Proposed Moore Unit #5 DO Enhancement System does not meet the PLUS standard.

All commenters raised concern that the levels of methyl mercury found in Comerford and Moore reservoirs are high relative to other locations in the state, with CRC noting that Vermont’s Upper Connecticut River Basin 16 Tactical Basin Plan¹⁸ for the area lists both Moore and Comerford as being in “poor condition” for mercury on their scorecard for lakes in the area, while all other lakes in the area are listed as in “fair condition.” This Basin Plan also noted that “dramatic shifts in water level cause the release of bio-available mercury that is otherwise sequestered in the sediments and this mercury is more easily transferred up the food web to fish and loons.”

It should be noted that 2020/2022 New Hampshire Consolidated Assessment and Listing Methodology (CALM) notes for both reservoirs, that the impairment for mercury is categorized as 4A-M, or “relatively slight or marginal”.¹⁹

A June 13, 2003 report by VDEC, entitled Biogeochemistry of Mercury in Vermont and New Hampshire Lakes, An Assessment of Mercury in Waters, Sediments and Biota of Vermont and New Hampshire Lakes, was designed specifically to determine the generalized level of mercury contamination in sediment, water, and biota of multiple trophic levels across the VT-NH region. Using field studies from 1998 through 2000, mercury was detectable in waters of all 103 lakes sampled. The study indicated that increased deep water Hg and meHg concentrations suggest accumulation in bottom waters, either due to loss from upper waters by sedimentation, release from deep water sediments, or a combination of both. Evaluation of the accumulation of Hg in the tissues of yellow perch, a common species found in all of the lakes analyzed, found that concentrations increased, not surprisingly, with age and size. Results of the loon tissue analyses suggest that across the region, 50% of Vermont lakes and 70% of NH lakes had loons with tissue Hg concentrations that placed those animals in a “moderate” or higher risk category. The study showed sediment Hg concentrations were most elevated in lakes occupying the most remote and forested regions of VT and NH and were lowest in lakes with the greatest levels of watershed development, which has also been suggested by other New England studies.

¹⁸

<https://dec.vermont.gov/sites/dec/files/WID/WPP/2021%20Upper%20Connecticut%20River%20Tactical%20Basin%20PlanSigned.pdf>

¹⁹ <https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/status-of-each-assessment-unit-2020-2022.xlsx>

Based on GRH provided data, Biodiversity Research Institute (BRI) has completed four fish sampling efforts in the Moore and Comerford reservoirs, conducted at five-year intervals beginning in 2003, for the purpose of determining trends in fish mercury (Hg) concentrations. The last collection effort was in 2018. Based on length-corrected mercury concentrations, BRI reported that no statistically significant differences in Hg concentrations in fish biopsies or whole-body samples were detected between 2018 and previous sampling years. It was also noted that mercury concentrations of all game fish displayed a declining tendency as compared to previous years and that on average, most species of fish from the northern or upstream sites of both reservoirs tend to have higher tissue Hg concentrations than fish sampled from the southern or downstream locations within the reservoirs. GRH information provided in 2021 indicated that at the Moore reservoir, the highest concentrations of mercury in fish have occurred in fish occupying areas at the upstream end of the reservoir, which does not stratify, and based on opinions presented by BRI staff, this likely reflects mercury loading into the reservoir that stems from inflow from upstream basin runoff from the White Mountains.

My assessment is that Project operations are not the cause of the high mercury levels in the water and sediments. Measurement of hazards from mercury in waters is through levels of mercury in fish, thus the NH Consolidated List identifies the parameter as “Mercury – Fish Consumption Advisory”. Usually, a pollutant parameter level is measured directly. The Northeast Regional Mercury TMDL²⁰ focused on reduction of manmade contributing mercury point sources (wastewater discharges) and non-point sources (e.g., emissions from coal-burning facilities), which are the true contributing source of the mercury.

This review, the 2001 FERC Environmental Assessment, and other studies suggest that there could be multiple causes for the high levels of mercury found in fish tissue in the Moore and Comerford reservoirs, also found in many other New England lakes. This poses a unique challenge in answering the question of whether or not FMF is contributing to the impairment. My position is that it is inappropriate to determine that the criterion has not been satisfied, as FMF is not contributing to the level of mercury in the water and sediments. Also, while it has been suggested that water level fluctuations may be allowing release of mercury from the sediments, that does not appear to have been proven yet. This issue is not an uncommon concern in New England, and because of that, I believe that any research of information on this issue, as recommended by VDEC, CRC, and CRJC in their comment letters would be more appropriately compiled by an independent party.

CRC also raised some questions about lack of documentation required in an application, such as the license, WQC and copies of monitoring reports. The license and WQC were linked to the application and while the LIHI application should have included additional details on the results of water quality testing, copies of monitoring reports are available from FERC’s eLibrary.

The VDEC however was more specific and raised a concern that at Comerford, the five years of dissolved oxygen monitoring (DO) was completed in 2003, 2006, 2007, 2008 and 2013. The delay to 2013 was due to a proposed upgrade of waterwheels. VDEC also stated that following review of the 2013 report, both Vermont and New Hampshire indicated that one year of data collected was inadequate and requested another year of sampling, which was never done. Follow-up data

²⁰ <https://neiwpc.org/our-programs/nps/mercury/mercury-tmdl/>

provided by GRH and review of FERC documents²¹ found that the five study years at Comerford were 2003, 2004, 2005, 2007 and 2008. Monitoring was suspended for 2006 pending completion of the Comerford Unit 1 runner upgrade as approved by NHDES. The waterwheels at Comerford Units 2, 3, and 4 were replaced in the 2009 to 2012 time period. To ensure compliance after these upgrades, the then Project owner proposed a 2013 monitoring study that was completed. The study summarized all data that had been collected and concluded that: “DO met the New Hampshire and Vermont standards at the Comerford tailrace during monitoring in 2003, 2004, 2005, 2007, 2008, and 2013. In addition, the 2013 study and earlier studies indicated that Comerford reservoir does not experience substantial stratification and DO levels in the penstocks also typically meets water quality standards.” The comment letters from NHDES and VDEC, and the prior owner’s response are included in that report.

A review of those letters determined that neither state requested an additional year of monitoring, only that additional information should be provided in the final report before NHDES could consider suspending additional monitoring under the WQC. FERC’s July 10, 2014²² letter recommended that agency consultation be concluded to ensure compliance with WQC Condition 7. GRH provided documentation of a consultation conference call held on September 4, 2014 at which neither agency requested additional monitoring. There is no record that NHDES formally suspended monitoring, but they reviewed the six years of data and, to date, have not recommended additional monitoring. Comerford project operations have not changed since that time, the data demonstrates that standards were being met, and there is no indication standards are not being met presently.

VDEC also noted that at Moore, all five years of monitoring were completed by 2008. The GRH report summarizing the five years of data issued in 2009 noted that in some years below Moore station there were short durations, typically in August and September, where DO levels did not meet water quality standards. This report continues by stating “We intend to submit a report to the NH and VT water quality agencies prior to December 31, 2009 with our proposal for addressing the issue. Upon review, consultation and approval of our proposal we will prepare a plan and schedule for instituting any such measures as well as specify if additional monitoring will be necessary.” Such a follow-up report was never submitted.

GRH confirmed that this proposal was not developed largely due to the insignificance (frequency, duration and extent of deviation from standard) of the instances where low DO was reported in the Moore discharge data. The prior owner had suggested any mitigation would be implemented in conjunction with the planned Moore minimum flow unit, and that the States did not object to this approach. Mitigation options and requirements were studied starting in 2015 in advance of the development of the Moore Unit #5 minimum flow project. The five years of reservoir profile data and discharge monitoring together with the 2015 evaluation and modeling were critical in designing the proposed DO mitigation plan incorporated into the new Moore Unit #5 project. My assessment of this situation, is that the commitments now in place at the Moore development will address the question that appears to have been outstanding. The future monitoring at the new unit will assess if the water quality standards are being met.

²¹ <https://elibrary.ferc.gov/eLibrary/filedownload?fileid=01c152b7-66e2-5005-8110-c31fafc91712>

²² <https://elibrary.ferc.gov/eLibrary/filedownload?fileid=01c42096-66e2-5005-8110-c31fafc91712>

Based on my review of all of the information described above, I believe the Project continues to conditionally satisfy the requirements for this criterion. I am recommending a condition requiring GRH to submit annual updates on the findings of the two years of dissolved oxygen monitoring and confirmation of the enhancement system's effectiveness required with the installation of the Moore Unit #5.

GRH also proposed that they qualify for a PLUS standard given the installation of the aeration system for the Unit #5 project. While it is true that that monitoring of DO levels will be used to establish the releases needed from the aeration system to ensure compliance with DO license requirements, I believe these are done to satisfy **Standard B-2 Agency Recommendations**. The requirement for a PLUS is that the adaptive management program must be "in addition to satisfying one or more of the standards" as noted in the 2nd Edition of the Handbook. Therefore, I do not believe this PLUS standard will be met once this system is installed as part of the Moore Unit #5 Project.

The Project Conditionally Passes Criterion B – Water Quality

C. UPSTREAM FISH PASSAGE

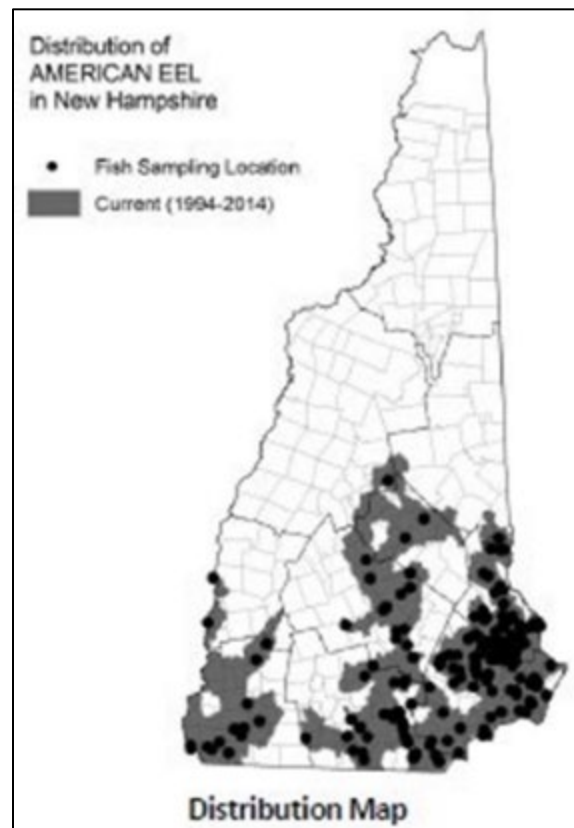
Goal: The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility.

Assessment of Criterion Passage

The Applicant selected **C-1 - Not Applicable/De Minimis Effect** for all ZOE's, however, I believe that **C-2-Agency Recommendation** is more appropriate for the Moore tailrace (ZOE#2), Comerford tailrace (ZOE#3) McIndoes tailrace (ZOE#6) as there are FERC license requirements to address upstream passage of diadromous species, although the trigger events requiring construction of passage facilities have yet to occur as sufficient numbers of the target species (Atlantic salmon and American eel) have not yet reached the Project waters.

Species Present

Migratory species in the Connecticut River with historic reach to the Project area include Atlantic salmon and American eel, but no other anadromous species. European colonization brought decline to the native salmon population as water-power dams were erected throughout the lower basin, and by the late 1700's salmon were extirpated from the Connecticut River. Restoration efforts began in the late 1860's



with minimal success but were rejuvenated in the late 1960's with the availability of federal funding. Those efforts included fry and smolt stocking in mainstem tributaries and the construction of upstream and downstream fish passage facilities at the first five dams on the mainstem Connecticut River, all of which are downstream of FMF. Further upstream migration is impeded by the Dodge Falls Project, located between the Wilder Project and McIndoes Development. In 2013, the USFWS formally announced that its Atlantic salmon stocking efforts in the Connecticut River basin would be discontinued as restoration efforts did not meet the goals.

American eels enter the Connecticut River as juveniles, moving upstream and into tributaries. They have few habitat preferences and can move around most obstructions, allowing them to inhabit most aquatic habitats. Historical records indicate eels were found upstream of FMF in the Connecticut Lakes. Recent studies show few eels moving farther than the Vernon and Bellows Falls dams as shown on the 2015 New Hampshire Fish and Game (NHFG) map shown to the right. Re-licensing studies performed at the GRH's Wilder station downstream of FMF noted that eels have been observed using the fish ladder at that dam²³.

The Project waters primarily support a warmwater/cool-water fish community; however, a coldwater fishery for salmonids also exists in the Project area, supported by a stocking program, with some wild trout production in the tributaries to the Project reservoirs. New Hampshire stocks brown, rainbow and brook trout in Moore reservoir, and brown and rainbow trout in the Connecticut River upstream of the reservoir. Vermont stocks brown and rainbow trout in the Passumpsic River, a tributary to the Comerford downstream reach. The dominant warmwater species include smallmouth bass, rock bass, white sucker and fallfish; cool-water species include yellow perch, northern pike, and chain pickerel.

Fish Passage Requirements and Compliance

The 2002 FERC license included upstream passage initiatives under Articles 411, 412 and 414 as summarized below. These Article requirements adopted those from the SA and align with those included in the NH WQC. The US Department of Interior also reserved their authority to require additional facilities in the future under license Article 408.

License Articles 411 and 412 include requirements to transport up-migrating adult salmon past McIndoes and Comerford after notification that 20 adult Atlantic salmon reached the Dodge Falls Project in two consecutive years, and when the NHFG, the Vermont Department of Fish and Wildlife (VDFW), the USFWS, and the Connecticut River Atlantic Salmon Commission (CRASC) determined that upstream fish passage is justified. Some wild salmon continue to enter the Connecticut River, although very few migrate farther than the Connecticut state line. To date, the trigger condition associated with upstream salmon passage at the Fifteen Mile Falls Project has not been met.

In accordance with Article 414 of the FERC license, the licensee filed an American Eel Passage Plan in accordance with the Settlement Agreement and the WQC, and with the support of the resource agencies. The American Eel Passage Plan describes a plan for developing a specific study

²³ The 2019 Dodge Falls LIHI recertification report notes that NHFG reported a very low density of eels above Wilder at that time and stated that upstream passage is not warranted for Dodge Falls unless and until passage improvements are made at the downstream dams and the eel population increases in the upper watershed.

for providing upstream and downstream American eel passage past the Project within one year of notification by the USFWS, VDFW and NHFG that eel passage is needed at the Project. Such notification has not been issued.

Comments, Assessment and Conclusion

Only CRC expressed a fish passage concern, namely recommending that eDNA or some other sort of ongoing study to document the presence or absence of American eel below the McIndoes dam within one year after upstream fish passage is provided at the Wilder dam under the not yet issued new Wilder license should be conducted. I do not believe that this is needed for FMF to satisfy this criterion at this time. I believe the existing license requirement to install eel passage within one year's notice from USFWS, VDFW and NHFG that it is needed at FMF sufficiently addresses the potential for greater movement of eel to the FMF Project waters.

Based on my review of the application, FERC eLibrary review, and stakeholder comments, I believe that the Project continues to satisfy this criterion.

The Project Passes Criterion C – Upstream Fish Passage

D. DOWNSTREAM FISH PASSAGE AND PROTECTION

Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Facility operations. Migratory species are able to successfully complete their life cycles and maintain healthy populations in the areas affected by the Facility.

Assessment of Criterion Passage

The Applicant has appropriately selected **D-1 – Not Applicable / De Minimis Effect** for Comerford tailrace (ZOE#3), Comerford downstream reach (ZOE#4) and McIndoes tailrace (ZOE#6) and **D-2–Agency Recommendation** for the remaining three ZOE's which include the impoundments.

Species present in the Project waters are listed above under *Upstream Fish Passage*.

Fish Passage Requirements and Compliance

The 2002 FERC license included downstream passage (Articles 409 and 410) and monitoring (Article 413) requirements for juvenile Atlantic salmon (smolts) at the Moore, Comerford and McIndoes developments. Article 406 requires development of a plan for any trashrack replacement activities for review by applicable state resource agencies. Article 414 requires development of an American Eel Passage Plan to address study development for up and downstream passage. These license requirements adopted those from the SA and align with those included in the NH WQC. The US Department of Interior also reserved their authority to require additional facilities in the future in the license under Article 408.

As previously noted, the plan for American eel passage was filed but no fishery agency has yet required study development. The trashracks have not been replaced and are not scheduled to be replaced according to the application. Currently Moore units #1-4 have 3-inch clear spacing trashracks while one-inch spacing racks are planned for Unit #5. The Comerford and McIndoes units have 2.94-inch spacing racks.

From 2004 through 2015 downstream passage of Atlantic salmon smolts past the Moore and Comerford dams was via a fish trap installed in the sluice gate of the Moore dam. The trap was non-selective and a range of resident species was collected each year along with salmon smolts. As reported annually to the FERC, USFWS, VDFW, and NHFG, the collected salmon were transported downstream below FMF and all resident species collected in the trap returned to Moore reservoir per agency direction. Downstream transportation of resident species was not a condition of the FERC license, SA or WQC.

After USFWS officially discontinued Atlantic salmon stocking efforts in the Connecticut River basin in 2013, the former licensee filed license amendment requests with the Commission on [December 31, 2015](#), [March 3, 2016](#), and [March 8, 2016](#) to suspend or remove license Articles 409, 410 and 413 associated with downstream passage of Atlantic salmon at the Project developments. In its 2015 filing, the licensee included correspondence from the CRASC noting that all surviving smolts from the final stocking of salmon fry in the upper Connecticut basin in 2013 migrated out of the basin by 2015. Correspondence from NHFG and VDFW supporting such suspension was also submitted. On May 2, 2016 the Commission issued an Order Suspending License Articles 409, 410, and 413. Downstream passage was suspended in 2015.

It should be noted that the corresponding Conditions in the NHDES WQC appear to remain in the WQC, although activities associated with them have been halted. LIHI conducts certification assessments relative to “resource agency recommendations”. That said, it has been demonstrated by the Applicant that cessation of fish passage activities at these developments was found acceptable to the state fishery agencies.

Comments, Assessment and Conclusion

No stakeholder comments were received regarding downstream passage. Based on my review of the application and supporting information, including lack of stakeholder comments, I believe the Project continues to satisfy this criterion.

The Project Passes Criterion D – Downstream Fish Passage and Protection

E. SHORELINE AND WATERSHED PROTECTION

Goal: The Facility has demonstrated that sufficient action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.

Assessment of Criterion Passage

The Applicant has appropriately selected **Standard E-2, Agency Recommendation** and **PLUS** credit to pass the Shoreline and Watershed Protection criterion for all Project ZOE.

Regulatory Requirements and Compliance

There are no Shoreline Management Plans and no specific agency recommendations for shoreline management. In large part, this is due to the fact that the vast majority of the shoreline is owned in fee, undeveloped, available for day-use only, has a number of resource specific management plans to address resources, and the shorelines are also overseen by the perpetual conservation easement holders. These management requirements, listed below, were part of the SA. There has been no change in these protection related requirements for the Project since it was last recertified by LIHI.

- Article 415 requires the finalization and implementation of a Wildlife and Forest Management Plan that includes a number of wildlife protection measures in designated areas and establishment of conservation easements on the approximate 4,000 acres of land within the existing Project boundary.
- Article 417 requires development/implementation of a Rare and Unusual Plant/Plant Community Management Plan.
- Article 420 requires development/implementation of an Upper Connecticut River Mitigation and Enhancement Fund (MEF), to be established by the States of New Hampshire and Vermont for the implementation of resource enhancement measures in the Upper Connecticut River Basin.

The licensee developed a single [Land Management Plan](#) that incorporates the requirements of Article 415 and 416, along with the Management Plan for Threatened and Endangered Species required by Article 416, which is addressed later under *Threatened and Endangered Species Protection*. The Land Management Plan was prepared in December 2006. Along with this Plan, GRH maintains a Geographic Information System (GIS) that contains maps of natural communities, locations of known threatened and endangered species, recreation sites, rare plant locations, important wildlife habitats, forest stands, cultural resource sites, and detailed stand management prescriptions. Combined, these tools represent technical guidance for the professional foresters and ecologists managing the lands associated with the FMF, as agreed to in the SA and required in the license.

The process used by GRH to ensure onsite activities minimize impacts to these important ecological resources (including protected species) is that areas that will undergo ground disturbance or vegetation management, such as timbering, (but excluding things such as lawn mowing) are reviewed for current data from the USFWS for federally protected species and from appropriate Vermont and New Hampshire resource agencies for protected species and rare plants,

sensitive wildlife areas, etc. Prior to such activities, a site visit of the area involving the agency representatives, GRH Land Agent and GRH's professional consulting foresters is conducted unless the agency staff believe such a visit is not needed. The foresters physically mark all harvesting areas with paint and or flagging, including any buffers to identified sensitive areas outlined in the Land Management Plan (and GIS mapping) or those otherwise required by regulation (e.g., Acceptable Management Practices or Best Management Practices for foresting) or by direction of the resource agency during the walkdown. Thus, sensitive resources within the "activity area" are buffered from the activity. Mitigative measures may also be recommended by the agency staff and employed by GRH and their contractors, to avoid or minimize impacts, and therefore comply with the SA and license requirements. GRH's consulting foresters have full authority to stop work, as does GRH, by the terms of all harvesting contracts if non-compliance is found.

The application states the land and water area under GRH control at FMF are 8,200 and 5,048 acres, respectively. Property owned by GRH is roughly 85% forested, 9.3% developed, 4.3% undeveloped, 0.5% agriculture, and 0.8 undetermined. The owned forest land both inside and outside of the Project boundary, adjacent to the Connecticut River is under professional forest management. The range of acres harvested yearly have been:

| 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|--------|------|--------|--------|-------|--------|------|------|------|--------|
| 341 ac | 0 | 320 ac | 110 ac | 49 ac | 116 ac | 0 | 0 | 0 | 638 ac |

GRH owns significant portions of the shoreline within its Project boundary as shown in the table below. The SA for the Project (and adopted into Article 418) set out specific requirements for management and permanent conservation of these properties, including establishment of a series of specific riparian protection management buffers. The protections are defined within the following zones:

- 600 ft along both sides of 4th Order and greater rivers,
- 300 ft along both sides of 3rd Order rivers and along shores of ponds and non-forested wetlands greater than 10 acres in size, and
- 100 ft along both sides of 1st and 2nd Order streams and along shores of ponds and non-forested wetlands less than 10 acres in size.

Great River Hydro owned shoreline within the FMF Project boundary

| Impoundment | Total Shoreline (ft) | GRH Owned/ Protected (ft) | Percentage |
|-------------|----------------------|------------------------------|------------|
| Moore | 197,753 | 189,175 | 95.6% |
| Comerford | 100,511 | 47,465 | 47.2% |
| McIndoes | 124,356 | 42,954 | 38.3% |
| TOTAL: | 422,620 | 279,594 | 66.2% |

Furthermore, conservation easements were conveyed to New England Forestry Foundation, Inc. in 2008 that adopted these buffer requirements. The conservation easements permanently conserve all upland acreage of both Project and abutting non-project lands totaling 6,918 acres in New Hampshire and Vermont. Figure 8 illustrates these conserved lands.

The SA established the development of a Mitigation Enhancement Fund (MEF) to support restoration, protection, and enhancement of the river, wetlands, and shore lands within the Connecticut River watershed upstream of the confluence of the White River and the Connecticut River at White River Junction, VT and West Lebanon, NH. After an initial contribution of \$3M, the SA required an annual contribution in the amount of the greater of \$100,000 or 10% of the gross revenues of the Project over a base amount of \$14M continued until the total amount of annual contributions equals \$13.5M or for fifteen years from the completion of licensing. While regular annual contributions have ended, to date the MEF has been funded to the amount of \$21M including interest.

Since its inception, the MEF has helped to conserve over 14,700 acres of property in the Upper Connecticut River watershed. Since 2017, when Great River Hydro last updated LIHI on the fund, close to 1,600 acres have been conserved representing over 138,000 feet of river and stream frontage (of which, over 38,000 feet is on the Connecticut River mainstem), 27 barriers to aquatic organism passage have been removed to restore over 288 miles of riparian habitat, and over 156,000 feet of in-stream habitat has been enhanced and/or restored. Table 5 of the application details MEF accomplishments since 2012. The MEF is administered through the New Hampshire Charitable Foundation and is guided by a twelve-person advisory committee made up of representatives of environmental organizations, state and federal agencies, local community groups and GRH²⁴. To date, the fund has awarded more than \$17.4M in grants. Over \$1.7M has been awarded for 12 projects across the upper Connecticut River watershed in 2021. The fund balance, as of September 30, 2021, remains at approximately \$4.8M for future conservation and riparian projects. Table 6 of the application provides a funding status report for the MEF.

²⁴ The Committee is comprised of a representative or designee of the Project Owner, plus one representative from each of the following: USFWS, NPS, VANR, a NH resource agency (to be rotated between the NHFG and the NHDES), an Historic Preservation Agency (to be rotated between the NH and VT Historic Preservation Agencies), the North Country Council, the Northeastern Vermont Development Association, the Connecticut River Joint Commissions, the AMC, the CRWC, and TU.



Figure 8 – Lands Subject to Perpetual Conservation Easements

Comments, Assessment and Conclusion

Key issues identified by both the CRC and VDEC included:

- There is no confirmation of Land Management Plan conformance;
- Forestry procedures may not address current state Best Management Practices;
- No discussion of how non-native invasive species are being monitored; and
- The Project should not meet PLUS standard since funding of the MEF has stopped.

Additional documentation was requested from GRH to address the first two items dealing with compliance with the Land Management Plan and forestry practices. A licensed professional consulting forester lays out the proposed harvest, reviews the proposed harvest with resource agencies and the easement holder, reviews harvest and harvest conditions/restrictions with all prospective operators prior to awarding contracts, oversees through routine inspection all work as it is being conducted, and oversees all closeout work at the end of the harvest to ensure compliance. An example of communications with the state on timbering conducted on a plot called MR/VT 16-1 in 2019 was provided. Closeout work includes a post-harvest walkdown to update the data set with final conditions. Certification letters from the forester to the easement holder are also issued following any timbering operation. Also, the New England Forestry Foundation (NEFF) conducts a remote aerial assessment of conserved properties on an annual basis. From this, they identify areas they would like to assess on the ground. GRH takes them to the requested area and to any stand that was harvested that year. There have been no concerns raised, or outstanding issues regarding timbering activities.

GRH's supplemental information stated that while the Land Management Plan document and the GIS data set together comprise the Land Management Plan, updates are necessarily only made to the GIS data. Considering the evolving nature of agency management objectives and datasets, and the rotating nature of the timber harvests, GRH determined it is best practice to check with agency resources prior to undertaking any activity to be sure they are using the most current data. Therefore, reviews and updates to the GIS dataset are done on a site-specific basis where and when timbering or other potentially impacting activity will be occurring. However, GRH's response does not specifically confirm that current state specific Acceptable Forest Practices guidelines are being used nor does it address how non-native nuisance species are being monitored as required by the Land Management Plan. Thus, I have recommended a Condition to address these two items.

Both CRC and VDEC also suggested that reports of compliance with the Land Management Plan should be regularly provided to LIHI and interested stakeholders. The recommended condition addressing this criterion requires compliance confirmation to be reported as part of the Annual Compliance Report to LIHI. The newest edition of the LIHI Handbook (Revision 2.05: January 1, 2022) requires that such "facility compliance status and a summary will be posted on the project webpage once compliance submittals have been reviewed." Thus, the status of Project compliance will be available to any interested stakeholder.

I believe the Project continues to conditionally satisfy the requirements of this criterion under **Standard E-2** given the protocols used by GRH to ensure preservation of sensitive ecological resources.

To be eligible for an extra three years of certification, the application must:

- “Provide documentation that the facility has a formal conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline that the facility owns around its reservoirs and river corridors; or
- In lieu of a formal conservation plan, provide documentation that the facility has established a watershed enhancement fund for ecological land management that will achieve the equivalent land protection value of an ecologically effective buffer zone of 50% or more around undeveloped shoreline.”

CRC raised the concern that the MEF should not be used as the basis of satisfying the PLUS standard. My assessment is that the Project satisfies the conservation buffer zone requirement of at least 50% of the shoreline buffer, qualifying it for the PLUS credit. The Enhancement Fund further adds to satisfaction of meeting the goal of watershed protection. Based on my assessment of the noted materials, I believe the Project does meet the requirements for three extra years of LIHI certification.

The Project Conditionally Passes Criterion E and PLUS Credit – Shoreline and Watershed Protection

F. THREATENED AND ENDANGERED SPECIES PROTECTION

Goal: The Facility does not negatively impact federal or state-listed species.

Assessment of Criterion Passage

Standard F-2 – Finding of No Negative Effect was selected for all ZOE. However, I believe that **Standard F-4 – Acceptable Mitigation** is more appropriate as state protected species have been identified as possibly or known to be present in essentially all ZOE. However, the protocols used by GRH to review all ground or vegetation disturbing activities (except those in developed areas such as grass mowing) within the Project boundary for updated data on the presence of such species, coordination of a site visit with a state biologist, and adoption of agency recommended mitigative measures, I believe satisfies the conditions of Standard F-4. Standard F-4 is defined in the LIHI handbook as:

“If a newly listed species has been determined to be present by an appropriate resource agency subsequent to the establishment of environmental requirements at the facility, and no incidental take permit or statement, biological opinion, habitat conservation plan, or similar government document relevant to the facility exists, and the facility is implementing significant, agency-approved measures to avoid or minimize the impact of the facility on that listed species.”

The state endangered or threatened species identified as present or possibly present onsite are not “newly listed” (i.e., only recently classified as such). However, they are species which have been identified onsite “subsequent to the establishment of environmental requirements at the facility” (i.e., the requirements in the SA, FERC license or WQCs), and GRH is implementing agency-approved measures to minimize impacts to these species, which are other descriptors in LIHI’s definition for Standard F-4.

Federal and state threatened and endangered species in the Project area were obtained by accessing USFWS's [IPaC](#) project review website, NH Division of Forests and Lands' [DataCheck Tool](#) and an email request to VT's Natural Heritage Bureau. Results of these requests were provided to LIHI confidentially as the locational information for species is considered sensitive. The following summarizes the more detailed discussion of the various species, including their habitat preferences, included in the LIHI application.

Mammals

Two federally threatened mammals were identified: Canada lynx (*Lynx canadensis*) and Northern long-eared bat (*Myotis septentrionalis*)²⁵. Critical habitat has not been identified for the bat, but has been for the lynx, although the USFWS report stated the habitat location "was unavailable". Only two reports of lynx in New Hampshire exist for the 1990s. Although reports are scarce, lynx are expected to be present in New Hampshire because habitat remains contiguous with Maine where a resident population is believed to exist. Lynx are not thought to occur in Vermont and preferred habitat is limited onsite²⁶. White-nose syndrome, a fatal fungal disease known to affect the Northern long-eared bat, is currently a serious predominant threat, especially throughout the Northeast where the species has declined by up to 99 percent from pre-white-nose syndrome levels at many hibernation sites.

Birds

Species that are known or expected to occur include cliff swallows (*Petrochelidon pyrrhonota*) (NH threatened), and bald eagle (*Haliaeetus leucocephalus*) (VT endangered). The bald eagle however has been delisted in 2007 from the federal list and is recommended for delisting in VT.

Over the last 20 years, the number and size of cliff swallow colonies in NH has declined considerably and the species is now found primarily in Coos County and the Lakes Region, with scattered colonies near the Seacoast²⁷. The bald eagle has returned to many parts of its former range, including Vermont, and has become reestablished as a breeding species in the northeastern United States. Successful restoration of bald eagle populations to North America is due to the ban on dichlorodiphenyltrichloroethane (DDT), extensive reintroduction programs, and the protection of critical breeding and wintering habitat. Presently, the species has continued protection under the Bald and Golden Eagle Protection Act (1940), the Lacey Act (1900), and the Migratory Bird Treaty Act (1918). Bald eagle nests occur in the Project area and eagle sightings are common.

Insects

The monarch butterfly (*Danaus plexippus*) is a federal candidate species and not yet listed or proposed for listing. Census data for the two North American populations (located east and west of the Rocky Mountains) indicate long-term declines in population abundance at the overwintering sites, leading the USFWS to identify it as a candidate species.

²⁵ In March 2022 USFWS proposed up-listing of Northern long-eared bat to endangered.

<https://www.govinfo.gov/link/fr/87/16442>

²⁶ <https://www.govinfo.gov/link/fr/79/54781?link-type=pdf>

²⁷ NH Wildlife Action Plan Appendix A <https://www.wildlife.state.nh.us/wildlife/wap.html>

Invertebrates

The dwarf wedgemussel (*Alasmodonta heterodon*) is a federally and state (NH and VT) listed endangered species that lives in freshwater streams and rivers along the Atlantic coast drainage. Populations are believed to occur in Connecticut, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Vermont, and Virginia. According to the USFWS IPaC website, no conservation plans are currently available for this species.

Surveys for dwarf wedgemussels were conducted throughout the FMF Project area during the summer and fall of 1997. During these surveys, seven live dwarf wedge mussels and two relic shells were found at the upstream end of the Project area. Additional SCUBA surveys were conducted to document the size of the population, available habitat, and approximate mussel density. The presence of rapids downstream of the mussel population suggested that Moore Reservoir may not have a direct influence on the dwarf wedge mussel site. To assess the potential influence of Moore Reservoir on the mussel habitat, a topographic survey was conducted on March 3, 1998. The SCUBA and topographic surveys indicated that water levels and flow conditions in the reach occupied by the mussels are controlled primarily by inflow from the upstream dam. In addition, a submerged ledge outcrop downstream of the mussel site constricts the channel and creates a backwater that floods the mussel population, apparently even under low-flow conditions. USFWS staff visited the site to evaluate habitat conditions in the vicinity of the mussel site and concluded that the mussels were not likely to be influenced by operation of the Fifteen Mile Falls Project (see License Order, page 8). No operational changes have occurred at the Project, nor with the installation of Moore Unit #5, that would alter this conclusion, and no action has been issued by a regulatory agency regarding the existing population.

Plants

No federally listed plant species were identified in the Project affected area. Some of the plant species identified by New Hampshire and Vermont are likely outside of the Project affected area but are included here for consistency with the state provided lists. New Hampshire state listed plants include eight endangered and eight threatened species. For eight of the listed species the most recent report of an occurrence was made over 20 years ago. NH endangered plant species occurring in the Project affected area include bur-reed sedge (*Carex sparganioides*), crested sedge (*Carex cristatella*), great St. John's-wort (*Hypericum ascyron* ssp. *pyramidatum*), limestone-meadow sedge (*Carex granularis*), marsh horsetail (*Equisetum palustre*), shining ladies'-tresses (*Spiranthes lucida*), small dropseed (*Sporobolus neglectus*), and sticky false asphodel (*Trianthaglutinosa*). Only great St. John's-wort, and sticky false asphodel occurrences have been documented in the Project area within the past 20 years. NH threatened plant species occurring in the Project affected area include American spurred-gentian (*Halenia deflexa* ssp. *deflexa*), Bailey's sedge (*Carex baileyi*), balsam groundsel (*Packera paupercula*), brook lobelia (*Lobelia kalmii*), elk sedge (*Carex garberi*), fen grass-of-Parnassus (*Parnassia glauca*), golden-fruited sedge (*Carex aurea*), and Loesel's wide-lipped orchid (*Liparis loeselii*). The last report of an occurrence for two of these species, Bailey's sedge and balsam groundsel, was over 20 years ago.

Vermont state listed plants include two endangered species: Greene's rush (*Juncus greenii*) and woodland cudweed (*Omalotheca sylvatica*); and nine threatened species: Muehlenberg's sedge (*Carex muehlenbergii* var. *muehlenbergii*), sticky false asphodel (*Triantha glutinosa*), tubercled

orchid (*Platanthera flava* var. *herbiola*), bog wintergreen (*Pyrola asarifolia* ssp. *asarifolia*), Garber's sedge (*Carex garberi*), lance-leaved violet (*Viola lanceolata* ssp. *lanceolata*), marsh horsetail (*Equisetum palustre*), slender mountain rice (*Piptatheropsis pungens*) and stiff gentian (*Gentianella quinquefolia*).

Due to the close association of rare plants with rare and unusual plant communities identified in the Project area, threatened and endangered plants are managed as part of the Rare and Unusual Plant/Plant Community Management portion of the Land Management Plan. This approach of monitoring by community, mirrors that of the State Natural Heritage Programs (NHP). The state NHP datasets of rare, threatened and endangered (RTE) species and communities are now available online. In advance of any activity conducted on Project lands such as timber harvests, construction, and vegetation management (but not grass mowing), GRH accesses NH's DataCheck Tool to request a project review for RTE species, or VT's tool at <http://anrmaps.vermont.gov/websites/anra5/>. As previously discussed, state wildlife biologists are consulted directly on each timber harvest. An example data check for a recent forest management project in NH was provided confidentially to LIHI as part of the LIHI application. This process provides the most current data specific to a location of activity. Identified RTE species and plant and plant community locations are GIS mapped and buffered from forest management, or other activity. Agency staff are consulted prior to any management action and are provided access to Project lands to monitor these RTE species and plant communities and recommend management options.

Comments, Assessment and Conclusion

An issue raised by CRC was that there was no Agency documentation of "no impact" to listed species provided in the application. Such documentation would be appropriate to satisfy **Standard F-2 – Finding of No Negative Effect**. However, as noted earlier, I believe **Standard F-4, Acceptable Mitigation** is more appropriate. I believe the protocols undertaken by GRH ensure that no or limited impacts to protected species are occurring. These protocols, such as the site reconnaissance done with agency staff, would identify any trees possibly serving as bat roosting locations, and would be flagged to ensure they are not disturbed, a concern raised by VDEC.

VDEC, CRC, and CRJC recommended that new surveys be conducted in the area upstream of the Moore Development for dwarf wedgemussel and other mussel species. Based on inquiries made by GRH, more recent studies have been done on the river above and below the FMF Project, but no dwarf wedgemussels were found. While new surveys would update data that was collected a number of years ago in the Project area, I do not believe such data is needed for criterion satisfaction assessment. It should be noted that VDEC, CRC, VDFW and USFWS did attend the Joint Agency-Public Meeting on the licensing of Moore Unit #5, but no issues were identified at the meeting. Likewise, the three state agency comment letters did not raise questions or a need for a new survey for mussels for this new unit.

Thus, I believe that this criterion continues to be satisfied.

The Project Passes Criterion F – Threatened and Endangered Species Protection

G. CULTURAL AND HISTORIC RESOURCE PROTECTION

Goal: The Facility does not inappropriately impact cultural or historic resources that are associated with the Facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.

Assessment of Criterion Passage

The Applicant has appropriately selected **Standard G-2 – Regulatory Recommendation** for all ZOE's as the Project is required to comply with license Article 419, which provides for cultural resources protection, via implementation of a Programmatic Agreement (PA) executed February 6, 2002 between FERC, the Advisory Council on Historic Preservation, the Vermont State Historic Preservation Officer (VT SHPO) and the New Hampshire State Historic Preservation Officer (NH SHPO). In accordance with the PA, license, and Settlement Agreement, a Cultural Resources Management Plan (CRMP) was filed by the licensee on [January 4, 2008](#) and modified and approved by FERC on [January 21, 2009](#). The modification was a requirement for the licensee to file a PA stipulated land-use map with FERC, the VT SHPO, and NH SHPO. The map was filed as a component of the Land Management Plan and associated GIS dataset. No changes have been made to these requirements since last certified by LIHI. Review and consultation required for the new Moore Unit #5 are discussed below.

The FMF hydroelectric facilities are considered eligible for listing in the National Register of Historic Places, as the Fifteen Mile Falls Hydroelectric Power Station Historic District, and one prehistoric site was recommended eligible for listing. The facilities considered to be supporting elements in the Historic District are:

| Development | Facility Portion |
|-------------|---|
| Moore | Dam (including spillway, intake and non-overflow sections) |
| | Powerhouse |
| Comerford | Dam (including spillway, intake, non-overflow sections, and transformer service building) |
| | Powerhouse |
| McIndoes | Dam (including spillway and non-overflow sections) |
| | Powerhouse |
| | Cable hoist and hoist house |

An historical summary of the Project prepared for the licensee by the Public Archeology Laboratory Inc. was provided in the application.

The CRMP includes mitigation measures for the historic properties, including an evaluation of any site that will be impacted by an activity. All of the archeological sites were monitored to establish a baseline. An Historic American Building Survey/Historic American Engineering Record of the historic buildings and structures was also conducted. This baseline information is updated at 10-year intervals, through visual inspections by a qualified professional architectural historian; the last 10-year report was filed with the VT and NH SHPO's on October 1, 2019 and with LIHI for this review as a Confidential Document supporting the application.

The CRMP also integrates cultural resource management into GRH's master planning process for the Project. Cultural resources are evaluated during planning for any alterations to Project facilities, and consultation with the appropriate SHPO is initiated if activities could impact those resources. Biennial reports summarize these evaluations and document consultation. The last biennial report filed with the VT and NH SHPOs on April 15, 2020, and confidentially to LIHI.

My review of this report indicated that GRH has been in compliance with the requirements of their CRMP. The 2020 report discussed the results of the SHPO consultation conducted for the substation projects at McIndoes in 2017 and Comerford in 2018. It appears that prior 2013 consultation conducted for the McIndoes project resulted in development of a Memorandum of Agreement between the NH SHPO and TransCanada, the prior owner, which required the preparation of historic and photographic documentation of the original GSU transformers. When GRH took ownership in April 2017, the transformers had already been removed but the documentation not developed. For the 2018 Comerford project, all NH SHPO due diligence review requirements for archaeological resources were conducted. NH SHPO concurred with the finding that the substation project will have no effect on historic properties in a letter dated August 20, 2018. A 2018 door replacement project at Comerford and 2019 recreational facility upgrades were also appropriately reviewed. Follow-up consultation with GRH also confirmed that appropriate SHPO consultation was done with recreational enhancements completed, as those activities also require such review.

Consultation was conducted with both the VT and NH SHPO during the license amendment process for the Moore Unit #5. GRH's assessment was that Unit #5 would have no adverse effect on the FMF Historic District or the contributing Moore dam and powerhouse. While the project would cause changes to the historic appearance of the Moore Development by adding new structures on the dam and powerhouse, the effects are mitigated by the fact that the addition of a fifth generating unit was anticipated in the 2002 license. GRH stated that the only significant new visible change to the dam would be the headgate hoist, which would be of similar design to the existing headgate hoists. By implementing a design that is consistent with the Secretary of Interior's Standards for the Treatment of Historic Properties, GRH stated that it minimized the effect of adding Moore Unit #5 on the integrity of the powerhouse. In addition, the proposed amendment would have no effects on archaeological resources because the areas where construction and operation of Moore Unit #5 contain no intact landforms that predate the construction of the Moore dam and powerhouse.

In their October 22, 2019 letter, the VT SHPO stated the majority of the work described in the draft amendment application would be located in New Hampshire, and under the Cultural Plan, the NH SHPO would be the lead SHPO for consultation. On December 11, 2020, GRH provided the NH SHPO with the historic property effects assessment completed for the proposed amendment. In the assessment, GRH concluded that no historic properties would be affected due to the proposed amendment. GRH proposed to minimize or mitigate the project's effects on historic properties by: (1) capturing photographic documentation during and after construction to form a permanent record of the project; and (2) affixing a permanent plaque or other identifier that provides the date of the addition to further denote that it was not part of the original construction. On December 22, 2020, the NH SHPO concurred with the no adverse effect determination and the

proposed mitigation measures.

Comments, Assessment and Conclusion

No stakeholders issued comments regarding cultural resource issues. Based on my review of the application materials and FERC eLibrary data, it is apparent that GRH is committed to ensuring Project operations and onsite activities are performed in careful compliance with the requirements established for the Project to ensure protection of onsite archaeological and historical resources. I believe the Project continues conditionally to satisfy this criterion. The recommended condition would require confirmation that the mitigation measures outlined by GRH in their filings for Moore Unit #5 have been fulfilled upon unit construction.

The Project Conditionally Passes Criterion G – Cultural and Historic Resource Protection

H. RECREATIONAL RESOURCES

Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

Assessment of Criterion Passage

The Applicant has appropriately selected **Standard H-2, Agency Recommendation** for all Project ZOE's.

The Project provides recreational access, accommodation and facilities. In accordance with Article 418 and in consultation with resource agencies, upgrades to existing recreational areas for picnicking, boating, and hiking are in place and construction of new primitive camp sites are completed as described in the Fifteen Mile Falls [Recreation Management Plan](#). The plan was approved, with modification, by FERC on [November 21, 2008](#). The modification called for filing of as-built drawings of the recreation facilities and improvements proposed in the plan, except that such drawings were not required for picnic tables and grills, signs, or buoys. Safety devices such as signage, warning lights, sirens, and recorded messages are in place to ensure that recreational users, particularly fishermen, are properly warned of sudden changes in discharge flows. The location of each safety device is specified in the Public Safety Plan filed with FERC and updated when changes are made or at least every 10 years. There have been no changes to the recreational facility requirements at the Project.

In addition, GRH maintains minimum reservoir levels for open water recreation (e.g., boating) at Moore and Comerford reservoirs. These reservoir restrictions have been incorporated into the Project's water management and operations protocols.

FERC conducted an environmental and public use inspection the FMF on August 8, 2018, and identified eight items for follow up in their August 30, 2018 letter, including repairs to three boat ramps, replacement and corrections to part 8 signs, recovering a picnic table from the lake, and filing revised exhibits reflecting switchyard upgrades. On [September 28, 2018](#) Great River Hydro provided a plan and schedule to address each item and filed follow up letters annually until all items were completed ([July 3, 2019](#) and [June 9, 2020](#)). These repairs included Pine Grove Picnic

Area Boat Ramp in Barnet, VT and the Waterford Picnic Area Boat Ramp in Waterford, VT in 2019, and the Route 18 Waterford Bridge Boat Ramp in Waterford, VT in 2020.

The Pattenville Boat Ramp, Littleton, NH, and Route 18 Boat ramps were likewise improved, independent of this FERC inspection, in 2020 and 2021, respectively. The Moore Dam boat ramp is tentatively scheduled for upgrade this year.

Comments, Assessment and Conclusion

The VDEC did not identify any recreational concerns, while the CRC and CRJC raised several concerns and made a series of suggestions to enhance the recreational opportunities of the Project. The CRC's question about whether all facilities in the approved Recreational Plan were developed was confirmed during the previous LIHI certification review in 2013. Some suggestions were to add new campsites, improve the Comerford portage trail²⁸, add new Connecticut River Paddlers Trail sites around Moore or Comerford reservoirs that "do not conflict with the conservation easements" and conduct a recreation use survey to understand the economic impact of recreation in the area. While such actions might provide recreational benefits, I do not believe any of them are needed to demonstrate criterion compliance. Recreational trails are an allowed use on the conservation easements around the reservoirs and therefore do not conflict with the easements.

However, several comments raised by CRC and/or CRJC I believe warrant adoption as I believe that they raise criterion satisfaction concerns:

- enhanced public knowledge of Project facilities at the Project would increase their use;
- signage at the reservoirs about the proper boat maintenance to avoid the spread of aquatic invasive species and fish consumption advisories due to elevated mercury levels;
- periodic assessment of the adequacy of the recreational facilities is a commitment in the Recreational Plan and it is uncertain if this is done; and
- GRH should consult with bordered towns for additional access opportunities.

GRH is required to maintain their recreational facilities and it appears this may not regularly be done, based on some comments received. Article 405 requires the posting of state issued fish advisories at public access points within the Project boundary. Signage for aquatic invasive species management would align with the requirements to monitor for such species as part of the Land Management Plan, as required by license Article 415.

Effective March 28, 2019, FERC eliminated the requirement for licensed Project owners to collect and report data on the use of the recreational facilities at each Project every six years (formerly known as FERC Form 80 Reporting), unless otherwise required in a FERC license. Part of the rationale used by FERC to support this rule change was that by 2018, the large majority of licensees have Recreational Management Plan requirements in their licenses, and that one part of the responsibilities to be committed to in such plans is the periodic assessment on the use (i.e., adequacy) of the recreational facilities to meet the public need over time. The last Form 80s for each development were filed in 2015 for the 2014 reporting year.

²⁸ The portage trail is long and steep which is a function of the topography and limited access at the site.

The approved 2008 Recreational Management Plan for FMF has such commitment to “periodically assess and evaluate the effective use of existing and new facilities to meet changing recreational needs and demand” as a stated commitment in section 5.1. The FMF Plan also states that they will “periodically meet with key public and private agencies, municipal officials and organization which share in recreational planning for the area and work with such groups to improve and maintain recreational uses.”

Follow-up data provided by GRH noted that all recreation areas and portage trails are inspected in early Spring and any missing items or damaged areas, such as picnic tables, grills, signs, parking areas, etc., are replaced or fixed and any public safety hazards such as hazard trees are removed. Areas are also inspected by GRH after storms and periodically through the season, and by the sheriff’s department on weekends via contract between the sheriff’s department and GRH. The GRH contact phone number is also listed on the Part 8 signs in the recreation areas and on the company website, allowing stakeholders and the public to contact them regarding maintenance or other needs. Identified safety issues are corrected immediately, and they strive to address any damage or vandalism as soon as practicable. The company website currently offers general information about FMF recreation areas but is being updated with more location specific data. In addition, GRH provides an annual financial donation the Connecticut River Paddlers Trail. GRH provided a summary of responses to CRC and CRJC recreation-related comments that is included in Appendix A.

Despite the reported regular inspections being done, it appears that some improvement in maintenance is needed. Thus, I have recommended a Condition to address these recreational issues, including a suggestion to improve those inspections. CRJC also suggested that GRH should fund “invasive species greeters” at all reservoirs, however, I believe signage would suffice to meet LIHI’s requirements.

Based on my review, consideration of the comments received and follow-up information from GRH, I believe that the Project continues to conditionally satisfy this criterion.

The Project Conditionally Passes Criterion H – Recreational Resources

IX. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on my review, I believe that this Project conditionally continues to meet the requirements of a Low Impact Facility, with the following conditions. As I reviewed the documents associated with the addition of the Moore Unit #5²⁹, I considered that unit to be included in this Certification. However, Condition #1 is recommended to confirm compliance with the requirements of that installation and initial operation. I also believe the Project satisfies the requirements for PLUS credit for the *Shoreline and Watershed Protection* criterion, as previously discussed. If approved, the FMF would qualify the Project for three extra years of certification for a total of 13 years.

The second condition of the 2015 certification of the FMF Project required annual reporting of headpond and flow deviations to LIHI to help ensure proper focus on minimization of such events. My recommendation is that this condition not be carried forward. While a number of deviations have occurred since 2016, all were considered to be beyond the fault of GRH with the exception of one headpond deviation and one minimum flow deviation. Thus, I believe the intent of this 2015 condition has been met. Annual compliance statements also now require reporting of all deviations.

Condition 1 - The facility Owner shall provide a status update of the Moore Unit #5 installation and initial operation in the first annual compliance submittal to LIHI after the unit becomes operational. The update shall include copies of any required monitoring and agency comments on the monitoring results. The update shall identify any deviations from the expected design or operating conditions approved by FERC. LIHI reserves the right to require additional information and conduct additional review of impacts if changes in design or operation occur that could affect one or more LIHI criteria.

Condition 2 (as modified by the LIHI Technical Committee) - To confirm satisfaction of the Water Quality criterion and until system acceptance, the facility Owner shall provide in annual LIHI compliance submittals, a summary of the Moore DO monitoring results, agency comments on them, and the final agency acceptance of the DO enhancement system effectiveness, or any modifications needed to improve its effectiveness.

Condition 3 – To confirm compliance with the Land Management Plan, the facility Owner shall:

- a. Within one year of LIHI Certification, review and update the Land Management Plan, as necessary, to incorporate the current New Hampshire and Vermont forestry Best Management Practices and ensure that similar current state requirements for management of invasive species are included. The forestry practices section shall denote that tree removal near potential bat roosting trees should be avoided, if possible, between April 1 and October 31. Confirmation of this review/updating shall be provided to LIHI in the next annual compliance submittal.
- b. In annual compliance submittals, provide confirmation that all provisions of the Land Management Plan have been satisfied in the prior year. Any deviations shall be noted, and actions taken to remedy the situation shall be identified and reported.

Condition 4 – To confirm compliance with the Cultural and Historic Resources criterion, the facility Owner shall provide documentation that the cultural resource protection mitigations

²⁹ Construction began February 14, 2022 per GRH's February 25, 2022 notice to FERC.

required by the SHPO related to installation of Moore Unit #5 have been completed and accepted by the SHPO in the first annual LIHI compliance submittal after acceptance has been received.

Condition 5 (as modified by the LIHI Technical Committee) – To confirm compliance with the Recreational Resources criterion, the facility Owner shall,

- a) within one year of LIHI Certification:
 - i. Provide and maintain information on recreation opportunities at the Project on the company website, including but not limited to one or more maps showing the locations and facility amenities as well as additional information such as permissible times of use and both permissible and restricted activities (if appropriate).
 - ii. Confirm that fish consumption advisory signage is posted at all public access facilities and contains the most updated advisory information provided by NHDES and VDEC, in accordance with license Article 405. Signage shall be reviewed and updated if needed in consultation with the resource agencies after each 5-year mercury monitoring study is complete and confirmation shall be provided to LIHI in the following annual compliance submittal.
 - iii. Consult with NHDES and VDEC on installation of signage at the reservoirs about proper boat maintenance to avoid the spread of aquatic invasive species and confirm that periodic inspection of the signage has been incorporated into regular recreation area inspections.
- b) per the schedules indicated below:
 - i. Develop and document a process to ensure periodic re-assessments of public access and use of project lands and waters for recreation and a process for ongoing recreation needs coordination with local entities and interested stakeholders for submittal to LIHI in the 2023 annual compliance submittal.
 - ii. Provide summaries of all recreation related coordination and copies of related communications that occurred during the prior year in annual LIHI compliance submittals.
 - iii. By December 31, 2024, and again by December 31, 2030, conduct assessments of public access and recreation use in cooperation with Federal, state, local entities and interested stakeholders, and provide a summary of the assessment results, any plans and schedules for proposed enhancements, and copies of all related stakeholder communications to LIHI in the following year's annual compliance submittal.

Appendix A
Applicant's Additional Information

GRH Response to Updated Questions from LIHI on GRH's FMF Recertification Application

May 10, 2022

1. Which signatories to the settlement agreement, if any, have oversight for administration and/or decision making for spending under the MEF? Both CRC and CRJC were signatories. Can these funds be used for any of the studies requested in comment letters?

Membership of the MEF steering committee is established by the settlement agreement, Section IV.C.2:

Membership. The Committee shall be comprised of twelve members, including a representative or designee of the Project Owner, plus one representative from each of the following: USFWS, NPS, VANR, a NH resource agency (to be rotated between the NHFGD and the NHDES), an Historic Preservation Agency (to be rotated between the NH and VT Historic Preservation Agencies), the North Country Council, the Northeastern Vermont Development Association, the Connecticut River Joint Commissions, the AMC, the CRWC, and TU.

Note: 1) the Connecticut River Watershed Council (CRWC) changed its name to the Connecticut River Conservancy (CRC) in April 2017; 2) currently, the CRJC does not have a representative sitting on the steering committee.

Section IV.B of the settlement agreement limits the use of the fund by GRH, especially for those water quality and fisheries studies named in Section VI of the settlement agreement.

Purposes and Uses of the Fund. Consistent with these purposes, these funds are intended to be used to contribute to fulfillment of regional resource management goals, plans, and priorities as articulated by the responsible agencies.

The fund is expressly not intended to be used to defray the Project Owner's costs in conducting and implementing the resource studies, and management plans called for in section VI herein, unless otherwise agreed to by all Parties

Furthermore, the MEF has taken a position of no longer funding studies, as indicated in the fund guidelines found here: [MEF-application-guidelines-evergreen.pdf \(nhcf.org\)](#)

3. No studies - The Connecticut River watershed has been the subject of numerous studies, planning efforts, management documents, and federal-designation processes. The results of these activities provide a wealth of guidance about relative priorities for restoration work within the watershed. The MEF directly funds implementation of conservation and restoration projects, and will not consider proposals that seek funding to study generic conservation objectives or management planning. Specific, project-based studies (such as engineering reports investigating the feasibility of a specific dam removal project) are permitted.

2. In the relicensing instream flow studies what habitat trade-offs were made in determining minimum flows? Please provide copies of the relevant studies which were not found on the FERC elibrary.

It would be accurate to state there were no habitat trade-offs made as a result of instream flow studies in determining minimum flows below the three developments within the Fifteen Mile Falls Project. The required minimum flows were largely established on the basis of the New England Flow Policy, an internal U.S. Fish and Wildlife Service directive NE Interim Regional Policy for New England Streams Flow Recommendations and information on available habitat, identified through field studies. The recommended flows, as prescribed in the FMF Settlement Agreement, were then assessed in a subsequent field group assessment with participants from State and Federal agencies and NGO's. A Riverine Habitat Report and Flow Effects Report for the Fifteen Mile Falls Project are included as Attachment 1.

Application of the New England Flow Policy was adjusted based on whether the downstream reach was riverine, backwatered by downstream projects or reaches, or augmented by Passumpsic River flow.

Moore, with its year-round minimum flow requirement of 320 cfs or inflow if less, is only 0.20 cfsd because fish and wildlife agencies and 401 WQ regulators agreed the reach below the station was controlled and backwatered as the Comerford impoundment. No riverine habitat exists below the development that required flows greater than as prescribed either for spawning, incubation, water depth, water temperature or water quality. Flows greater than 320 cfs are released daily to provide the necessary, much higher, seasonally adjusted minimum flows below Comerford that are guaranteed from storage. Therefore, daily average flows generally match or are greater than the minimum flow requirements at Comerford.

Comerford has instantaneous minimum flow guaranteed from storage (as opposed to or inflow if less). This requirement protects and sustains habitat in the short riverine reach that lies below the dam but above the upstream extent of the McIndoes impoundment, and affects the entire flow regime down to the Wilder dam over 60 miles downstream. The length of the riverine reach above the McIndoes impoundment was increased by lowering the operating elevation of McIndoes, creating a longer riverine reach as well as expanding submerged and emergent wetlands. The Comerford minimum flows equal or exceed the NE Flow Policy recommendations for aquatic base flow (ABF) of 0.50 cfsd or inflow if less primarily because these flows are guaranteed from upstream storage (Moore) rather than matching inflow, which is often less than 0.50 cfsd as measured at the Dalton gage, upstream of Moore. As noted elsewhere in the application or as described in various consultation and communications with State agencies and the FERC, there are many times the flow below Comerford is substantially augmented, as much as 2.0-2.5 times the natural inflow. Winter minimum flows of 0.75 cfsd and Spring minimum flow of 2.0 cfsd is less than default values under the NE Flow Policy but that was because the primary riverine stretch of concern lies at or below the confluence of the Passumpsic River which in the Spring adds significant stream flow to the riverine reach below the dam upstream of the McIndoes impoundment; thus increasing the actual cfs flow rate in the reach above what is provided from Comerford dam, 1.5 miles upstream. Additionally, the daily average flow is typically higher than the minimum flow during these two seasons.

Agency participant Delphi process qualitative habitat evaluations under various flow scenarios were performed in the various channels that weave between the Nine Islands complex at the confluence of the Connecticut and Passumpic rivers. Potential spawning and incubation habitat in these channels was only available during high flows and therefore difficult to protect through seasonal ABF flows and such flow rates would significantly diminish mainstem habitat above the McIndoes impoundment, which was the primary focus for improving habitat. This was largely due to the formative nature of these islands – that is the habitat and braided channels are largely only wetted under high Spring flow or storm runoff conditions.

McIndoes minimum flow requirements mirror the NE Flow Policy for ABF of 0.50 cfs summer flow, 1.0 cfs winter but require only 2.0 cfs for spring incubation and spawning largely due to the lack of riverine habitat below the dam due to the impoundment associated with the downstream Dodge Falls Project. These flow requirements, however, were established due to and largely reflect the upstream guaranteed minimum flow out of Comerford and the value they had downstream of the run-of-river Dodge Falls project where there is a significant riverine reach above the Wilder impoundment.

As stated, largely based on the Comerford requirements, guaranteed minimum flows from storage are largely responsible for protecting habitat as well as sustaining that protection when natural flows would otherwise diminish habitat and protection.

3. Was additional water quality monitoring completed at Comerford after 2013?

No. Article 404 and the Water Quality Monitoring Plan, which was approved and incorporated comments and suggestions from State 401 agencies, required 5 years of monitoring. The first three years included 2003, 2004 and 2005; with the remaining two years (2007 and 2008) suspended until after the Comerford Development Unit 1 turbine replacement project in order to evaluate the new Comerford Unit 1 minimum flow turbine discharge. 2013 was an additional year the Licensee agreed to perform to evaluate the conditions following the replacement of Unit 2-4 waterwheels at Comerford. Further need for WQ monitoring would be determined by the States of NH and VT pending the Licensee response to NHDES/VANR comments on the draft report. TransCanada, as the Licensee, filed its responses to NHDES/VANR comments in Appendix G of the Final Report on 2013 Water Quality Monitoring. Neither state has requested additional monitoring until our proposed Moore Development minimum flow Unit 5 is commissioned.

For Moore, was a proposal to address low DO ever submitted to VT/NH after the 2008 monitoring? If there was and it was implemented, please provide a copy of the results. If it was not implemented, why not?

It was not developed largely due to the insignificance (frequency, duration and extent of deviation from standard) of the instances where low DO was reported in the Moore discharge

data. Ultimately the discharge below Comerford was significantly above the state's WQ standards. TransCanada suggested implementing any mitigation would be done in conjunction

with a planned Moore minimum flow unit. States did not object to this approach, largely we presume, because of the insignificance of the instances where the WQ fell slightly below the standards. Mitigation options and requirements were studied starting in 2015 in advance of the development of the Moore minimum flow project. The 5 years of reservoir profile data and discharge monitoring together with the 2015 evaluation and modeling were critical in designing the proposed DO mitigation plan incorporated into the new Moore Unit 5 project.

If additional monitoring will be conducted at Moore this year for the minimum flow unit, would it be difficult to conduct some monitoring below Comerford at the same time?

There is no plan or need to monitor WQ below Comerford. Six years of continuous WQ monitoring studies and data have shown that there is absolutely no WQ issue whatsoever below Comerford under current license operation and with new turbines operating per license amendments. Improvements though DO enhancement at Moore would not cause degradation in WQ below Comerford.

4. How would you summarize the results of the 5-year mercury fish tissue studies to date? Are there any trends?

Biodiversity Research Institute (BRI) has completed four fish sampling efforts in the Moore and Comerford reservoirs, conducted at five-year intervals beginning in 2003, for the purpose of determining trends in fish mercury (Hg) concentrations. The last collection effort was in 2018. Based on length-corrected mercury concentrations, BRI reported that no statistically significant differences in Hg concentrations in fish biopsies or whole-body samples were detected between 2018 and previous sampling years. However, it was noted that mercury concentrations of all game fish displayed a declining tendency as compared to previous years and that on average, most species of fish from the northern or upstream sites of both reservoirs tend to have higher tissue Hg concentrations than fish sampled from the southern or downstream locations.

As stated in the Mercury Monitoring Plan, the purpose of the mercury monitoring program is to monitor the levels of mercury in fish that may be consumed by anglers, and in turn provide these data to the NH Department of Health and Human Services and the VT Department of Environmental Conservation, so that these agencies may issue fish consumption advisories, if warranted.

Both the Mercury Monitoring Plan and results of the 2018 sampling effort were included in our application via hyper-link.

5. Please provide the requested data regarding the Land Management Plan, GIS mapping:

- a) How and when is the data updated within the Land Management Plan and GIS mapping (e.g., rare, threatened and endangered species, exemplary natural communities, rare plant locations, etc.). Is there periodic updating of all data (if so, how often) or are data reviews done on a site-specific basis where timbering or other potentially impacting activity will be occurring that year.

While the Land Management Plan document and the GIS data set together comprise the Land Management Plan, updates are necessarily only made to the GIS data. The property is managed with a long-term perspective. Timber harvests are conducted on relatively small portions at a time, of the over 8,000-acre management area, and some harvests take multiple years to complete. Considering the evolving nature of agency management objectives and datasets, and the rotating nature of our timber harvests, it is best practice to check with agency resources prior to undertaking any activity to be sure we are using the most current data. Therefore, reviews and updates to the GIS dataset are done on a site-specific basis where and when timbering or other potentially impacting activity will be occurring.

- b) Please describe the procedures used “to buffer” the sensitive resources in an area to be timbered.

When a timber harvest is planned, GRH invites resource agencies to walk the proposed site with our GRH Land Agent and GRH’s professional consulting foresters to review the harvest plan. The foresters physically mark all harvesting areas with paint and or flagging, including any buffers to identified sensitive areas outlined in the Land Management Plan or those otherwise required by regulation (e.g., Acceptable Management Practices or Best Management Practices for foresting) or by direction of the resource agency during the walkdown.

- c) How do you evaluate compliance with the plan’s provisions?

The Licensed (NH) professional consulting forester lays out the proposed harvest, reviews the proposed harvest with resource agencies and the easement holder, reviews harvest and harvest conditions/restrictions with all prospective operators prior to awarding contracts, oversees through routine inspection all work as it is being conducted, and oversees all closeout work at the end of the harvest to ensure compliance. Closeout work includes a post harvest walkdown to update the data set with final conditions.

Is work being done in these specific areas overseen by a GRH specialist with the authority to stop work?

GRH’s consulting foresters have full authority to stop work, as does GRH, by the terms of all harvesting contracts.

Please provide documentation that activities undertaken since last certified have complied with your Plan.

Please see the certification letter from the forester to the easement holder in Attachment 2.

- d) Is it possible to identify approximately how many acres of forest is timbered annually? If it significantly varies, can you provide a range of acres?

It does vary quite a bit year to year. Between 2012 and 2021 it ranged from 0 to over 600 acres:

| 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|--------|------|--------|--------|-------|--------|------|------|------|--------|
| 341 ac | 0 | 320 ac | 110 ac | 49 ac | 116 ac | 0 | 0 | 0 | 638 ac |

- e) Do you report on timbering activities or other aspects of the Land Management Plan to the easement holder(s)?

Yes.

Do you receive copies of easement monitoring reports from the easement holder(s)?

Yes. The New England Forestry Foundation (NEFF) conducts a remote aerial assessment of the property on an annual basis. From this, they identify areas they would like to assess on the ground. GRH takes them to the requested area and to any stand that was harvested that year. There have been no concerns raised, or outstanding issues regarding our timbering activities.

Were stewardship plans developed for the easements? If so, please provide them.

The FERC-approved Land Management Plan is the guiding plan for stewardship of the property. Section 5 of the Plan specifically outlines the guiding principles.

6. Please contact Ethan Nedeau to find out if he is aware of more recent DWM surveys or data in the project reaches. Some time ago, he had provided LIHI with a confidential 2009 report addressing studies he did or is aware of in nearby upstream and downstream waters but that did not address FMP.

In response to our inquiry, Ethan stated that everything he could find or knew about DWM up to 2008 was summarized in the 2009 report he did for Vermont Fish & Wildlife/New Hampshire Fish & Game. He surveyed 3 sites in the Connecticut River last year, 2 above Dodge Falls Dam in Monroe and 1 below the Dodge Falls Dam in Bath, they were not in the FMF Project area and he did not find any DWM. We put a similar inquiry to Normandeau, and they, as well, have not conducted studies, or are aware of any studies or data that was collected on DWM in the FMF Project area since the FMF relicensing studies were completed.

7. The application does not provide specific documentation from the applicable state resource agency stating that the project activities (e.g., timbering) are not having a demonstrable negative effect the state threatened species noted as being within the area. However, based on the process described in the LIHI application, Standard F-4 may apply. Can you confirm that GRH implements any

mitigative measures that are provided by the state biologists reviewing the projects to minimize impact to listed species?

We implement mitigative measures suggested by state biologists for listed and non-listed species alike. A great example is the feedback we received from VT F&W for reducing the potential harvest impacts on a softwood harvest in Concord, VT related to deer wintering areas. We revised our harvesting plans, eliminating large swaths of proposed shelterwood cut, to preserve winter yards and travel corridors between yards. On the same harvest, we installed a beaver deceiver to help preserve beaver habitat that had encroached on our truck road. In addition to the pre-harvest site visits and review that the forester conducts with the state wildlife agencies, he and GRH's Land Agent made a special trip to Montpelier to review this particular harvest with the biologists and made the modifications requested. We review each harvest with the state wildlife agencies and take all recommended wildlife enhancements/protections into account when harvests are implemented. Correspondence related to this harvest is provided as Attachment 2.

8. Please provide a description of the review taken to confirm that the construction/operation of the new Moore Unit #5 would not have an effect on VT or NH state listed endangered or threatened species. My review of documents available on FERC eLibrary only address federally listed species.

The area of disturbance for the project is entirely in NH on the existing earth embankment and toe of the dam. Access to the site is via an existing road parallel to the river on the Vt side. For the permitting process, we worked primarily with NHDES (including the USACE under the General Permit) but made sure VTDEC was also consulted. State permit/review requirements resulting from the consultation were: NHDES Wetlands and Non-site Specific Permit, and NHDES approval of the DO Monitoring Plan. As part of the wetlands permit, GRH consulted with the NH Natural Heritage Bureau to identify state listed species and exemplary natural communities. Due to the highly modified and maintained nature of the project area, no listed species or exemplary natural communities were identified. GRH also consulted with the VT SHPO regarding upgrades needed to the access road (culvert replacement and overlay material onto the roadbed), but this was performed under our consultation requirements set forth under the Historic Resource Management Plan.

9. The 2008 Recreation Plan includes a provision that the owner "will strive to" periodically assess recreation use – has this been done since FERC eliminated the Form 80 requirement? The last filed Form 80 was in 2015. What routine inspections and maintenance are done on recreational amenities? How often are these done? Does it include the Comerford portage trail? How is information about available recreational opportunities and facilities made available to the public?

All recreation areas and portage trails are inspected in early Spring and any missing items or damaged areas, such as picnic tables, grills, signs, parking areas, etc., are replaced or fixed and any public safety hazards such as hazard trees are removed. After the initial inspection, the areas are inspected by GRH after storms and periodically

through the season, and by the sheriff's department on weekends via contract between the sheriff's department and GRH. GRH vehicles and employees are known in the area and folks are not hesitant to reach out, we also have a contact phone number on our Part 8 signs in the recreation areas and on our company website. Safety issues are corrected immediately, and we strive to address any damage or vandalism as soon as practicable. Our company website currently offers general information about our recreation areas but is being updated with more location specific data. In addition, GRH provides an annual financial donation the Connecticut River Paddlers' Trail <https://connecticutriverpaddlerstrail.org/crpt7/node/3119>, and maintains the primitive campsites on GRH owned land.

10. The 2019 10-year review report on cultural resources mentioned possible upgrades to the Pattenville Boat Ramp and the Route 18 Waterford Bridge Boat Ramp in the spring of 2020 and the Moore Dam Boat Launch in the Spring of 2021. Please confirm if these were completed and if the CRMP required review was completed.

Appendix B 6.13 of our LIHI application is our 2019-2020 Fifteen Mile Falls Biannual CRMP Monitoring Report which describes PAL's review of the Pattenville and Route 18 boat ramps (page 2). The Moore Dam boat ramp is tentatively schedule for upgrade this year and will be reviewed in accordance with the CRMP.

GRH Response to Recreation Comments

| Commenter | Comment | GRH Response |
|---|---|--|
| General Comment: Improve conditions of portage trail and access areas to the river | | |
| Riverbend LRS | Work with river towns to improve access to the river. | <p>In 2014 - 2015 the portage trails, take-out, and put-in areas of all three dams were walked with Noah Pollock (then with the Paddler's Trail) to discuss possible improvements from the perspective of a boater who uses the areas. By the end of 2015, all three areas were upgraded taking into account Noah's suggestions. The steepness of the Comerford portage trail a topography issue and not something we can change. Stairs were added at the steepest location to assist boaters. An alternative route is available. It's a longer walk but mostly downhill. GRH will post both the current and alternative portage trails and ask that both are identified on Paddler's Trail materials. We spray the portage trails annually to keep the poison ivy down. Spraying usually occurs in June and spot treatment is done as needed thought the season.</p> <p>As far as improvements, over the past four years three boat ramps have been improved with a fourth planned for 2023.</p> |
| Riverbend LRS | Review the portage around Comerford Dam downstream for potential improvements. This is long and in places steep. | |
| CRC | CRC 's understanding based on personal communication is that there are needed improvements at the Comerford portage trail, which is very steep, as further evidenced by this quote from a paddler's website, "The portage at Comerford is amazing steep down behind the dam. I don't think I could have managed carrying my kayak down anything steeper... And I need to tip-toe through some poison ivy! | |

| General Comment: Conduct regular assessments of recreation area usage | | |
|--|---|---|
| Riverbend LRS | Conduct a recreation use survey to understand economic impact of recreation in the area. | GRH sees no need, requirement or purpose for conducting an economic impact study |
| CRC | There has not been any detailed use assessment of these recreational areas since 1997. | The 1997 Recreation Use study was the basis for determining what current use and needs were in order to develop the recreation plan incorporated into the license. We are not required to perform such an extensive study as that nor did the Recreation Plan suggest that similar “detailed” studies would be conducted. |
| CRC | In their Recreation Plan, the company committed to, “periodically reassess and evaluate the effectiveness of existing and new facilities to meet changing recreation need and demand; and monitor demand frequency of use and the quality of the experience at the major facilities and keep record thereon for periodic evaluation.” There is no documentation in this application that indicates that this is being done. | <p>The last Form 80 use assessment was in 2015. While FERC does not require Licensees to file this report, GRH continues to monitor use through its security contractors, who as part of their regular duty perform counts of vehicles and users and activities during their visits; sometimes as often as 3-4 times per day. They also report items that require maintenance or replacement – largely due to vandalism.</p> <p>FERC does continue to perform Public Use Inspections and GRH has been responsive to any and all observations. The most recent was 4 years ago.</p> <p>Based on all of the above GRH feels it has an adequate handle on where, when and how much use is occurring on an on-going basis; and believes that there is more than adequate facilities to meet the needs. We have made significant upgrades to our boat launches in the past few years, improved traffic, parking and patterns as needed. GRH will continue to do so.</p> <p>Additionally, we meet with communities and user groups regarding new opportunities and enhancements. As examples, we have facilitated an kayak rental vendor looking to provide opportunities for such on Moore Reservoir; we had supported and worked with promoters for two additional bass fishing derbies (in addition to the long-standing Moore Reservoir), as well as upgrading canoe camp sites which are not required project recreation facilities.</p> |

| General Comment: Additional primitive campsites | | |
|--|---|---|
| Riverbend LRS | Provide additional paddlers trail sites around Moore or Comerford reservoirs that do not conflict with the conservation easement. | From the Gilman dam (mile 108) at the head of Moore reservoir to Rygate dam (mile 137) downstream of McIndoe dam, there are six primitive (paddlers trail) campsites, two maintained by GRH. Within this 29 mile stretch, the farthest distance between sites is 11 miles. GRH participates in the Paddler's Trail annual meeting and encourages open communication with members. As a result of communication initiated this year, GRH is adding compostable toilets to both of its primitive camp sites, and stairs at one site. This effort includes cultural resource assessments, SHPO consultation, and potential mitigation, all independent of actual installation and maintenance. |
| General Comment: Improve maintenance at recreation areas, particularly portable restrooms | | |
| Riverbend LRS | Provide better maintenance of recreation access areas, including portable restrooms. | <p>We contract to have all portable restrooms cleaned weekly during the recreation season (early June to mid-October). Over the past few years, maintaining the facilities has been problematic at some locations due to vandalism (facilities burned to the ground, filled with live fireworks, and knocked over); one result is that the provider is unwilling to continue replacing the facilities. We understand the availability of vendor services has been hampered by post-Covid employment struggles as well. We continue to seek solutions and do not intend to have unclean or un-maintained facilities as a standard operating protocol.</p> <p>GRH, in concert with community based interests, is actively trying to identify and implement solutions to address the increasing and bold acts of vandalism. Specific to port-potti's: GRH is developing solutions to this problem, including purchasing replacement facilities, developing anchoring systems to prevent tipping over vandalism; looking at more permanent fire resistant facilities. GRH may adjust its open gate policy or hours of operation to discourage vandalism.</p> <p>GRH is in communication with local sheriff's offices, and town representatives and local public members on the Riverbend Sub-committee [to the CRJC] in developing resolutions to these issues.</p> |
| Riverbend LRS | The portage at the McIndoes impoundment has been observed to not clean out its port-a-potty facilities during the open season. | |

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|--|--|--|
| General Comment: Lake greeter | | |
| Riverbend LRS | Fund invasive species greeters at all boat launches on Moore with particular attention at events. It is nearly universal on all Vermont lakes now and has been for some years. | We are unaware of a greeter program in the vicinity of Moore Reservoir. We have never refused to discuss supporting programs such as these. There are 12 put-in's within the project area (10 ramps and 2 hand carry sites); and none see the amount of boats or use as other areas we participate with greeter programs elsewhere. Our participation in greeter programs elsewhere in VT is on a cost -sharing basis. |
| General Comment: Education and outreach - mercury | | |
| Riverbend LRS | Education and outreach, including posting of warnings about elevated mercury levels in fish, at the boat launches on both the Moore and Comerford Reservoirs. Conduct additional studies of mercury levels within and beyond the reservoirs. | GRH has and will continue to post fish consumption advisories <u>that are issued by the NHHHS and VTDEC</u> at the location of existing public informational signage displays at the public access areas within the Fifteen Mile Falls Project area. GRH conducts mercury monitoring in our project area in accordance with our agency and FERC approved monitoring plan. The data is provided to these States who in turn decide and develop the fish advisories. GRH is aware of no scientific or state management justification to expand that monitoring beyond the project area. |
| General Comment: Public communication | | |
| CRC | There needs to be clear and consistent local and regional marketing and public communication about the facilities and amenities available. | GRH recently updated its Company website to include Deerfield River project recreation area maps and information. Similar updates are in progress for GRH's remaining recreation areas. We anticipate this to be completed this summer or fall. |

Appendix B
Minimum Flow and Headpond Deviations

| Event Date | Development - Event | GRH Filing | FERC Response Letter | FERC Decision | Notes |
|------------|--|------------|----------------------|---------------|---|
| 2/7/14 | McIndoes minimum flow deviation | 2/17/14 | 3/31/14 | No Violation | The station tripped off-line due to equipment malfunction. Minimum flow was interrupted for 95 minutes before station service was restored and a Tainter gate opened. |
| 3/14/14 | McIndoes minimum flow deviation | 3/24/14 | 4/16/14 | No Violation | The station tripped off-line due to equipment malfunction and minimum flow was interrupted for 38 before station service was restored and a tainter gate opened. |
| 6/5/14 | McIndoes minimum flow deviation | 6/16/14 | 9/2/14 | No Violation | The station tripped off-line due to equipment malfunction and minimum flow was interrupted for 53 min before station service was restored and a generating unit brought on-line. |
| 7/8/14 | Moore and Comerford minimum flow deviation | 7/14/14 | 9/2/14 | No Violation | The stations tripped off-line when thunderstorms caused a fault in National Grid's 230KV transmission line between the two stations. Minimum flow was interrupted for 1 h 55 min before service was restored and a gate opened. |
| 7/13/14 | McIndoes minimum flow deviation | 7/23/14 | 9/2/14 | No Violation | The station tripped off-line due to equipment malfunction and minimum flow was interrupted for 56 min before station service was restored and a tainter gate opened. |

| | | | | | |
|-----------------|--|-----------------------|----------|--------------|--|
| 7/23/14 | Comerford minimum flow deviation | 7/31/14 | 9/2/14 | No Violation | The stations tripped off-line when thunderstorms caused numerous National Grid switch yard breakers and a 115KV line to trip. Minimum flow was interrupted for 1 hr 25 min before station service was restored. |
| 9/30/14 | Comerford minimum flow deviation | 10/10/14 | 11/19/14 | No Violation | The station was shut down for 62 min to allow clean-up, via boom deployment, of an oil sheen in the tailrace. |
| 10/1 – 10/21/14 | McIndoes and Comerford. Temporary modification of minimum flows under Article 401 and with Agency concurrence. | 10/10/14 and 10/22/14 | 10/28/14 | No Violation | Seasonal low inflows to the project coupled with low Moore reservoir elevation conditions caused a decision not to increase the minimum winter flows on Oct. 1. |
| 11/16/14 | McIndoes minimum flow deviation | 11/24/14 | 12/22/14 | No Violation | Failure of a voltage transformer on National Grid's 34.5KV line caused voltage deviation and opened breakers isolating McIndoes station. National Grid requested an immediate station shut-down to enable a reset of the 34.5 KV line. Minimum flow was interrupted for 40 min due to the voltage failure and station shut down. |

| | | | | | |
|--------------|--|------------------------------|----------------------|---|--|
| 4/1 – 4/5/15 | McIndoes and Comerford. Temporary modification of minimum flows under Article 401 and with Agency concurrence. | 4/13/15 | 6/3/15 | No Violation | Seasonal low inflows to the project coupled with low Moore reservoir elevation conditions caused a decision not to increase the minimum spring flows on April 1. |
| 8/22/15 | McIndoes minimum flow deviation | 8/31/15 | 10/15/15 | No Violation | The station tripped off-line due to equipment malfunction and minimum flow was interrupted for 51 min before station service was restored. |
| 8/24/15 | McIndoes minimum flow deviation | 9/1/15 | 10/15/15 | No Violation | The station tripped off-line due to a transmission line fault and minimum flow was interrupted for 30 min before a tainter gate opened under emergency power. |
| 2/3/16 | McIndoes minimum flow deviation | 2/12/16, 4/4/16, and 8/31/16 | 5/19/16 and 11/10/16 | Violation – no further enforcement action taken | With two units running, one unit was shut off resulting in the 3 h 25 min minimum flow deviation. Inattention by the primary operator was the cause. Corrective action was taken as described in subsequent letters. |
| 7/18/16 | McIndoes minimum flow deviation | 7/28/16 | 9/20/16 | No Violation | The station tripped off-line due to failure of fire detection/protection equipment on station service breakers. Minimum flow was interrupted for 21 min. The equipment was replaced. |

Fifteen Mile Falls Project***LIHI Recertification Review***

| | | | | | |
|----------------|---|---------|---------|--------------|--|
| 7/1/17 | McIndoes elevation limit exceeded | 7/11/17 | 11/2/17 | No Violation | Inflow rose very rapidly due to natural inflow from a heavy rain event and unforeseen failure of a section of pin flashboards at the upstream Comerford Dam. The station was out of service for maintenance, so gates were used to pass inflow and the exceedance was limited to 35 minutes without adding to high water conditions downstream. |
| 10/16-10/25/17 | Comerford. Temporary modification of minimum flows under Article 401 and with Agency concurrence. | 11/9/17 | 1/08/18 | No Violation | Extremely low natural inflows to the project caused a decision to reduce minimum flows until natural inflow increased. |
| 4/22/18 | McIndoes elevation deviation | 5/2/18 | 7/2/18 | No Violation | The upstream Comerford Development was discharging minimum flow when an additional unit came online. The travel time for the additional flow was underestimated and therefore did not arrive on time to maintain elevation at McIndoe dam. Flow at McIndoe was reduced to minimum, but it did not prevent the 0.06 ft deviation below minimum operating elevation. |
| 4/26/18 | Comerford minimum flow deviation | 5/2/18 | 7/2/18 | No Violation | An unanticipated transmission line operation tripped the single unit operating at the time resulting in an 11 min deviation. |

Fifteen Mile Falls Project***LIHI Recertification Review***

| | | | | | |
|-------------|--|---------|----------|--------------|---|
| 7/12/18 | Comerford minimum flow deviation | 7/20/18 | 11/16/18 | No Violation | A cracked insulator on the unit bus caused the single unit operating to trip. Station service to two other units did not fully transfer due to a failed electronic controller. Low pressure gate manually activated to restore flow after 31 min deviation. |
| 7/23/18 | Comerford minimum flow deviation | 8/2/18 | 11/16/18 | No Violation | Unit tripped due to a transformer electrical cable fault. Minimum flow restored after 17.5 min deviation. |
| 9/9-9/12/18 | McIndoes. Agency approved, planned reservoir drawdown. | 9/21/18 | 11/2/18 | No Violation | Drawdown was necessary to conduct repairs to the spillway flashboard deicing system. Conducted in accordance with License Art. 401. |
| 7/23/19 | McIndoes minimum flow deviation | 8/1/19 | 10/16/19 | No Violation | An unanticipated transmission line issue tripped the station and min flow was disrupted for 29 min, 30 sec before it was restored. |
| 8/17/19 | McIndoes minimum flow deviation | 8/27/19 | 10/16/19 | No Violation | A localized thunderstorm caused a transmission problem that tripped the |
| | | | | | station. Minimum flow was disrupted for 42 minutes. |
| 7/15/20 | McIndoes minimum flow deviation | 7/28/20 | 9/17/20 | No Violation | An unanticipated transmission line issue tripped the station. Minimum flow was disrupted for 42 minutes and 33 seconds. |
| 8/18/20 | McIndoes minimum flow deviation | 8/28/20 | 11/25/20 | No Violation | An unanticipated transmission line fault tripped the station resulting in a minimum flow disruption lasting 29 minutes and 20 seconds. |

Fifteen Mile Falls ProjectLIHI Recertification Review

| | | | | | |
|---------------|---|----------|-------------------------------|-------------------------------|--|
| 9/25-10/18/20 | Comerford. Temporary modification of minimum flows under Article 401 and with Agency concurrence. | 10/29/20 | 12/18/20 | No Violation | With state agency concurrence, minimum flow was reduced to 600-650 cfs for 23 days. Historic low flows and drought conditions resulted in depleted storage for downstream minimum flows. Reducing minimum flow at Comerford allowed for reasonable resource flows through the system while limiting adverse conditions for future reservoir management heading into winter. |
| 6/21-6/30/21 | Moore. Temporary elevation deviation under Article 401 with Agency concurrence. | 7/12/21 | 12/17/21 | No Violation | Due to lower-than-normal conditions in the area a conflict occurred meeting the Comerford Development minimum flow constraint and the Moore Development elevation constraint. It was agreed that Moore reservoir would gradually be drawn down as necessary to pass the required minimum flow of 818 cfs at Comerford. The maximum drawdown deviation was less than 1.6 feet below the 2-foot limit. |
| 10/1-10/26/21 | Comerford and McIndoes. | 11/5/21 | <i>(No response from FERC</i> | <i>(No response from FERC</i> | With state agency concurrence, summer minimum flow was continued through |

| | | | | | |
|----------|--|----------|--------------------------------------|--------------------------------------|--|
| | Temporary modification of minimum flows under Article 401 and with Agency concurrence. | | <i>to date)</i> | <i>to date)</i> | October 26 rather than increasing to winter minimum flows on October 1. Low flow and drought conditions resulted in depleted storage at the Project. Continuing summer minimum flow at Comerford and McIndoes allowed storage recovery to normal historic operations at Moore reservoir. |
| 12/18/21 | McIndoes elevation deviation and minimum flow deviation | 12/23/21 | <i>(No response to FERC to date)</i> | <i>(No response to FERC to date)</i> | Reservoir elevation dipped 0.13 inches below the required elevation for about 49 min, and discharge fluctuated above and below the required 2210 cfs minimum flow 34 times over a 2 hr, 20 min period. The flow deficiency averaged approx. 20 cfs, or <1% of required flow. Both deviations appear to have occurred due to operator error. In response to the elevation deficiency alarm, the operator reduced discharge at McIndoes dam and increased discharge at Comerford dam to increase McIndoes reservoir elevation. However, the unit generation set point needed to maintain min flow was not correctly specified. |