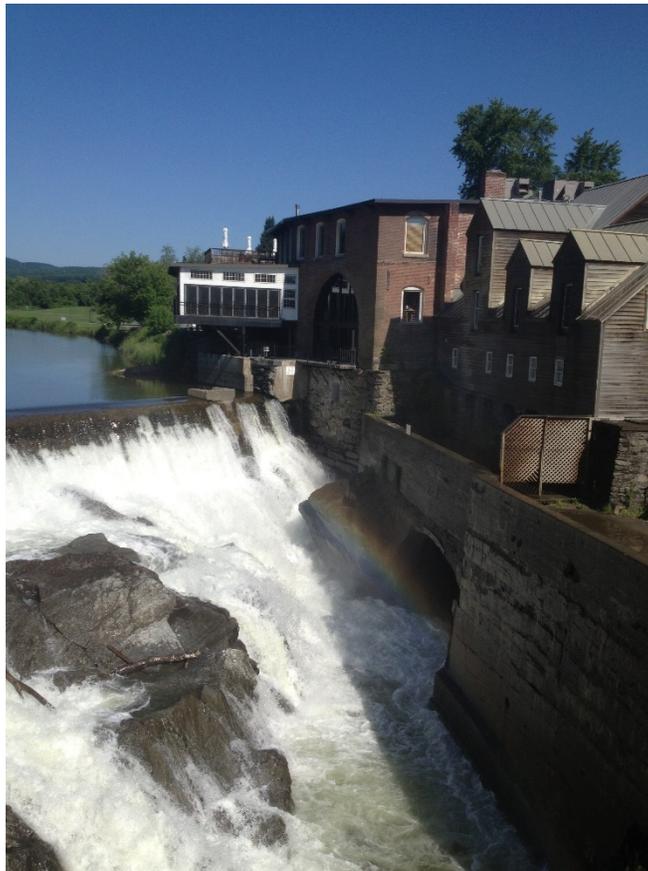




**REVIEW OF APPLICATION FOR LIHI RECERTIFICATION OF THE
DOWNER'S MILL HYDROELECTRIC PROJECT, LIHI #122**

**FERC Project No. 5195 (exempt)
Ottauquechee River, Hartford VT**



**June 21, 2021
Maryalice Fischer, Certification Program Director**

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FINAL REVIEW OF APPLICATION FOR LIHI RECERTIFICATION OF THE DOWNER'S MILL HYDROELECTRIC PROJECT, LIHI #122

This report provides final review findings and recommendations for the recertification application submitted to the Low Impact Hydropower Institute (LIHI) by Hydro Management Group on behalf of Simon Pearce (US), Inc. Applicant) for recertification of the Downer's Mill Hydroelectric Project, LIHI #122 (Project). The Project is a 0.645 MW facility located on the Ottauquechee River in Quechee Village, Hartford Vermont. The final recertification application package including fee was filed on April 19, 2021 and is subject to review under the 2nd Edition LIHI Handbook.

I. INTRODUCTION

The Project was first certified by LIHI in 2015 for a 5-year term which expired on March 3, 2020. The term was extended several times, most recently to July 31, 2021 to allow time to complete the recertification process. The 2015 recertification included three conditions discussed in Section IV.

II. RECERTIFICATION PROCESS AND MATERIAL CHANGE REVIEW

Under the 2nd Edition LIHI Handbook, 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, if the only issue is some missing information, a Stage II review may not be required. These standards also state that "material changes" mean non-compliance and/or new or renewed issues of concern that are relevant to LIHI's criteria. If the answer to either question (2) or (3) is "Yes", a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application, and completion of a Stage II report is required. As a result, all projects currently applying for renewal must go through a full review unless their most recent certification was completed using the 2nd Edition Handbook.

A review of the initial application submitted January 28, 2021 resulted in a Stage I report dated April 1, 2021. The Stage I assessment found no material changes at the Project and determined that only a small amount of additional information was needed to conduct the review. That information was provided by the Applicant on April 9, 2021. The application was posted for public comment on April 20, 2021 and the 60-day public comment period ended on June 19, 2021. This Stage II assessment included review of the recertification application package, the FERC eLibrary, other publicly available information, and annual compliance statements submitted during the past term of Certification.

III. PROJECT LOCATION AND SITE CHARACTERISTICS

The Project is located in Quechee Village in the Town of Hartford, Vermont approximately seven miles upstream of the Ottauquechee River’s confluence with the Connecticut River. With a watershed area of 223 square miles and a length of about 38 miles, the Ottauquechee River is a major tributary of the Connecticut River. The river descends from the Green Mountains near Killington Peak and flows generally in an easterly direction to its outlet in the town of Hartland (Figure 1).

The Project dam is the fourth upstream of the confluence with the Connecticut River. The White Current Company dam, or the Ottauquechee Woolen Mill dam (FERC No. 2787) is located at river mile 0.3; the US Army Corps of Engineers North Hartland Flood Control dam (site of FERC No. 2816) is located at river mile 1.6; and the Deweys Mill dam (FERC No. 5313) is located at the head of Quechee Gorge at river mile 6.0 (Figure 2). Upstream of Downer’s Mill is Taftsville (FERC No. 2490) at river mile 11.3. There are numerous other non-powered dams upstream.

Figure 1. Project location and watershed

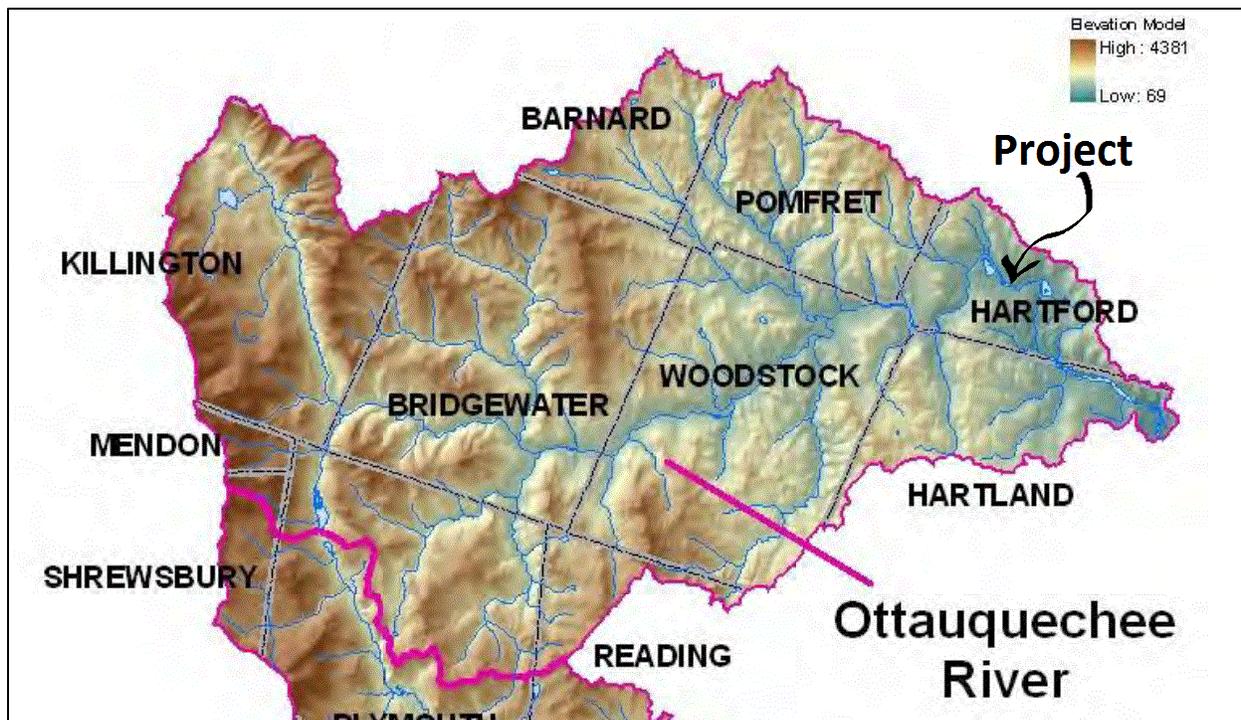
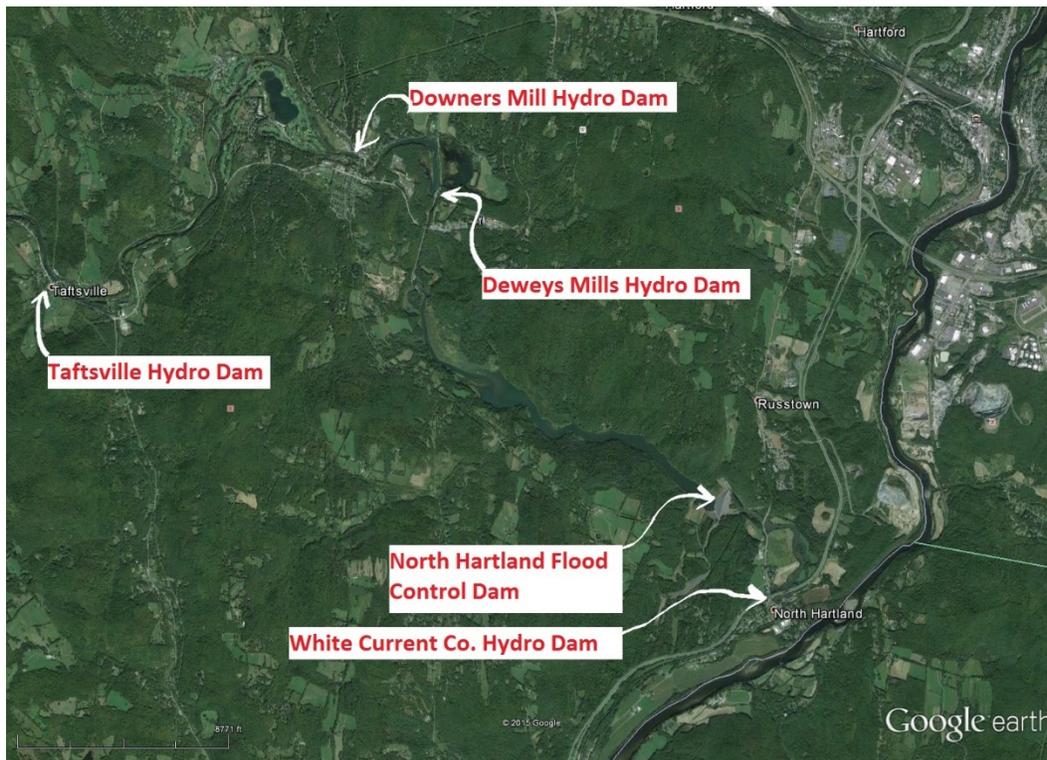


Figure 2. Dams on the Ottauquechee River

The hydroelectric station was constructed at the site of the existing Emory Mill dam (also known as Downer's Mill). The original timber crib dam was built in the early 1800s to power a grist mill. It was rebuilt as a concrete structure in 1926. In 1983, the generator was put back into service, and the power from the site has subsequently been used to melt the glass used in production by Simon Pearce (U.S.), Inc.'s glass-blowing studio located in the mill, with excess power being sold onto the regional grid. The mill also houses a farm-to-table restaurant and visitors can watch the glass blowing process.

The concrete gravity dam is 150 feet long¹ with an uncontrolled spillway. The crest elevation of the dam is 562 feet NGVD and is about 14 feet above the bedrock streambed at the downstream toe (Figure 3). A 57-foot-long steel penstock conveys water from the impoundment to the powerhouse, located in the basement of the mill building. The powerhouse contains a single vertical Kaplan turbine/generator with a capacity of 645 kW.

At full pool, the impoundment extends about half a mile upstream and covers approximately nine acres² with an average depth of about six feet. The facility is operated as a true run-of-river facility with instantaneous inflow equal to outflow.

¹ Confirmed by the Applicant, other information stating 185 feet long was incorrect.

² The application indicates that the impoundment extends upstream to Taftsville dam and has a surface area of 40 acres, but that information appears to be incorrect based on a review of aerial images.

Figure 3. Impoundment, Dam, and Mill Building



IV. REGULATORY AND COMPLIANCE STATUS

FERC issued an exemption (No. 5195) for the Project on May 4, 1982³. A water quality certificate (WQC) was issued by the State of Vermont on May 11, 1982⁴. The Project is subject to terms and conditions set forth by the U.S. Fish and Wildlife Service (USFWS) in a March 16, 1982 letter to FERC, and the Vermont Agency of Natural Resources (VANR) in a March 3, 1982

³ https://lowimpacthydro.org/wp-content/uploads/2020/07/Appendix-1-2_Downers-Mills-FERC-Exmpetion-dtd-May-4-1982.pdf

⁴ https://lowimpacthydro.org/wp-content/uploads/2020/07/Appendix-4-1_Downers-Mills-401-Water-Quality-Cert.-dtd-May-11-1982.pdf

letter to FERC, both filed as part of the exemption process. A review of the FERC elibrary from January 1, 2015 to present identified only dam safety documents. The current LIHI Certification included the following three conditions including their current status:

Condition 1: The facility owner shall cooperate with the Vermont Agency of Natural Resources (VANR) in scheduling and completing a flow demonstration study for the bypassed reach to determine an appropriately protective minimum flow for aquatic habitat support. The outcome of the study, including VANR recommendations, shall be reported to LIHI within 90 days of the issuance of LIHI certification. Since this certification is being granted without the minimum bypassed flow having been deemed appropriately protective by the resource agencies, LIHI may withdraw certification if it determines that the owner is failing to make a good faith effort to cooperate with the resource agencies in determining a final minimum bypass flow. Any increase in the bypass minimum flow to meet the appropriately protective standard shall be implemented within 14 days of receipt of the VANR recommendation.

This condition was satisfied in 2015 upon completion of a flow demonstration study and submission of a letter from VANR which stated: *"the Agency deems the existing bypass flow appropriately protective of fish, wildlife, and water quality"*.

Condition 2: The facility owner shall develop a system for producing and maintaining records sufficient to demonstrate compliance with the headpond elevation and flow management limitations for an instantaneous run-of-river operation and bypass conservation flows. Within 90 days of the issuance of LIHI certification, the facility owner shall provide LIHI with a copy of the operations and flow monitoring plan. Prior to filing the plan, the facility owner shall obtain plan approval from U.S. Fish and Wildlife Service (USFWS) and VANR; written confirmation of the approvals will be filed with the plan. Should the minimum bypass flow be increased after the plan is completed, the plan shall be revised accordingly and resubmitted to VANR, USFWS, and LIHI.

This condition was satisfied in 2016 with submission of the Flow Monitoring Plan.

Condition 3: During the term of this certification, should a resource agency request implementation of upstream and/or downstream fish passage at the Facility, the owner shall notify LIHI of this new requirement within 14 days and provide LIHI with a copy of the request and its response.

This condition remains active but to date, no agency has requested upstream or downstream fish passage (see Section VII.C-D).

V. PUBLIC COMMENTS RECEIVED OR SOLICITED BY LIHI

The application was publicly noticed on April 20, 2021 and notice of the application was forwarded to resource agency and stakeholder representatives listed in the application. No public comments were received during the 60-day comment period which ended on June 19, 2021. Based on the completeness of the application, no direct outreach to resource agencies or

other stakeholders was conducted as part of this review.

VI. ZONES OF EFFECT

The Applicant delineated the Project into three Zones of Effect (ZoEs) as shown in Figure 4.

- Zone 1: impoundment extending from RM 7.4 – RM 7.0
- Zone 2: de minimis bypassed reach extending from RM 7.0 – RM 6.98
- Zone 3: tailrace/downstream zone extending from RM 6.98 – RM 6.86

Figure 4. Zones of Effect



The Applicant selected the standards shown in the tables below. The Reviewer agrees with the selected Standards except where noted in **red** below.

Zone:		1: Impoundment	2: Bypassed Reach	3. Downstream Reach
River Mile Extent:		RM 7.4 – RM 7.0	RM 7.0 – RM 6.98	RM 6.98 – RM 6.86
Criterion		Standard Selected		
A	Ecological Flows	1	2	1
B	Water Quality	± 3	± 3	± 3
C	Upstream Fish Passage	1	1	1
D	Downstream Fish Passage	1	1	1
E	Shoreline and Watershed Protection	1	1	1
F	Threatened and Endangered Species	± 2	± 2	± 2
G	Cultural and Historic Resources	1	1	1
H	Recreational Resources	3	3	3

VII. 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: The Applicant selected Standard A-1, Not Applicable/De Minimis Effect in Zones 1 and 3, and Standard A-2, Agency Recommendation in Zone 2, the bypassed reach.

Discussion: The Project is operated in an instantaneous run-of-river mode. There is no impoundment storage. Inflows are controlled by the discharge from the upstream Taftsville project supplemented by inflow from small tributaries. The bypassed reach is very short, approximately 105 feet long. It has a high gradient (Figure 5) and limited habitat value being composed primarily of ledge, which limits habitat value as noted by VANR in their 2015 letter (Appendix 1 of the LIHI recertification application). The tailrace/downstream reach is also comprised primarily of ledge (Figure 6).

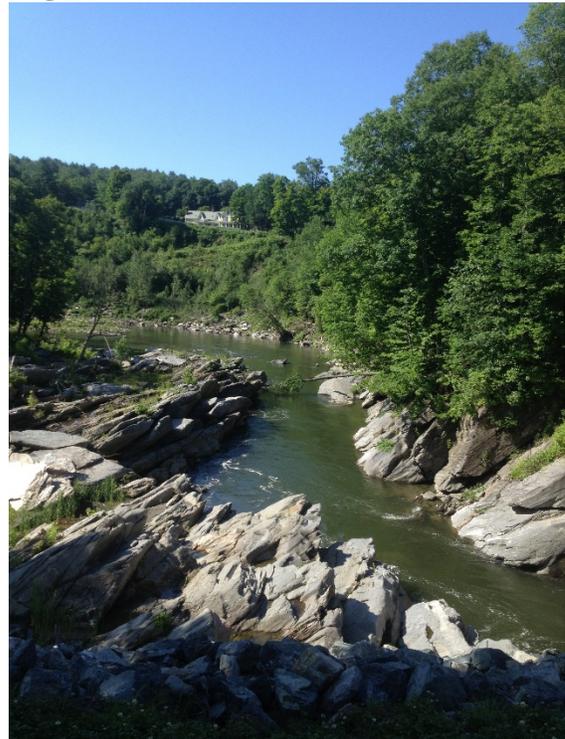
The bypassed reach minimum flow is 22 cfs and was confirmed by VANR as being “appropriately protective of fish, wildlife, and water quality”, based on the flow demonstration required by the original LIHI certification and attended by VANR and Vermont Department of Fish and Wildlife (VDFW). Compliance monitoring includes visual inspection of the flow over

the dam, and review of the control system and electronic data used to manage flows under the Project's Flow Monitoring Plan. The Project's WQC requires a minimum depth of water over the dam equal to 0.5-inch across the entire face of the dam, which ensures that more than 22 cfs (the 7Q10 flow) flows over the dam and the entire surface of the dam is wet at all times. The WQC notes that flows above that level are not warranted for purposes of aquatic habitat which is so limited.

Figure 5. Bypassed Reach



Figure 6. Tailrace/Downstream Reach



Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the flow regime is appropriately protective, and the Project continues to satisfy the ecological flows criterion.

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: The Applicant selected Standard B-1, Not Applicable/De Minimis Effect for all ZoEs. This review finds that Standard B-3, Site-Specific Studies is more appropriate.

Discussion: The Ottauquechee River in the Project vicinity is classified in the Vermont Water Quality Standards as Class B(2) water managed to achieve and maintain good aesthetic quality, primary recreation contact, public water supply with treatment, and for agricultural purposes. The river in the Project area is not listed as a Category 5 water (impaired and in need of a TMDL) in the Vermont 2020 303(d) Impaired Waters list. It is also not listed on any of the other Vermont 2020 lists included in the Water Quality Assessment Report. The river downstream from the North Hartland Army Corps impoundment is listed in Part F of the Assessment Report as being altered by water fluctuation in the impoundment and altered by flow regulation downstream to the river's mouth.

The river from upstream of Downer's Mill at Woodstock VT downstream to the North Hartland dam, including the Project area is considered "stressed" for secondary contact recreation, aquatic biota/habitat and aesthetics due to nutrients, organic enrichment, temperature, sediment, and E. coli from golf course, road, and developed land runoff, septic systems and fertilized turf.

The Applicant completed a water quality sampling program in 2013 prior to the original LIHI certification to demonstrate compliance with state water quality standards. Water temperature and dissolved oxygen were monitored in the impoundment and tailrace during a low-flow period. In its comment letter on the original LIHI application, VDEC noted that, "*during the sampling period, the water quality in the impoundment and tailrace met Vermont Water Quality Standards for dissolved oxygen under current operating conditions*"⁵. The Applicant notes that there have been no changes in Project operations that would change compliance with water quality standards.

Based on the application, supporting and publicly available documentation, and FERC elibrary documents, this review finds that the Project does not impact water quality and continues to satisfy the water quality criterion.

⁵ https://lowimpacthydro.org/wp-content/uploads/2020/07/Appendix-4-2_Comment-ltr-Eric-Davis-VT-DEC.pdf

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: The Applicant selected Standard C-1, Not Applicable/De Minimis Effect for all ZoEs.

Discussion: There are no migratory fish species present at the Project since no downstream dams on the Ottauquechee River have upstream passage. As noted above, the bypassed reach is composed of ledge forming a steep gradient that is also a barrier to passage except possibly for American eel if any were present.

As part of the exemption proceeding, USFWS and VDFW reserved authority to prescribe fish passage at Downer's Mill, although the exemption specified only anadromous fish species at that time. The agencies have not yet exercised that authority. As part of the 2015 LIHI certification, USFWS commented that it considered the current absence of passage measures to be "*appropriately protective for the purposes of LIHI certification.*" Dams on the Connecticut River downstream of the confluence, including the nearest (Wilder) have upstream passage facilities although Wilder's fish ladder has not operated other than for that project's relicensing studies since 2017.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project does not impact upstream fish passage and continues to satisfy the upstream passage criterion.

D: Downstream Fish Passage

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 can successfully complete their life cycles and maintain healthy populations in the areas affected by the facility.*

Assessment of Criterion: The Applicant selected Standard D-1, Not Applicable/De Minimis Effect for all ZoEs.

Discussion: The Ottauquechee River in the Project vicinity sustains wild populations of rainbow trout, some brown trout, and numerous nongame fish species, as well as wild brook trout in tributary streams that may also use the Ottauquechee River seasonally. VANR noted the presence of the ledge cascade in the bypassed reach, stating "*Further evaluation of this natural feature would be required before considering future fish passage conditions*".

Other public information suggests that both cold and warm water species including common shiner, golden shiner, white sucker, black bullhead, rock bass, longnose dace, blacknose dace,

bluntnose minnow, creek chub, fallfish, white sucker, smallmouth bass, slimy sculpin, and stocked populations of trout are also present in the river either upstream of downstream of the Project. None of these species require passage to complete their life cycle. There is no information that American eels are present above the Project.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project does not adversely impact downstream moving fish and continues to satisfy the downstream passage and protection criterion.

E: Shoreline and Watershed Protection

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

Assessment of Criterion: The Applicant selected Standard E-1, Not Applicable/De Minimis Effect for all ZoEs.

Discussion: There are no lands of significant ecological value and no critical habitats for threatened or endangered species in the Project area. The Project is located in the developed Quechee Village area. No protected buffer zones have been created along the impoundment through a settlement agreement or the FERC exemption, and no shoreland protection plan is required.

Land use around the upper impoundment includes a golf course on the west side of the river and Quechee Green Park owned by the Town of Hartford on the east side. Land around the lower impoundment is lightly developed with residences and some businesses at and near the mill buildings. The east bank at the dam includes steep banks and rock outcrops and the downstream reach is rocky with a sand shoreline, a naturally vegetated buffer, and limited development farther away from the river (Figures 2-4).

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project with run-of-river operation and small footprint does not adversely impact the shoreline or watershed, and continues to satisfy the shoreline and watershed protection criterion.

F: Threatened and Endangered Species

Goal: *The facility does not negatively impact federal or state listed species.*

Assessment of Criterion Passage: The Applicant selected Standard F-1, Not Applicable/De Minimis Effect for all ZoEs. This review finds that Standard F-2, Finding of No Negative Effect is more appropriate.

Discussion: The Applicant conducted a USFWS IPaC online data check as part of the LIHI

recertification application that showed that only Northern long-eared bat may be present near the Project. There is no critical habitat designated for the species. Protected migratory birds could also be present on a transient basis at certain times of the year.

Vermont's listed species that could be present include bald eagle and rusty blackbird, both state-endangered. The Applicant also conducted an online data check of the Vermont BioFinder site that shows only one unidentified state-listed species that could be present in or near the downstream reach. Based on that information (vertebrate animal that is both state endangered and federally threatened), it appears to be the Northern long-eared bat. No state-listed birds have been observed in the immediate Project area according to the data check result. Lands under Project ownership do not extend downstream of the dam and covered bridge, and the Project does not impact potential roosting or nesting habitat for bats or birds.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that given the very small Project footprint and developed location, there are unlikely to be any listed species present, and the Project continues to satisfy the threatened and endangered species criterion.

G: Cultural and Historic Resources Protection

Goal: *The facility does not unnecessarily 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: The Applicant selected Standard G-1, Not Applicable/De Minimis Effect for both ZoEs.

Discussion: The mill building is a contributing building in the Quechee Historic Mill District which was listed on the National Register of Historic Places in 1997. The District includes 75 buildings and 4 sites or structures in Quechee Village. The building was replaced in 1870 after high river flows damaged it. The mill was later enlarged with sections subsequently demolished in the 1950s due to safety concerns, a new annex section was added in 1969. In 1980, Simon Pearce bought the building, renovated the inside for a glass blowing operation, and added the hydroelectric plant in 1982.

At the time of the mill's rehabilitation in the early 1980's the FERC exemption did not include any requirements related to cultural or historic resources. The rehabilitation was conducted entirely inside of the existing mill building. No additional work has been performed since the FERC exemption was issued.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project does not adversely affect cultural or historic resources, and continues to satisfy the cultural and historic resources protection 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.*

Assessment of Criterion Passage: The Applicant selected Standard H-3, Assured Accessibility for both ZoEs.

Discussion: The FERC exemption does not include requirements for recreation and there is no recreation management plan for the Project. However, a canoe portage is naturally provided via Quechee Main Street that parallels the river above and below the dam. Both the take out and put in are located outside of the Project boundary. Access on Project lands is not limited except where safety is a concern.

Other recreational areas near the Project include Quechee Falls Park, a town-owned pocket park with views of the dam, the covered bridge just downstream, and the downstream reach. The Ottauquechee Trail is a footpath that runs from the covered bridge downstream along the river. It connects to the Quechee Gorge Trail which leads to Quechee Gorge State Park. The state park includes a visitor center, picnic area, campground, and trails down into the glacially formed 165-foot deep Quechee Gorge in the Ottauquechee River just downstream of Deweys Mill dam. The gorge has been called Vermont's Little Grand Canyon⁶.

Based on the application, supporting documentation, and FERC elibrary documents, this review finds that the Project continues to satisfy the recreational resources criterion.

VIII. CERTIFICATION RECOMMENDATION

This review included evaluation of the application, a review of the FERC elibrary during the current LIHI term, and review of other publicly available information. Based on this evaluation, the Reviewer recommends that the Downer's Mill Project be recertified for a term of five (5) years with no conditions.

⁶ <https://vermonttourismnetwork.com/quechee-gorge-vermonts-little-grand-canyon/>