

# REVIEW OF APPLICATION FOR CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE CANAAN HYDROELECTRIC PROJECT

(FERC No. 7528)

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## **I. INTRODUCTION**

This report reviews the April 2019 updated application submitted by Central River Power NH, LLC (Applicant) to the Low Impact Hydropower Institute for Low Impact Hydropower Certification for the Canaan Hydroelectric Project (Project) Federal Energy Regulatory Commission (FERC) Number 7528. An initial application was submitted in February 2019 and a Stage 1 Intake Review Report was prepared by the Reviewer in April 2019, which included additional follow-up questions regarding the Project. The Applicant provided the requested supplemental information in the revised application package which was submitted on May 3, 2019. The following certification review was conducted in compliance with LIHI's handbook, 2<sup>nd</sup> Edition, revision 2.03 dated December 20, 2018.

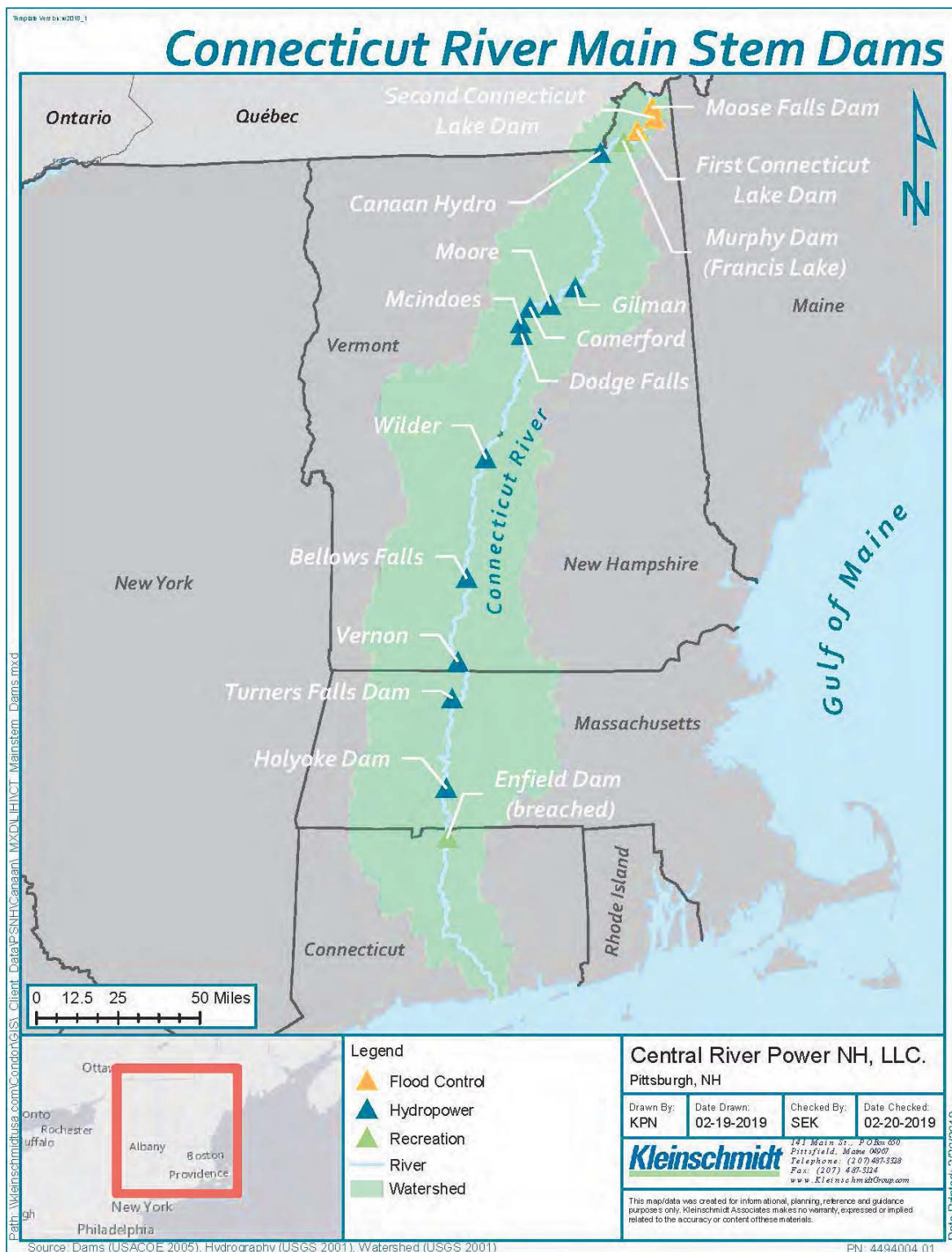
The Project was most recently licensed by FERC on January 16, 2009, as a minor Project at an existing dam. The State of Vermont, Department of Environmental Conservation (VDEC) issued a Water Quality Certification (WQC) for the Project on November 20, 2008 on behalf of both Vermont and New Hampshire (the Project lies in both states). The Project is owned by Hull Street Energy (HSE) Hydro NH, AC, LLC and operated by Central Rivers Power NH, LLC. It operates as a run-of- river plant and has a capacity of 1.1 megawatts. The dam was built in 1927 and was reconstructed in 1943, when the original timber dam failed. A powerhouse was added to the facilities in 1943. It was originally licensed by FERC on August 24, 1984 as a minor project.

## **II. PROJECT'S GEOGRAPHIC LOCATION**

The Project is located at river mile (RM) 370 on the Connecticut River, near West Stewartstown Village in Coos County, New Hampshire and near Canaan, Vermont (Figure 1). The Connecticut River is New England's largest river. It has an 11,250 square mile watershed and flows 407 miles from its headwaters to Long Island Sound. The Project has a watershed area at the dam of 381 sq. miles, which is about 3 percent of the total Connecticut River watershed.

The Canaan Dam is one of 13 dams on the mainstem of the Connecticut River which provide flood control and/or hydroelectric power. The reach, directly below the Canaan Project, is the

Connecticut River's longest free-flowing reach upstream of Holyoke Dam, which is located at Rm 87 in Southern Massachusetts.



**Figure 1. Connecticut Mainstem Dams**

### III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Canaan Project has a FERC boundary of 26.1 acres. The Project consists of an impoundment, dam, powerhouse, tailrace channel, transmission lines, transformers, and associated facilities. The run-of-river plant is a base-load unit, which operates whenever adequate river flows are present. A minimum flow of 220 cubic feet per second (cfs), is required for generation (165 cfs bypass flow plus a 55 cfs minimum generation flow). The maximum hydraulic capacity of the turbine/generator is 466 cfs. The impoundment is 4000 feet long and has a surface area of 20 acres with a maximum storage of 200-acre feet.

As described in the application, the Canaan dam (Figure 2) is approximately 275 feet long. The height of the dam measured from the lowest elevation of the natural streambed at the downstream toe of the dam to the top of the 3.5-foot-high spillway flashboards is 18 feet. A concrete section is located at the south abutment and is 56 feet wide with stoplogs supported by steel stanchions. The crest of the sluiceway is at elevation 1046.0 (USGS) and the stoplogs extend up to elevation 1055.7 (USGS).



**Figure 2. Canaan Dam**

The main spillway of the dam is a concrete gravity, ogee-shaped section approximately 150 feet long with a crest elevation of 1051.5 (USGS). This section is equipped with 3.5-foot-high pipe-supported flashboards extending to elevation 1055.0 (USGS).

A waste gate is located to the right of the main spillway. It consists of a 20-foot wide concrete sluiceway equipped with an electrically operated 15-foot high steel tainter gate. The crest of the sluiceway is at elevation 1040.75 (USGS).

The intake structure is located on the north abutment (the Vermont side) of the dam. The intake racks have a 3-inch spacing. The powerhouse has one generation unit (capacity of 1,100 KW). The steel penstock is 9 feet in diameter, 1360 feet long. It is supported by concrete saddles. Two surge tanks, approximately 15 feet in diameter and 21 feet high, are located near the penstock.

Discharges from the powerhouse travel through a 400-foot long open tailrace and then into the Connecticut River. The bypass reach is approximately 1600 feet long. Power generated by the Project is transmitted through a 1450-foot long, 34.5-kilovolt transmission line connecting to the regional grid.

#### **IV. ZONES OF EFFECT**

The three Zones of Effect being evaluated for this Project are shown in Figure 3:

- Zone 1 is the impoundment (blue);
- Zone 2 is the bypass reach (yellow); and
- Zone 3 is the downstream reach (red).



**Figure 3. Zones of Effects**

## V. REGULATORY AND COMPLIANCE STATUS

### FERC Licensing and Water Quality Certification

FERC issued a license to the prior owner, Public Service Company of New Hampshire on January 26, 2009.<sup>1</sup> The license was transferred to the current owner on September 11, 2018, and the license was amended to change the Licensee name on April 9, 2019. The previous license, a 25-year minor license that was granted in August 24, 1984, expired on July 13, 2009. The dam was originally constructed in 1927 as a non-hydro dam. In 1943, the dam was reconstructed and upgraded, and hydropower facilities were added to the project.

<sup>1</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11906826>



The FERC license for the Project, includes the Water Quality 401 Certification (WQC) issued by VDEC on November 20, 2008.<sup>2</sup> These documents require the Project to implement a number of actions. Those pertinent to LIHI criteria are included in Table 1.

Table 1. License Terms and conditions (FERC) and Water Quality Certification Conditions (VDEC).

FERC License Article or VT WQC number	Plan or Action	Date Applicant Filed with FERC	Action Approved by FERC (approval letters indicating required action was completed)
FERC 401 VT-B	Bypass flow of 165 cfs (or natural inflow if less than 165 cfs) is instantaneous flow delivered as full crest spillage	Feb 12, 2010	Apr 6, 2010
VT-C/D	Impoundment Water Level Management	Feb 12, 2010	Apr 6, 2010
VT-E	Flow Management Plan	Feb 12, 2010	Apr 6, 2010
VT-F	Monitoring plan for Impoundment and Flow Management	Feb 12, 2010	Apr 6, 2010
FERC 404	Historic Properties Management Plan under Programmatic Agreement with Vermont and New Hampshire State Historic Preservation Offices on Dec 8, 2008	Jul 29, 2010 Jul 29, 2011 Jul 18, 2013 Jul 31, 2015	Aug 18, 2010 Aug 3, 2011
FERC 402 VT-I	Upstream fish Passage Design	In abeyance	
FERC 402 VT-H	Downstream Fish Passage Design	In abeyance	
FERC 402 VT-J	Passage Effectiveness Study Plan	In abeyance	
FERC 401 VT-R	Shoreline Erosion Monitoring Report	Feb 24, 2015 Dec 29, 2017 Mar 6, 2019	No action required
VT-L	Debris Disposal Plan	Oct 3, 2011	Nov 3, 2011
VT-N	Public Access/Public Safety	Aug 26, 2011	Sep 19, 2011
FERC 401 VT-O	Riparian Management Plan	Apr 30, 2010	Dec 6, 2010
FERC 403 VT-P	Recreation Management Plan	Oct 25, 2010	Dec 21, 2010
FERC 403 VT-Q	Boat Cleaning Station and Put-In at Vermont Route 114 Bridge.	Feb 28, 2012	Jun 14, 2012

The current FERC license requires the Project to operate in a run of the river mode assisted by a pond level control, such that instantaneous flows provided below the tailrace equal the instantaneous inflows into the impoundment. A minimum flow of 165 cfs, or inflow, if less, is maintained continuously in the bypass reach below the dam. The license also requires that flow

<sup>2</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11858942>

over the dam shall be provided as full-crest spillage to support aquatic habitat and aesthetics downstream of the dam.

Based on the FERC record from issuance of the relicense, the Project appears to be in compliance with these terms and conditions. No compliance issues were identified in the Docket Search.

At the time of licensing, the provision of fish passage at the facility for both upstream and downstream passage of resident trout was considered. FWS and the New Hampshire Dept. of Fish and Game (NHFG) and stakeholders advocated for immediate installation of fish passage facilities for resident trout. FERC found the action unwarranted in the Environmental Assessment<sup>3</sup>, due to an ongoing stocking program in the reach where the Project is located. The stocking program is conducted by the NHFG to support a popular recreational fishery. The License notes there is nothing in the record to indicate that existing survival and growth of trout are deficient, nor is there any information to indicate whether access to additional habitat is currently a limiting factor for fish populations. The 401 WQC certification concluded that provision of fish passage at the dam is less critical as long as the high recreational demand requires NHFG to stock the Connecticut River near the Project to meet this demand. The trout fishery remains popular and will likely continue to be supported by stocking.

## **VI. PUBLIC COMMENTS RECEIVED OR SOLICITED BY LIHI**

On May 3, 2019 LIHI opened the public comment period for the Project application. The deadline for submission of comments was July 2, 2019. One comment letter was received from the Connecticut River Conservancy (CRC) on July 2, 2019 (Appendix A). The Applicant responded to those comments on July 12, 2019 (Appendix A). Both comments and responses were posted on the LIHI website upon receipt and are summarized in applicable criterion sections below. LIHI staff also contacted VDEC via email for input on the Project's WQC and received an emailed response on July 9, 2019 which included prior communications between VDEC and the Applicant's representative (Appendix A), discussed in applicable criterion sections below.

## **VII. SUMMARY OF COMPLIANCE WITH LIHI CRITERIA**

The following matrices include the standards selected by the Applicant for the Project for each criterion by Zone of Effect. The Reviewer concurs with the Applicant's selection of three Zones of Effect. The Zones of Effect are presented in order from upstream to downstream: Zone 1-impoundment, Zone 2-bypass reach, and Zone 3-downstream reach. The alternative standards for each reach are discussed below. Where the Reviewer's selection differed from the

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<sup>3</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11624076>

applicant's, the table is marked with **red X**. An explanation of the selection is provided for each criterion.

#### Zone 1: Impoundment Zone of Effect

CRITERION		ALTERNATIVE STANDARDS				
		1	2	3	4	Plus
A	Ecological Flow Regimes	<b>X</b>	<del>X</del>			
B	Water Quality Protection		X			
C	Upstream Fish Passage	X				
D	Downstream Fish Passage and Protection	X				
E	Watershed and Shoreline Protection		X			X
F	Threatened and Endangered Species Protection	<del>X</del>	<b>X</b>			
G	Cultural and Historic Resources Protection		X			
H	Recreational Resources		X			

#### Zone 2: Bypass Reach Zone of Effect

CRITERION		ALTERNATIVE STANDARDS				
		1	2	3	4	Plus
A	Ecological Flow Regimes		X			
B	Water Quality Protection		X			
C	Upstream Fish Passage		X			
D	Downstream Fish Passage and Protection		X			
E	Watershed and Shoreline Protection		X			X
F	Threatened and Endangered Species Protection	<del>X</del>	<b>X</b>			
G	Cultural and Historic Resources Protection		X			
H	Recreational Resources		X			

#### Zone 3: Downstream Zone of Effect

CRITERION		ALTERNATIVE STANDARDS				
		1	2	3	4	Plus
A	Ecological Flow Regimes		X			
B	Water Quality Protection		X			
C	Upstream Fish Passage	X				
D	Downstream Fish Passage and Protection	X				
E	Watershed and Shoreline Protection		X			X
F	Threatened and Endangered Species Protection	<del>X</del>	<b>X</b>			
G	Cultural and Historic Resources Protection		X			
H	Recreational Resources		X			



## **A. Ecological Flow Regime**

**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:** The Applicant selected Standard A-2, Agency Recommendation for all three zones.

***Standard A-2, Agency Recommendation: The flow regime at the Facility was developed in accord with a site-specific, science-based agency recommendation.***

### **Impoundment Reach**

For the impoundment, the Applicant selected Standard A-2. However, the Reviewer selected A-1 Standard for this reach.

***Standard A-1, Not Applicable/De Minimis effect. The facility operates in a true run-of-river operational mode and there is no bypassed reaches or water diversion associated with the facility.***

The impoundment is subject to the natural inflow of the river. It is approximately 4000 feet long and a surface area of 20 acres. Under Condition F of the WQC, the Licensee was required to develop a plan for compliance with run-of-river operations in the impoundment. The impoundment level control was set at 1055.45 ft which ensures compliance with minimum bypass flows for the bypass reach as required by the WQC. The run-of-river operation requirements are achieved using an impoundment level control to maintain appropriate water surface elevation and to provide the required 165 cfs minimum instream flow into the bypass reach. The FERC license also requires that the Project release 90 percent of inflow during impoundment refill after maintenance drawdowns for flashboard replacement to protect downstream aquatic biota. The WQC also restricts drawdowns to 1.0 feet below the dam crest without prior approval. The Reviewer believes that the Project meets criteria for the A-1 standard in this reach.

### **Bypass Reach**

For the bypass reach, the Applicant selected Standard A-2. The Reviewer concurs with the Applicant's selection.

***Standard A-2, Agency Recommendation. The flow regime at the facility was developed in accordance with a science-based agency recommendation.***

The WQC requires a bypass flow of 165 cfs, or inflow if the inflow to the impoundment is less than 165 cfs. According to the WQC, this flow level was determined to be appropriate based on

the results of an instream flow study conducted as part of relicensing.<sup>4</sup> This flow level is an increase over previous conditions where 50 cfs was typically released into the bypass. The WQC also notes that with adequate flows the bypass reach can provide habitat for salmonids and macroinvertebrates but has limited spawning suitability due to the lack of gravel substrates (WQC, page 7). The bypass flow is maintained through the use of an impoundment level control, which automatically regulates the turbine output as necessary to achieve the desired bypass flow. The Flow Management Plan allows the temporary modification of run-of-river if needed for an emergency situation with notification to the FERC, Vermont Agency of Natural Resources (VANR) NHDES, FWS, and NHFG by telephone prior to any temporary modifications. During flood control operations, the waste gate is used to pass flows if the impoundment level exceeds 1057 feet. The waste gate prevents the potential loss of the wooden flash boards under high flows.

If the turbine shuts down, either for scheduled maintenance or an unscheduled event, the Project will increase the bypass flows, as the generation flow spills from the impoundment into the bypass reach. The sensor levels are checked and calibrated annually to verify function (application page 19).

If the flashboards should fail, remedial action will occur after the river flow has receded to allow access to the dam. The Licensee will lower the impoundment to no more than one foot below the fixed dam crest to allow maintenance to be performed on the flashboards. The Licensee will notify FERC and state and federal agencies within 24 hours of any deviation in bypass flows.

Condition F of the WQC required the development of an impoundment and flow management monitoring plan. The approved plan emphasizes continuous monitoring and reporting of flow releases at the Project (including both spillage and turbine discharge); impoundment levels; and inflows. The Project is operated in compliance with condition F using impoundment level controls to maintain an impoundment level at 1055.45 feet to ensure compliance with required minimum instream flows in the bypass reach. During flow control operations the Project uses the waste gate to pass flows, if the impoundment level exceeds the operation level. The plan also contemplates both types of turbine shutdowns, planned and unplanned. The Licensee monitors generation, impoundment level and inflows at the Project; and uses a USGS gage to predict project inflows. The run-of-river operations creates a stable impoundment and provides required flows to the bypass reach. (application pages 18-19).

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<sup>4</sup> <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11414740>

## **Downstream Reach**

For the downstream reach, the Applicant selected Standard A-2 and the Reviewer concurs with this selection.

**Standard A-2, Agency Recommendation. The flow regime at the facility was developed in accordance with a science-based agency recommendation.**

Project operations are consistent with the WQC Condition B that requires the facility to operate in a true “run-of-river mode”, where instantaneous flows below the tailrace equal the instantaneous flow into the impoundment. When the facility is not operating, all inflow to the impoundment passes over the dam into the bypass reach and enters the downstream reach. In addition, the flow management plan filed with FERC on February 12, 2010 in response to Condition E of the WQC, details operations that comply with the required flows in the bypass reach and water fluctuation limitation in the impoundments.

As noted above, Condition F of the WQC required a flow management monitoring plan for continuous monitoring and reporting of flow releases at the Project (including both spillage and turbine discharge); impoundment levels; and inflows. The Project is operated in compliance with condition F to ensure compliance with required minimum bypass flows.

The CRC commented that the Applicant had not explained how the Project satisfies Standard A-2. The WQC (Appendix C in the application) includes the requisite background information as summarized above for the bypass reach where Standard A-2 is applicable.

VDEC provided LIHI with a copy of email correspondence with the Applicant’s representative requesting one water year of operations data to confirm run-of-river operations. According to the Applicant, since the sale of the Project in 2018, they have been attempting to retrieve historical operations data from the prior owner and will provide that information to VDEC once it is available. As such, the Reviewer recommends a condition requiring the Applicant to provide such data to VDEC as soon as it becomes available, and to inform LIHI of acceptance by VDEC that run-of-river operations are occurring.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project conditionally satisfies the ecological flow regimes criterion.

## **B. Water Quality**

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

**Assessment:** The Applicant selected Standard B-2, Agency Recommendation for water quality in all three zones. The Reviewer concurs with the Applicant's selection.

***Standard B-2, Agency Recommendation. The facility is in compliance with all water quality conditions contained in a recent science-based agency recommendation providing reasonable assurance that water quality standards will be met for all waterbodies directly affected by the Project, for example a recent WQC issued pursuant to Section 401 of the Clean Water Act. The assessment must include consideration of all water quality components necessary to preserve healthy fish and wildlife populations, support human uses, including recreation.***

The Project is operated in compliance with the WQC issued by the Vermont Agency of Natural Resources, Dept. of Environmental Conservation (VDEC) on November 20, 2008. In the vicinity of the Project, the Connecticut River is classified as a Class B water by both Vermont and New Hampshire (FERC EA). Class B Waters are acceptable for fishing, swimming and other recreation purposes and for water supply after suitable treatment. The application (application page 24) notes that the NHDES designated 1.83 mile of the Connecticut River just 2 miles upstream of the Project as impaired due to pH levels, and other portions of the river are also listed in the NH 2016 impaired waters list as pH impaired due to acidic atmospheric deposition.<sup>5</sup> The Project area is not listed on Vermont's 2018 impaired waters list.<sup>6</sup> The Canaan Project impoundment itself is classified as "Good" and is in support of its designated uses. Under WQC Condition G and license article 401, a dissolved oxygen study is to be conducted if the triggering flow of 200 cfs occur at the Project. Appendix D of the application indicates that the triggering flow has not occurred at the Project during the years from 2011 to 2018, thus no measurements have been taken.

The water quality in the vicinity of the Project appears to support uses including fishing, boating, and aquatic habitat, but not for swimming due to e coli, according to the FERC EA which summarized water quality monitoring conducted in 2000 for temperature and in 2004 for dissolved oxygen within state water quality standards and "excellent temperature regimes for salmonids".<sup>7</sup> Although NHDES has reported that PCB's have been detected in some fish, the concentrations appear to be less than those that would require a fish consumption advisory for

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<sup>5</sup> <https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2016/documents/r-wd-17-09-app-a1.pdf>

<sup>6</sup> <https://www.epa.gov/sites/production/files/2019-02/documents/2018-vt-303d-list-report.pdf>

<sup>7</sup> <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11624076>

<sup>8</sup>

[https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2008/documents/appendix\\_10\\_removed\\_from\\_303\\_d.pdf](https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2008/documents/appendix_10_removed_from_303_d.pdf)

PCB's.<sup>8</sup> However, "insufficient information" was cited by NHDES, (draft 2018 303(d)<sup>9</sup> mapping but they included all three reaches as, "Likely Good" and potentially fully supporting" relative to designated uses.

The WQC is slightly more than 10 years old and the application did not include an agency letter from VDEC indicating that the WQC is still valid as recommended in the LIHI Handbook. However, the WQC indicated that "the run-of-river operation and increase in bypass conservation flows [from that in the prior license] should assure that dissolved oxygen standards will be met in the future. During critical summer low flows...the station will be off line and all inflows will be spilled, providing full aeration benefits." The WQC also noted that additional data collection "is a continuing need for the purposes of the water quality certification review." (WQC page 6) which resulted in the Condition G requirement for dissolved oxygen monitoring if summertime low flow triggers are met.

The CRC commented: *"While the company is technically in compliance with the requirements of the WQC, there has been no data collection to actually identify if water quality standards are being met"* and recommended that if the Project is certified, a condition be added to require ongoing dissolved oxygen and temperature monitoring.

The Applicant reached out to NHDES requesting confirmation that Project operations do not contribute to water quality limitations (Project waters are located in both Vermont and New Hampshire). No response to the Applicant's inquiry was received from NHDES, but NHDES purposefully declined to comment on the application and did not request water quality monitoring data as the agency typically does for LIHI applications.<sup>10</sup> LIHI staff sent an email inquiry to VDEC about water quality at the Project. The response received via email<sup>11</sup> stated: *"The DO and WQ are likely fine at the Canaan Project at the flows that have been observed. The potential project's affect [sic] on WQ during the critical summer low flow values remains unknown since the flow value triggering monitoring has not occurred."* VDEC also provided LIHI with a copy of email correspondence with the Applicant's representative (see Appendix A) which confirmed *"that the continued operation of the project does not contribute to impairment of waters of the State."*

Therefore, based on the application, supporting documentation, agency communications, and FERC elibrary documents, this review finds that there is reasonable assurance that the Project meets water quality standards and satisfies the water quality criterion. The condition

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<sup>9</sup><https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2018/index.htm>

<sup>10</sup>Telephone communication between LIHI staff (Maryalice Fischer) and NHDES staff (Ted Walsh), June 28, 2019.

<sup>11</sup> email from Jeff Crocker, VDEC Streamflow Protection Coordinator, July 8, 2019.

requested by CRC is not needed since low flow conditions, if and when they occur, would trigger the existing requirement to conduct such sampling.

### **C. Upstream Passage Standards**

**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, sustainable fish and wildlife resources in areas affected by the facility.

***For all reaches the Applicant selected C-1 Not Applicable/De Minimis Effect for upstream passage for all zones. The Reviewer concurs with the Applicant's selection of C-1 although C-2, Agency Recommendation is also satisfied in applicable zones.***

There are no anadromous or catadromous fish in the reach of the Connecticut River where the Project is located, as there are several dams downstream which block upstream migration of anadromous fish. These include Gilman Falls Project (FERC 2392 and LIHI No. 108), approximately 70 river miles downstream, and Fifteen Mile Falls Project (FERC 2077 and LIHI No. 39) approximately 87 miles downstream of the Canaan Project (see Figure 1).

American eel, a catadromous fish, is found in the lower portions of the Connecticut River and may have been present at the Project site prior to development of the numerous dams on the Connecticut River. The Canaan dam was constructed in 1927 while numerous downstream dams were in place earlier (e.g., Holyoke LIHI #89, Vernon LIH #40, and Bellows Falls). Catadromous fish spawn in marine water and migrate into rivers to rear in fresh water. The downstream projects prevent eels from reaching the Project area.

Upstream passage for resident fish, specifically trout, was considered as part of both the relicensing and WQC processes. Resource agencies and stakeholders initially requested upstream and downstream passage at the Project. An evaluation of the technical and economic feasibility of upstream passage was completed as part of relicensing and in response to agency and stakeholder requests (Appendix F of the application). The application states that no comments on that study were received.

License article 402 includes the FWS reservation of authority to prescribe fishways. In WQC Condition I and license article 401, VDEC reserved the right to require the installation of fish passage facilities, should the fisheries management actions of New Hampshire Fish and Game (NHFG) change. Currently the Connecticut River near the Project is heavily stocked by NHFG to support a put and take fishery for brook, brown and rainbow trout. VDEC indicated that passage would be considered only after NHFG adopts a management plan that emphasizes self-



sustaining wild trout populations and provides VDEC with a plan for reducing or eliminating stocking and/or harvest in the towns of Stewartstown, Colebrook, and Columbia after implementation of passage (WQC and FERC License). NHFG is continuing to support the fishery with hatchery-raised trout.

The CRC commented that: *"...the Canaan project marks a very clear change in the river substrate and separates a large part of the trout population from the best natural spawning habitat...Unimpounded cold-water habitat is rare on the mainstem Connecticut River, and Canaan Dam disconnects the [sic] two of the longest reaches of that type of habitat...Through the last relicensing...there were numerous statements to indicate that the fishery above and below the Canaan dam is being damaged by the dam and that fish passage would enhance the reproductive health of this cold-water fishery"*

CRC recommended that if the Project is certified, a condition be added requiring upstream and downstream passage *"to support this cold-water fishery and reduce the burden on the states to stock this heavily used resource. A true low-impact facility would help the recovery of this riverine species to natural levels"*.

VDEC wrote to the Applicant's representative (Appendix A), stating that while fish passage remains of interest to both states, *"there are no immediate plans to initiate consultation."*

The WQC (pages 8-10) indicated that there is limited habitat value in the impoundment while there is spawning, fry and juvenile habitat upstream of the impoundment and feeding and overwintering habitat downstream of the Project. Electrofishing surveys conducted in 2008 in Vermont tributaries to the Connecticut River in the Project vicinity yielded low density and productivity of brown and rainbow trout *"due to these streams' low alkalinity attributed to the granitic bedrock of the watersheds"*. Electrofishing surveys in NH tributaries documented that those streams supported natural reproduction of brook, brown and rainbow trout (WQC page 9).

The FERC EA, which did not recommend fish passage facilities, noted that while naturally reproducing trout populations are currently sustaining themselves, the stocking program serves to supplement the populations in order to meet the high level of angling pressure in the Project vicinity; and that the stocking program has been in existence since the 1930s with no expectation that it would be discontinued (EA pages 27-28).

As CRC suggests, the relicensing record indicates statements were made by FWS and Trout Unlimited about the status of the fishery above and below the Project, but no scientific evidence was found in the FERC record to support those statements for trout at the Project.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds no scientific evidence that the Project poses a barrier to trout that affects their ability to successfully complete their life cycle and maintain sustainable populations. Given that the current fisheries management approach prioritizes stocking for recreational angling over increasing the wild trout population, the Project appears to meet the C-1 standard and can also meet the C-2 standard given the formal agency recommendations to not require passage at this time. Therefore, this review finds that the Project satisfies the upstream fish passage criterion.

The condition requested by CRC is not needed since agency requests or a change in the current fishery management program would trigger the existing requirement to implement upstream passage. In addition, there is no evidence that the current stocking program poses a burden to the states, particularly since the popular fishery has been in place for decades. There is no information about what the natural level of the trout population would be that could be restored, if that was prioritized as a management goal and current stocking program ceased.

#### **D. Downstream Passage and Protection Standards**

**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. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the Facility.

***The Applicant selected D-1 Not Applicable/De Minimis Effect for downstream passage for all zones. The Reviewer concurs with the Applicant's selection of D-1 although D-2, Agency Recommendation is also satisfied in applicable zones.***

The recreational fishery in the vicinity of the Project includes rainbow, brown, and brook trout, white sucker and dwarf longnose sucker. Chain pickerel, yellow perch, smallmouth bass, largemouth bass, and rock bass are also present (application page 30, EA page 27).

As discussed in Section C, populations of rainbow, brown, and brook trout are supplemented by stocking to support a recreational fishery the Connecticut River. Stocking of trout species on a yearly basis occurs upstream of the Project and directly into the Project impoundment. The reach downstream of the Project (Stewartsville to Stratford) also receives stocked fish, but at a lower level. The goal of the stocking program is to provide additional fish to help the populations sustain the high level of angling currently experienced near the Project.

An evaluation of the technical and economic feasibility of downstream passage<sup>12</sup> for resident fish was completed as part of relicensing. The study concluded that a downstream passage facility was not needed as long as trout populations were supplemented with stocked trout by the NHFG. No comments were received on the study. The FERC license article 402 includes FWS reservation of authority to prescribe fishways in the future. In Condition H of the WQC, VDEC will require downstream passage for trout within two years of an agency request. This would only occur after NHFG provides VDEC with a plan for reducing or eliminating stocking and harvesting in Connecticut River near the towns of Stewartstown, Colebrook, and Columbia after implementation of passage.

A second issue relative to downstream passage examined in the FERC EA was the potential effect on fish populations by the loss of fish that inadvertently pass through the Project turbine and may, through exposure to the turbine, suffer mortality. According to the application, Winchell et al. (2000) examined potential mortality rates at the Canaan Project from downstream passage through the turbine. They found that mortality of fish passing through the turbine is likely small. They estimated, based on the type of turbine installed in the Project (vertical Francis unit), and the head associated with the reservoir elevations, that fish passing through the turbine would likely have a 90 percent survival rate due to the slower approach velocity (< 2 feet per second) found at the Project. Winchell et al. concluded that passage through the turbine would likely not result in a meaningful degree of mortality. It should be noted that the study was conducted prior to relicensing and the current higher minimum flow (from 50 cfs to 165 cfs) into the bypass reach.

In the bypass reach, the 165 cfs minimum flow is intended to provide adequate flow to support aquatic habitat and allow for downstream passage. Since the flow over the dam covers a much broader extent than flow directed to the intake, it is likely that most fish moving downstream would use the bypass reach. In addition, the instream flow study conducted during relicensing included flow and water depth measurements which demonstrated that downstream fish passage through the bypass reach would not be impeded at the original base flow of 50 cfs nor at the 165 cfs minimum flow.

In the downstream reach, once a fish is past the dam via the bypass reach or through the powerhouse, there are no additional Project barriers to downstream passage.

The CRC commented: *“The applicant claims Standard D-1 for Downstream Fish Passage. In order to meet this standard, the applicant must show that, ‘the facility does not contribute*

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<sup>12</sup> Only the upstream feasibility report was included in the application, but the downstream feasibility report was also reviewed (<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11018027>).

*adversely to the sustainability of riverine fish populations or to their access to habitat necessary for the completion of their life cycles’ [quoting the LIHI handbook]”.*

The instream flow study results indicate no concern with downstream passage availability in the bypass reach, and the entrainment study indicated minor potential mortality for any fish that might pass from the impoundment reach into and through the powerhouse. As noted in Section C, the current fisheries management approach prioritizes stocking for recreational angling over increasing the wild trout population. No evidence was found to indicate that the trout population is adversely affected by the Project, and the state resource agencies do not intend to initiate consultation on passage at this time.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds no scientific evidence that the Project poses a barrier to trout that affects their ability to successfully complete their life cycle and maintain sustainable populations, and since there are no diadromous species present, the Project meets the D-1 standard and can also meet the D-2 standard given the formal agency recommendations to not require passage at this time. and satisfies the downstream fish passage criterion.

The condition requested by CRC to require downstream passage is not warranted at present for the same reasons noted in Section C above.

## **E. Shoreline and Watershed Protection Standards**

**Goal:** The Facility has demonstrated 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.

***The Applicant selected Standard E-2, Agency Recommendation for shoreline and watershed protection for all zones. The Reviewer concurs with the Applicant that Standard E-2 is appropriate. In addition, the Applicant has requested a plus standard for this category.***

Much of the land in the vicinity of the Project is industrial and commercial buildings and rural residential housing and agricultural lands. There are 2.7 acres of forested land within the Project Boundary. Beyond the FERC Project Boundary, there are forested lands along both sides of the river.

Three conditions in the WQC (L, O, and R) address shoreline and watershed protection. Condition L required the Licensee to develop a plan to address proper disposal of debris associated with Project operation including debris captured by the trash rack (Plan submitted and approved by FERC November 3, 2011).

Condition O required the development and implementation of a Riparian Management Plan (RMP) to develop and maintain an undisturbed, naturally-vegetated riparian zone along the river. This plan, filed on April 30, 2010 was approved by FERC on December 6, 2010. The goal of the plan is to maintain and preserve the existing vegetation riparian area to protect wildlife habitat, maintain water quality and provide public access for recreation.

The purpose of the RMP is to maintain an undisturbed riparian zone along the river including a narrow corridor along the impoundment and the bypass reach. The Applicant conducts a survey (every 4 years) for invasive plants. If invasive plants are identified, the Applicant consults with the agencies on eradication and control measures.

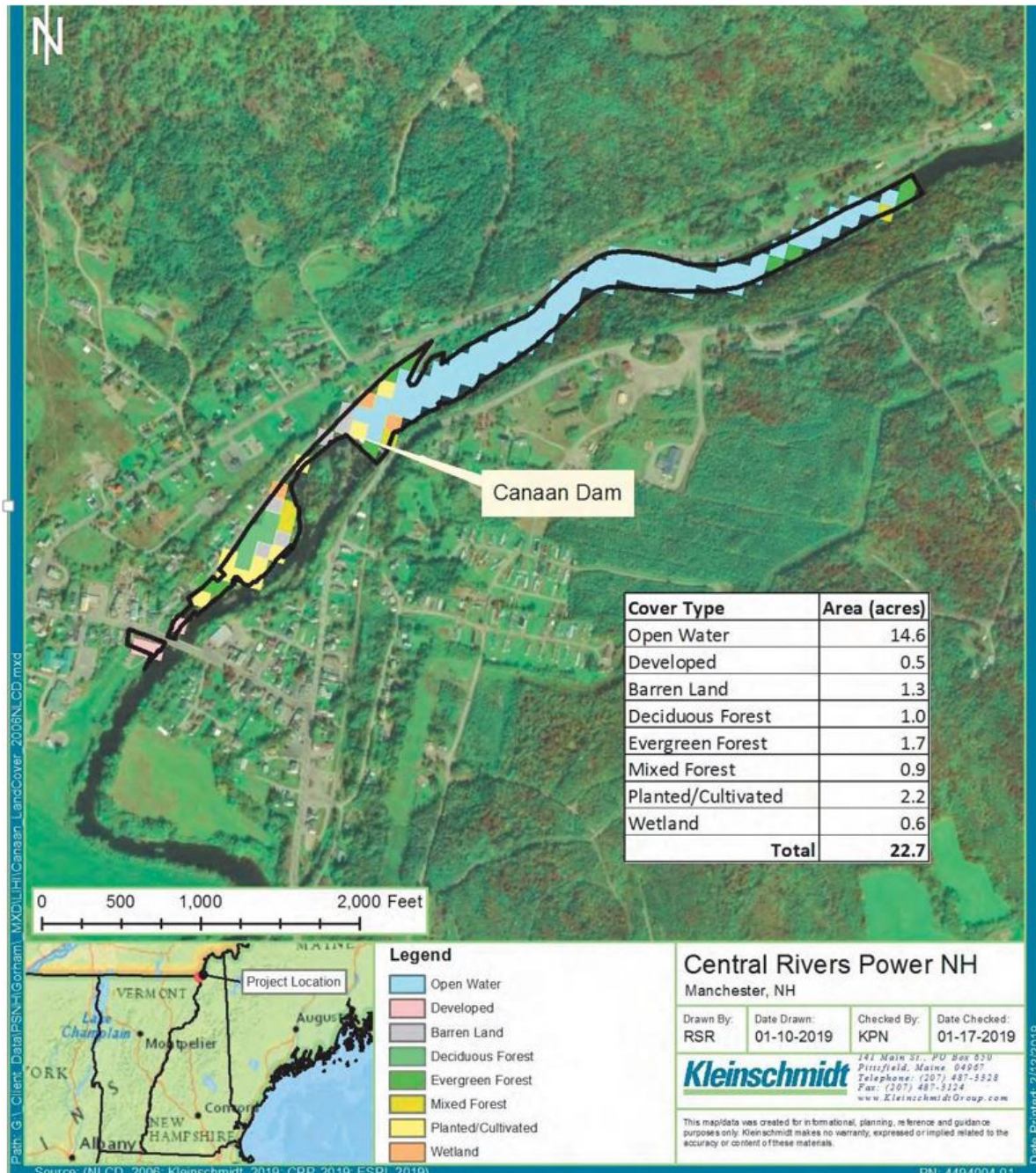
Condition R of the WQC required the Licensee to design and implement erosion and sediment control measures to address erosion occurring as a result of the Project or use of Project lands for recreation. The Applicant conducted an erosion study in an area from the first bridge upstream of the impoundment in Beecher Falls VT to the first meander bend about 3,000 feet downstream of the dam. The study found that erosion was occurring in reaches located both upstream and downstream of the dam. Upstream erosion was caused by bank slumping from the upper slopes of high bank glacial deposits as a result of concentrated runoff from NH State Route 3 and was unrelated to the Project. This additional sediment supply offsets the potential effects of increased storage in the project impoundment. The Study determined that the Project had minimal impact on the extent or degree of erosion (Field Geology 2006).

#### **E. Plus Standard for Shoreline and Watershed Protection Standards**

To qualify for the Plus Standard, the Project must have a formal conservation plan protecting a buffer of 50% or more around the undeveloped reservoir shoreline or along its riverine zones for purposes of conservation; or have a watershed enhancement fund that achieves the equivalent land protection value of a buffer zone of 50% or more.

Under the RMP, the Project developed and maintains an undisturbed, naturally-vegetated riparian zone along the river. This plan was approved by FERC on December 6, 2010. The plan's goal is to maintain and preserve the existing vegetation riparian area to protect wildlife habitat, maintain water quality and provide public access for recreational opportunities. The Applicant conducts surveys (about every 4 years) for invasive plants. If invasive plants are identified, the Applicant will consult with the Agencies on eradication and control measures.

The RMP also improves habitat for wildlife. As estimated from GIS-based calculation of the shoreline boundary and shoreline development information provided by Kleinschmidt for the application, approximately 89% of the shoreline within the Project boundary is undeveloped and included in the Riparian Management Zone (Figure 4).



**Figure 4. Riparian Management Zone for the Canaan Project**

The NH shoreline is subject to the NH Shoreland Water Quality Protection Act (SWQPA). Enacted in 1991, the SWQPA establishes minimum standards for the subdivision, use and development of shorelands adjacent to the State's public water bodies<sup>13</sup>. The Act has been modified several times since its enactment, and one of those changes was to include shoreline

<sup>13</sup> For more information on the SWQPA, including its history and modifications, see the following link: <https://www.des.nh.gov/organization/divisions/water/wetlands/cspa/categories/overview.htm>



buffer zones, where vegetation removal is limited, and protection of the shoreline of rivers through enhanced oversight methods. All land within 250 feet of the high water mark is defined as protected shoreland with restricted uses, including a 50-foot waterfront buffer and a 150-foot natural woodland buffer required to be maintained. Vermont also has a Shoreland Protection Act<sup>14</sup> which was enacted in 2014 but only applies to lakes and ponds; however, the Applicant stated upon inquiry that the RMP was intended primarily to address Project lands on the Vermont side of the river.

The CRC commented that the RMP “*is not a legally enforceable shoreline buffer...[which] would require some sort of conservation easement with standards for protection in perpetuity*” and that the RMP does not include land dedicated for conservation purposes.

The Reviewer agrees that the Project does not qualify for the Plus standard but notes that a land conservation easement would not necessarily be required to meet the standard. The RMP provides habitat benefits and retains land in an undeveloped form but it does not rise to the level of meeting the Plus standard since at least the buffer zone NH side of the Project is state-regulated and the plan is not specifically for conservation purposes. However, based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project satisfies Standard E-2 and satisfies the shoreland and watershed protection criterion.

## **F: Threatened and Endangered Species**

**Goal:** The Facility does not negatively impact listed species.

***The Applicant selected Standard F-2 Finding of no negative effect (although the application Section 2.0 standards matrix tables and Sections 3.10 – 3.12 indicate F-1, Not Applicable/De Minimis Effect in the tables but discuss F-2. The Reviewer believes this was a typographical error and the intent was to use Standard F-2.***

Species listed under the federal Endangered Species Act that are reported to occur in the vicinity of the Project include Northern Long-eared Bats (*Myotis septentrionalis*) and Canada lynx (*Lynx canadensis*). While both species could be transient visitors, the Project is not expected to affect either species or their habitats due to the developed nature of lands under the control of the Project and lack of forested habitat.

The NH Natural Heritage Bureau reported one occurrence of a rare plant occurring in the Project vicinity. The Natural Heritage Bureau reported that their database contained a record from 1997 of 10 plants satiny willow (*Salix pellita*) located at the edge of an agricultural field upstream of the dam. This species is listed as endangered by the State of New Hampshire.

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<sup>14</sup> [https://dec.vermont.gov/sites/dec/files/wsm/lakes/docs/Shoreland/lp\\_ShorelandHandbook.pdf](https://dec.vermont.gov/sites/dec/files/wsm/lakes/docs/Shoreland/lp_ShorelandHandbook.pdf)

Given the location of the Satiny willow, it is unlikely that Project operations would affect this plant. An acidic riverbank outcrop natural community, although rare, is not listed in New Hampshire but is located within the Project area.

VDEC reported (Appendix A) that no state-listed plant species have been documented in the Project area, although inventory efforts have been limited. The state-threatened Eastern pearlshell mussel (*Margaritifera margaritifera*) has been documented upstream and downstream of the Project and could be found at the Project as well. Two fish species of state concern, round whitefish (*Prosopium cylindraceum*) and brook trout (*Salvelinus fontinalis*) use the Connecticut River in the Project vicinity. Round whitefish is also a NH-threatened species, reported upstream and downstream of the Project from the Lake Francis Dam (Murphy Dam) south to North Stratford.<sup>15</sup>

Bald eagles are federally protected, listed as endangered in Vermont, and legally protected in New Hampshire. Eagles have been reported in the Project vicinity, but according to the application it is uncertain if there are residents near the Project area. The Project area is primarily developed, and it is unlikely that eagles would be roosting in trees within the Project affected area.

The CRC commented that the Applicant had not presented a finding of no negative effect from a resource agency perspective. While true, Standard F-2 also applies if listed species are or may be present but “*habitat for the species does not exist within the project’s affected area, or is not impacted by facility operations*” (LIHI Handbook p. 11). CRC also noted that NH Natural Heritage Bureau (NHNHB) reported (Appendix D of the application) that it has no current information about the natural community or rare plant species within the Project area nor historic data to compare with existing conditions and therefore could not comment on any Project effects on those resources. It is not clear why NHNHB made the statement referenced by CRC since the agency had already provided a report to the Applicant, but it may be that the agency was responding to a request for comment on Project effects, if any. The agency asked how long the dam had been there and the Applicant provided that information, but the agency never responded with a specific statement about Project effects on listed species, which is not unusual.

The public version of the LIHI application available to CRC from the LIHI website was redacted of confidential species locational information provided by NHNHB which was evaluated in this review. The review finds a lack of suitable habitat and a lack of Project impacts for species that are or may be present within the Project affected area.

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<sup>15</sup> <https://www.wildlife.state.nh.us/fishing/profiles/round-whitefish.html>

Based on the application and supporting documentation, the species present or potentially present, and given the small Project footprint, its location in a primarily developed area, and its run-of-river operations, this review finds that the Project is very unlikely to affect listed species and thus satisfies the threatened and endangered species criterion.

#### **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.

***The Applicant selected G-2, Approved Plan. The Facility is in compliance with approved state, federal, or recognized tribal plans for protection, enhancement, or mitigation of impacts to cultural or historic resources affected by the facility. The Reviewer concurs with this finding.***

The Applicant conducted a Phase IA archeological assessment of the Project during relicensing. The study was developed in consultation with the State Historic Preservation Office (SHPO), and the Alnobak Heritage Preservation Center. The study included research of library and agency records and a reconnaissance field inspection. The survey identified four historic-period archeological sites and five shoreline segments that are sensitive for prehistoric archaeological resources. They also uncovered a stone structure of unknown origin that was partially submerged in the impoundment, the structural remains of the Allen Electric Light Plant (the predecessor to the Canaan Project), and the possible location of a 19<sup>th</sup> century building. In compliance with license article 404, the Licensee implemented a programmatic agreement among FERC, the SHPO officers from both Vermont and New Hampshire, executed on Dec 8, 2008 and a Historic Properties Management Plan (HPMP) filed November 24, 2008. The Applicant files annual reports summarizing any activities that could impact cultural and historic resources, and the Project appears to be in compliance with the HPMP.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project satisfies the cultural and historic resources criterion.

#### **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.

***The Applicant selected H-2, Agency Recommendation, which required the documentation of any comprehensive recreation plan that has been adopted by***

***the Project and document that the facility is in compliance with all such recommendations and plans. The Reviewer concurs with this selection.***

License article 403 and WQC condition P required the Licensee to develop and implement a Recreation Management Plan. The plan was approved by the VDEC and submitted to FERC on October 25, 2010. FERC subsequently modified and approved the plan. The Licensee submitted as-built drawings for recreation facilities, which were approved by FERC on February 28, 2012. Revised drawings were submitted to FERC from February to May 2012 and FERC approved the drawings on June 14, 2012.

Recreation facilities in the impoundment include a boat barrier, a portage route, an information kiosk, portage takeout, and parking and angler access near the dam gatehouse. Recreation facilities in the bypass reach consist of a day-use parking area, picnic tables, and a site historic information sign. Downstream recreation facilities include a portage route sign, portage put-in below the dam, and portage put-in sign. Facilities are provided free of charge. A FERC environmental inspection was completed on Aug 9, 2018 that indicated recreation facilities are in good condition.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project satisfies the recreation criterion.

## **VIII. CONCLUSION AND RECOMMENDATION**

This review included evaluation of the LIHI application, supporting documentation as well as a review of the FERC elibrary, other publicly available information, agency responses to inquiries, and the CRC comment letter and Applicant response letter. Based on the information evaluated, the Canaan Project satisfies the LIHI criteria and the Reviewer recommends certification for a five (5) year term. One condition is recommended:

**Condition 1:** Upon completion of the current water year (Oct. 1, 2018 – Sep. 30, 2019), the Facility Owner shall provide operations data to VDEC that documents run of river compliance. The Facility Owner shall submit the data to VDEC by December 31, 2019 and provide any response from the agency in the first annual compliance submittal to LIHI.

## APPENDIX A



July 2, 2019

Low Impact Hydro Institute  
329 Massachusetts Ave  
Suite 6  
Lexington, MA 02420

Re: Comments on the Canaan Hydroelectric Project LIHI Certification Application

To Whom it May Concern:

The Connecticut River Watershed Council, Inc., doing business as the Connecticut River Conservancy (CRC), is a nonprofit watershed organization that was established in 1952 as a citizen group to advocate for the protection, restoration, and sustainable use of the Connecticut River and its four-state watershed. The interests and goals represented by CRC include, but are not limited to, improving water quality; enhancing habitat for fish and other aquatic biota; safeguarding and improving wildlife habitat; protecting threatened and endangered species; protecting wetlands; preserving undeveloped shore lands; enhancing public recreation and promoting recreational safety; protecting aesthetic values; protecting archeological, cultural, and historical resources; fostering sustainable economic development; and maintaining the potential energy benefits of hydroelectric projects in the watershed. In that capacity, we routinely participate in the relicensing of the many hydro-electric facilities that exist in the Connecticut River watershed.

While we recognize that the federal relicensing of a facility can be a considerable process, the results and requirements of relicensing alone do not justify certification as a low-impact hydro facility. Low-impact facilities must go above and beyond what is required in a relicensing process to demonstrate continued innovation to decrease impacts to our natural and cultural resources.

CRC has reviewed the Low-Impact Hydro Certification Application for the Canaan Project (FERC No. 7528) revised April, 2019 and provide the comments below.

### **3.2.1 Criterion A - Ecological Flow Regimes**

The applicant claims Standard A-2 for Ecological Flow Regimes. To meet that standard, the applicant must explain the scientific or technical basis for the agency recommendation, including methods and data used; explain how the recommendation relates to agency management goals and objectives for fish and wildlife; and explain how the recommendation provides fish and wildlife protection or mitigation and enhancement.<sup>1</sup> The applicant did not explain any of the above in their

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<sup>1</sup>Low Impact Hydropower Certification Handbook. 2nd Edition. Revision 2.03: December 20, 2018. Low Impact Hydropower Institute. Page 56.



application. There was no mention of management goals or the scientific process for flow regime. The applicant merely, "Identif[ied] the proceeding and source, date, and specifics of the agency recommendation applied."<sup>2</sup>

### 3.2.2 Criterion B - Water Quality

The applicant claims Standard B-2 for Water Quality. In order to meet this standard the applicant must be, "in compliance with all water quality conditions contained in a recent Water Quality Certification or science-based resource agency recommendation *providing reasonable assurance that water quality standards will be met* [emphasis added] for all waterbodies that are directly affected by the facility."<sup>3</sup> While the applicant may be in compliance with the Water Quality Certification requirements, there is little evidence to provide reasonable assurance that water quality standards are being met because it seems that ongoing sampling has not been done.

Under the "Findings" section of the Vermont Water Quality Certification (not included in the Low-Impact Hydro Application) it seems that the applicant was "not able to collect dissolved oxygen data under critical low flow conditions prior to the filing of the license application. Nor was PSNH able to collect data during Summer 2008... However, the collection of data to define the river's dissolved oxygen regime and provide a full understanding of project impacts *is a continuing need* [emphasis added] for the purposes of the water quality certification review."<sup>4</sup>

The Water Quality Certification requires a, "Dissolved Oxygen Sampling Study. When technically feasible based on critical river flow and water temperature conditions, the licensee shall complete the dissolved oxygen study following the protocol agreed upon with the Department and the New Hampshire Department of Environmental Services. The study report shall be filed by the December following the season of sampling and shall include proposed remediation to address substandard conditions, if identified, and an implementation schedule, both subject to Department approval. The Department, after consultation with the N.H. Department of Environmental Services, may require additional sampling, if needed, or post-remediation sampling to determine effectiveness. The licensee shall notify the Department by October 1 of each year as to whether it was successful in completing the sampling effort."<sup>5</sup>

According to reports to the Agency of Natural Resources, no sampling took place between 2011 and 2018 since "river flow at the Pittsburg gage did not reach the trigger flow."<sup>6</sup> While the company is technically in compliance with the requirements of the WQC, there has been no data collection to actually identify if water quality standards are being met. This lack of data does not provide "reasonable assurance that water quality standards will be met for all waterbodies that are directly affected by the facility."<sup>7</sup> The application to become LIHI certified should not rely only the

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<sup>2</sup> Low Impact Hydropower Certification Handbook. 2nd Edition. Revision 2.03: December 20, 2018. Low Impact Hydropower Institute. Page 56.

<sup>3</sup> Low Impact Hydropower Certification Handbook. 2nd Edition. Revision 2.03: December 20, 2018. Low Impact Hydropower Institute. Page 8.

<sup>4</sup> State of Vermont. Agency of Natural Resources. Department of Environmental Conservation. Water Quality Certification: Canaan :Hydroelectric Project. November 20, 2008. Page 6.

<sup>5</sup> Low-Impact Hydropower Institute Certification Application Canaan Hydroelectric Project (FERC NO. 7528). Kleinschmidt. Pittsfield, Maine. February 2019 – Revised April 2019. (Page 78 [41]).

<sup>6</sup> Ibid.

<sup>7</sup> Low Impact Hydropower Certification Handbook. 2nd Edition. Revision 2.03: December 20, 2018. Low Impact Hydropower

requirements set forth for a facility to renew its FERC license. It is incumbent upon the applicant to prove that the project is not degrading water quality. This assurance is not expressed in the current application or any of the supporting documents. The applicant could at any time choose to test the waterbodies directly affected by the facility, and provide water quality data to show the temperature and Dissolved Oxygen levels in the project area, but they have not done that.

While CRC contends that the applicant has not met the water quality standards, if a certificate is issued, it should contain a condition to provide ongoing monitoring for temperature and dissolved oxygen in the impoundment, the bypass reach and below the tailrace.

### **3.2.3 Criterion C - Upstream Fish Passage**

The applicant claims Standard C-1 for Upstream Fish Passage as it does not pose a barrier to upstream *anadromous* fish passage due to barriers further downstream. During the relicensing process for this facility there was disagreement about the need for upstream fish passage. The USFWS stated in a letter, "local knowledge, coupled with the information submitted by the state agencies regarding trout life history and specific studies of trout movements in rivers, provides ample evidence that the trout populations in the river would be enhanced by permitting access to better spawning habitat upstream from the project."<sup>8</sup>

During the scoping of the study plans the Northeast Kingdom Chapter of Trout Unlimited stated, "Although some of the fishery is supported with hatchery raised stocking there is still a wild population both above and below the dam. But a significant limiting factor in wild trout development is the fragmentation of the watershed with the Canaan dam. The river stretch above the Canaan Project for the eleven stream miles to the Lake Francis impoundment has a significantly higher value for trout reproduction and spawning than the downstream section. Below the Canaan Dam there few clean gravel beds the result of siltation from logging and agricultural usage. In other words the Canaan Hydroelectric Project marks a very clear change in the river substrate and separates a large part of the trout population from the best natural spawning habitat."<sup>9</sup>

Additionally, the applicant claims Standard D-1 for Downstream Fish Passage. In order to meet this standard the applicant must show that, "the facility does not contribute adversely to the sustainability of riverine fish populations or to their access to habitat necessary for the completion of their life cycles."<sup>10</sup> The presence of the dam with no safe downstream or appropriate upstream fish passage contributes adversely to the sustainability of riverine fish populations by blocking resident fish that have moved downstream from accessing better habitat above the dam. VT Department of Conservation state in comments on the Preliminary Licensing Proposal that, "PSNH has analyzed the technical feasibility and cost of installing upstream and downstream passage facilities at Canaan Dam. The resource agencies had indicated a need for these facilities for

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Institute. Page 8.

<sup>8</sup> Warner, John P. "United States Fish and Wildlife Service Comment on Environmental Assessment." Received by FERC, 23 Apr. 2008.

<sup>9</sup> Swaim, Stanley. "Comments on the scoping document for Canaan Hydroelectric Project No. 7528-004." Received by FERC, 12 Oct. 2004.

<sup>10</sup> Low Impact Hydropower Certification Handbook. 2nd Edition. Revision 2.03: December 20, 2018. Low Impact Hydropower Institute. Page 9.

non-migratory fish. Unimpounded cold-water habitat is rare on the mainstem Connecticut River, and Canaan Dam disconnects the two of the longest reaches of that type of habitat on the Connecticut River.”<sup>11</sup>

Implications of low-impact hydro would mean that the hydro-facility is making efforts to reduce damaging our collective resource. Through the last relicensing process, as indicated, there were numerous statements to indicate that the fishery above and below the Canaan dam is being damaged by the dam and that fish passage would enhance the reproductive health of this cold-water fishery. Given this, CRC feels that the applicant has not met the Standards for Criteria C or D.

While CRC contends that the applicant has not met the fish passage standards, if a certificate is issued, it should contain a condition to provide upstream and downstream fish passage to support this cold-water fishery and reduce the burden on the states to stock this heavily used resource. A true low-impact facility would help the recovery of this riverine species to natural levels.

### **3.2.5 Criterion E – Shoreline and Watershed Protection**

CRC agrees that the applicant has satisfied Standard E-2 for the Shoreline and Watershed Protection criterion assuming that they are in compliance with an approved Riparian Zone Management Plan. But, the applicant additionally claims that they have met Standard E-PLUS because of the existence of this Riparian Zone Management Plan. This Plan is not a “legally enforceable shoreline buffer,”<sup>12</sup> as outlined in the Standards. A legally enforceable shoreline buffer would require some sort of conservation easement with standards for protection in perpetuity. Developing a management plan for treatment of vegetation along the river does not satisfy the requirement to have land “dedicated for conservation purposes.”<sup>13</sup>

### **3.2.6 Criterion F - Threatened and Endangered Species Protection**

The applicant claims that they have met Standard F-2<sup>14</sup> Finding of No Negative Effect. Several species are listed in the area, but the applicant has not actually presented a “finding of no negative effect” from a resource agency point of view. Based on the wording of the criteria requirements, LIHI certification is not based on the lack of pertinent knowledge it is based on a specific standard that indicates that the facility *does not in fact* impact the endangered species in question. There has been no finding that this is the case. Additionally, NH Heritage indicated that they “do not have current information about the natural community or rare plant species within the project area, nor a set of historic data to compare with existing conditions. Therefore, we can’t comment on any effects the dam might be having on these resources.”<sup>15</sup>

It is incumbent upon the applicant to make the case that there is in fact no negative effect. The title

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<sup>11</sup> Cueto, Jeffrey R. “Canaan Hydroelectric Project -FERC No. 7528-004. Comments on Preliminary Licensing Proposal.” Received by FERC, 31 May, 2007.

<sup>12</sup> Low Impact Hydropower Certification Handbook. 2nd Edition. Revision 2.03: December 20, 2018. Low Impact Hydropower Institute. Page 11.

<sup>13</sup> Ibid.


<sup>14</sup> It looks like there is a mistake in the application. They cite F-1, but list the criterion for F-2. CRC assumes they are using the F-2 Standard for this criterion.

<sup>15</sup> Low-Impact Hydropower Institute Certification Application Canaan Hydroelectric Project (FERC NO. 7528). Kleinschmidt. Pittsfield, Maine. February 2019 – Revised April 2019. Page 105.

of the certification is "low-impact," not "we don't know the impact." If studies were not conducted to understand the project effect on these species during the relicensing process, it is incumbent upon the applicant to develop that body of work in pursuit of this certificate in order to show no impact.

CRC is grateful for the opportunity to comment on the Canaan application and we appreciate your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Kathy Urffer". The signature is written in a cursive, flowing style.

Kathy Urffer  
River Steward

Cc: Jeff Crocker, VT ANR  
Eric Davis, VT ANR  
Gregg Comstock, NH DES  
Peter McHugh, VT Fish and Wildlife

July 12, 2019

Ms. Kathy Urffer  
Connecticut River Conservancy  
River Steward  
15 Bank Row  
Greenfield, MA 01301

**RE: Response to CT River Conservancy comments on the Canaan Hydroelectric Project  
LIHI Certification Application**

Dear Ms. Urffer:

Thank you for providing comments on Central Rivers Power New Hampshire's, LLC (CRP) Low Impact Hydropower Institute (LIHI) Certification application for our Canaan Hydroelectric Project (FERC No. 7528). CRPNH offers the following responses:

**Comment 3.2.1 Criterion A – Ecological Flow Regimes**

An instream flow study was conducted to evaluate three study flows (130 cfs, 165 cfs and 213 cfs). The target species for the habitat suitability curves were brook trout, rainbow trout, longnose dace and macroinvertebrates. Study results available at <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11414740> suggested that the second study flow (165 cfs) provided significant improvement in habitat relative to the baseline condition and the first study flow (130 cfs). The current bypass flow of 165 cfs is an increase over previous conditions where 50 cfs was typically released into the bypass. The water quality certification (WQC) also notes that with adequate flows the bypass reach can provide habitat for salmonids and macroinvertebrates but has limited spawning suitability due to the lack of gravel substrates (WQC, page 7), which is the basis for the resource agencies to recommend the bypass flow of 165 cfs and for the state to include this flow in the WQC.

**Comment 3.2.2 Criterion B – Water Quality**

The current WQC condition (G) Dissolved Oxygen Sampling Study requires CRP to collect data during *critical river flow and water temperature conditions*. Each year since issuance of the 401, CRP has monitored river flows; however, the river flow at the Pittsburg gage has not reached the study trigger flow of 133 cfs, stipulated by the State.

In addition, the Vermont Department of Environmental Conservation (VTDEC) was contacted for their input on water quality at the project as part of the LIHI application review. The



VTDEC responded they had reviewed its list of impaired and stressed waters of the state and that no waters within the vicinity of the project are listed on the State's 303(d) list, nor on the State's list of priority waters outside the scope of the 303(d). They confirmed that the continued operation of the project does not contribute to impairment of waters of the State.

### **Comment 3.2.3 Criterion C – Upstream Fish Passage and Criterion D – Downstream Fish Passage**

The current WQC condition (I) Upstream Fish Passage states “*within two years of a request by the Department, the licensee shall institute upstream fish passage, subject to plan approval by the Department. Said request shall only occur after the N.H. Department of Fish and Game adopts a management plan emphasizing self-sustaining wild trout populations and provides the Department with a plan for reducing or eliminating stocking and/or harvest in the towns of Stewartstown, Colebrook, and Columbia after implementation of passage. Any request shall be made based on a written evaluation by the Vermont Department of Fish and Wildlife of the need for upstream fish passage, said evaluation to be done in consultation with the N.H. Department of Environmental Services, the N.H. Department of Fish and Game, the U.S. Fish and Wildlife Service, the Connecticut River Watershed Council, CRJC, Trout Unlimited, and PSNH*”. There has not been a request from the Department and the N.H. Department of Fish and Game has not adopted a management plan for reducing or eliminating stocking and/or harvest.

The FERC EA (footnote 10 in the LIHI application), which did not recommend fish passage facilities, noted that while naturally reproducing trout populations were currently sustaining themselves at that time (2008), the stocking program serves to supplement the populations in order to meet the high level of angling pressure in the Project vicinity; and that the stocking program has been in existence since the 1930's with no expectation that it would be discontinued (EA pages 27-28).

CRC cites several stakeholder comments from study scoping and preliminary licensing proposal phases of the licensing process, making no acknowledgement that the terms of the new license and WQC, which do not include fish passage for resident species, are based upon final recommendations from state and federal resource agencies.

Electrofishing surveys of tributaries both upstream and downstream of the Canaan dam revealed the presence of wild brook trout, yet CRC presumes that fish passage at the project is necessary to help “recovery” of riverine species. CRC also presumes that with all other factors remaining the same (stocking rates, fishing pressure, habitat availability) upstream and downstream passage for resident species would directly result in an increase in fish populations. The purpose of the stocking program is not to “recover” a resident species, but rather to supplement wild populations to support a popular recreational fishery.



### **Comment 3.2.5 Criterion E – Shoreline and Watershed Protection**

CRPNH acknowledges that The Riparian Zone Management Plan is not as extensive as some shoreline management plans with robust permitting programs. The plan is a requirement of a federally issued license to operate issued by and enforced by FERC.

### **Comment 3.2.6 Criterion F – Threatened and Endangered Species Protection**

While federally listed species Northern long-eared bat and Canada lynx might be transient at the project, the relatively limited footprint of the project and operational effects, including the requirement of the riparian plan, are not expected to adversely affect those species. No such concerns have been raised by the USFWS which has jurisdiction over activities that may affect threatened and endangered species.

We appreciate the CRC taking the time to review and comment on our LIHI application for Canaan. We strongly believe the historic Canaan project is a low impact facility that produces 1.1 MW of clean, renewable electricity to power homes in New England. The project also provides significant areas of well-maintained recreational access for anglers and a portage route for paddlers, as well as a protected riparian corridor for both wildlife and botanical species to prosper.

Sincerely,

A handwritten signature in black ink, reading "Curt Mooney". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

Curt Mooney, M.S.

Manager, Regulatory Affairs

Cc: Maryalice Fischer (via email)

**From:** Davis, Eric  
**Sent:** Friday, June 28, 2019 1:36 PM  
**To:** 'Kayla Easler'  
**Subject:** RE: Canaan LIHI application continued use review

Hi Kayla,

I realize that the formal public comment date is fast approaching, so I wanted to check in on my prior request of operations data (below). We don't anticipate submitting formal comments at this time, but will likely touch base with the LIHI reviewer as they draft their report.

Thank you!  
Eric

**Eric Davis**, *River Ecologist*

1 National Life Drive, Main 2  
Montpelier, VT 05620-3522  
802-490-6180 / [eric.davis@vermont.gov](mailto:eric.davis@vermont.gov)  
<http://www.watershedmanagement.vt.gov/rivers>



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**From:** Davis, Eric  
**Sent:** Monday, March 11, 2019 2:38 PM  
**To:** 'Kayla Easler' <[Kayla.Easler@KleinschmidtGroup.com](mailto:Kayla.Easler@KleinschmidtGroup.com)>  
**Cc:** McHugh, Peter <[Peter.McHugh@vermont.gov](mailto:Peter.McHugh@vermont.gov)>  
**Subject:** RE: Canaan LIHI application continued use review

Hi Kayla,

In regards to your request for a water quality and rare, threatened, and endangered species review for the Canaan project, the Agency offers the following comments.

#### Water Quality

The Department has reviewed its listing of impaired and stressed waters of the state. No waters within the vicinity of the project are listed on the State's 303(d) list, nor on the State's list of priority waters outside the scope of 303(d). As such, I can confirm that the continued operation of the project does not contribute to impairment of waters of the State.

#### Rare, Threatened, and Endangered species

- No RTE plant species have been documented in the project area, though inventory efforts have historically been limited.
- Eastern Pearlshell Mussel (*Margaritifera margaritifera*) have not been undocumented in the project affected area, but based on their distribution (present both up and downstream of the project) are quite likely to be found within the project affected area.
- In terms of fish, two SGCNs use the mainstem in Canaan's vicinity: (a) Round Whitefish (*Prosopium cylindraceum*) and (b) Brook Trout (*Salvelinus fontinalis*). A third, American Eel (*Anguilla rostrata*), hasn't been documented this far up the CT River at any point in the recent past, but its historic distribution may have extended all the way to the Connecticut Lakes.

#### Other Comments

- In regards to fish passage, both VT and NH still regard Conditions I and H of the 401 (fish passage) as being of interest,

though there are no immediate plans to initiate consultation.

- Before offering comments on a formal LIHI review, the Department requests one year of operations data for the purposes of assuring compliance with the conditions of the water quality certification issued for the project and LIHI criteria.

Thank you,  
Eric

**Eric Davis**, *River Ecologist*

1 National Life Drive, Main 2  
Montpelier, VT 05620-3522  
802-490-6180 / [eric.davis@vermont.gov](mailto:eric.davis@vermont.gov)  
<http://www.watershedmanagement.vt.gov/rivers>



See what we're up to on our [Blog, Flow](#).

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**From:** Kayla Easler <[Kayla.Easler@KleinschmidtGroup.com](mailto:Kayla.Easler@KleinschmidtGroup.com)>  
**Sent:** Tuesday, January 15, 2019 9:46 AM  
**To:** Davis, Eric <[Eric.Davis@vermont.gov](mailto:Eric.Davis@vermont.gov)>  
**Cc:** Kratzer, Jud <[Jud.Kratzer@vermont.gov](mailto:Jud.Kratzer@vermont.gov)>; Buck, John <[John.Buck@vermont.gov](mailto:John.Buck@vermont.gov)>; Darling, Scott <[Scott.Darling@vermont.gov](mailto:Scott.Darling@vermont.gov)>; Popp, Bob <[Bob.Popp@vermont.gov](mailto:Bob.Popp@vermont.gov)>  
**Subject:** Canaan LIHI application continued use review

Good morning,

Please see the attached letter for the review of the Canaan Hydroelectric Project (FERC No. 7528) for continued use and application for LIHI certification.

Best,

Kayla A. Easler  
Regulatory Coordinator

**Kleinschmidt**

Direct: (207) 416-1271  
[www.KleinschmidtGroup.com](http://www.KleinschmidtGroup.com)

*Providing **practical** solutions for **complex** problems affecting energy, water, and the environment*

**From:** [Crocker, Jeff](#)  
**To:** [mfischer@lowimpacthydro.org](mailto:mfischer@lowimpacthydro.org); [Davis, Eric](#)  
**Subject:** RE: Canaan Dam - LIHI Application  
**Date:** Monday, July 8, 2019 3:36:04 PM  
**Attachments:** [image001.png](#)

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Maryalice,

The DO and WQ are likely fine at the Canaan Project at the flows that have been observed. The potential project's affect on WQ during the critical summer low flow values remains unknown since the flow value triggering monitoring has not occurred.

Please let me know if you have any questions.

Thanks,

Jeff

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**From:** mfischer@lowimpacthydro.org <mfischer@lowimpacthydro.org>  
**Sent:** Wednesday, July 3, 2019 10:50 AM  
**To:** Davis, Eric <Eric.Davis@vermont.gov>; Crocker, Jeff <Jeff.Crocker@vermont.gov>  
**Subject:** Canaan Dam - LIHI Application

Hi Eric and Jeff,

I just tried to call you both but given the holiday, you may be out and if so, I hope you have a great holiday. In a tremendous oversight, I did not forward to you the announcement from May 3 of a LIHI application received for the Canaan project on the Connecticut River. As you may know, we forward the notice to agencies listed in the application. In this case, the applicant only included NH contacts. But our records indicate that you, Eric are on our Vermont list and should have received the notice of application directly.

The public comment period for Canaan just closed yesterday, but I wonder if you have anything to say about the Project's water quality certification and the fact that no WQ monitoring has been done since the flow level required to do sampling has not been triggered yet. I know that NH doesn't believe there is a WQ issue at the project, but do you?

**G. Dissolved Oxygen Sampling Study.** When technically feasible based on critical river flow and water temperature conditions, the licensee shall complete the dissolved oxygen study following the protocol agreed upon with the Department and the New Hampshire Department of Environmental Services. The study report shall be filed by the December following the season of sampling and shall include proposed remediation to address substandard conditions, if identified, and an implementation schedule, both subject to Department approval. The Department, after consultation with the N.H. Department of Environmental Services, may require additional sampling, if needed, or post-remediation sampling to determine effectiveness. The licensee shall notify the Department by October 1 of each year as to whether it was successful in completing the sampling effort.

Thank you, and I apologize for this oversight.

Maryalice Fischer  
Certification Program Director  
Low Impact Hydropower Institute