

October 3, 2011

Fred Ayer, Executive Director
Low Impact Hydropower Institute
34 Providence St.
Portland, ME 04103

Subject: Application Reviewer Final Report for the Winooski No. 8 Hydroelectric Project

Dear Fred:

Attached please find my final reviewer's report on the application by Winooski Hydroelectric Company for certification of the Winooski No. 8 Project by the Low Impact Hydropower Institute (LIHI). Please contact me with any questions or concerns.

Sincerely,

Jackie Dingfelder

Attachment: as described.

**Review of Low Impact Hydropower Institute Application
for Low Impact Hydropower Certification:
Winooski No. 8 Hydroelectric Project**

Introduction and Overview

This report reviews the application submitted by Winooski Hydroelectric Company (applicant) to the Low Impact Hydropower Institute (LIHI) for Low Impact Hydropower Certification for the Winooski No. 8 Hydroelectric Project (project) located on the Winooski River in Washington County, Vermont. The Federal Energy Regulatory Commission (FERC) licensed the project (FERC 6470) in 1983 for the operation and maintenance of the 930 kilowatt run-of-river project. Winooski No. 8, also known locally as Montpelier No. 4, is owned by Winooski Hydroelectric Co.

Project and site characteristics.

The Project is located on the Winooski River in East Montpelier, on the site of a dam originally constructed in 1908. The Winooski River begins in the town of Cabot and flows 90 miles to Lake Champlain in Colchester. The watershed drains approximately 1,080 square miles in central Vermont, encompassing all of Washington County, Vermont, about half of Chittenden County, and portions of Lamoille and Orange Counties. The Winooski River is the largest tributary watershed to Lake Champlain. It includes almost 10% of the land area of Vermont. The project dam is in the upper watershed, 42 miles southeast of the river mouth and upstream of Montpelier, the state capitol.

Currently there are 90 dams in the Winooski River Watershed. Fifteen are on the Winooski River itself; the rest are on the streams which feed into the river. Only three of the dams in the watershed were built for flood control and they are on tributaries. Electricity is produced at six dams on the main river and seven on tributaries. Green Mountain Power Corporation (GMP) formerly owned the project site and owns and operates all the mainstem hydroelectric dams, except for the applicant's two sites, Winooski One and Winooski No. 8. The remaining dams were built for recreation, water supply storage and small mill use.¹

GMP uses Marshfield Reservoir, on Molly's Falls Brook in the Winooski headwaters, to enhance peak power production at its facilities. The reservoir is upstream of the project. Consequently, flows at the project are highly regulated during low-to-moderate flow periods. All of GMP's hydroelectric dams are located downstream of Winooski No. 8 in Middlesex, Bolton, Essex, and Colchester.

The Winooski No. 8 Project consists of a 140' long dam, a 200' bypass reach provided with 25 CFS of minimum flow, and a 24' crest gate. The intake and powerhouse are an integral structure,

¹ Information obtained From Winooski Conservation District Website:
http://www.vacd.org/~winooski/winooski_watershed_background.shtml

housing three submersible adjustable propeller turbines. The project operates in strict run-of-river mode.

The project was reconstructed in 1985 and has an installed capacity of 930 KW. Annual energy production has averaged 3,500,000 KWH.

Fisheries. Most of the streams within the Winooski River drainage basin contain habitat that supports naturally reproducing (i.e. wild) trout populations. The cool, shaded mountain streams provide homes for wild brook trout; Vermont's only native stream trout. Larger tributaries and much of the Winooski River support naturalized populations of wild rainbow and brown trout. Both species were introduced to Vermont in the late 1800's; rainbows from the West Coast and brown trout from Europe.

A seasonal migration of fish enters the lower reaches of the Winooski River from Lake Champlain. Largemouth bass and northern pike are common near the mouth, and many of the more than 85 species of fish inhabiting Lake Champlain can be found from time to time. In recent years, significant numbers of lake trout have come into the Winooski in the fall and winter months.

Since 1993, a fish passage facility has operated at Winooski Dam One (below the Winooski Falls in the City of Winooski). Until recently, spawning salmon were trapped in the fall and trucked and released to reach spawning areas as far upstream as Bolton Falls Dam.² Trapped fish are now used solely for hatchery production due to concerns about potential spread of Viral Hemorrhagic Septicemia to the lake population.

Public comment and agency letters. The public comment period closed on April 18, 2011. LIHI did not receive any public comments or agency letters.

General conclusions. Based on my review, the project design and operations has resulted in a facility that is consistent with LIHI criteria. Initially, there was some concern regarding compliance with water quality standards since this project had received a Clean Water Act 401 certification prior to January 1, 1987. An email dated 8/26/2011 from Brian Fitzgerald, State of Vermont Water Quality Specialist at the Department of Environmental Conservation, confirms that the Winooski Project is currently meeting water quality standards. No other outstanding issues surfaced during the review of this project.

Recommendation. Based on my review of information submitted by the applicant, my review of additional documentation, and my consultations with resource agency staff, I believe the Winooski Hydroelectric Project MEETS all of the criteria to be certified and I recommend certification.

² Information obtained From Winooski Conservation District Website:
http://www.vacd.org/~winooski/winooski_watershed_background.shtml

Low Impact Certification Criteria

A. *Flows*

- 1) **Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?**

NA. The recommendation was issued prior to January 1, 1987.

If YES, go to B.

If NOT APPLICABLE, go to A2.

If NO, project fails.

- 2) **If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or “good” habitat flow standards calculated using the Montana-Tennant method?**

Yes. The flow condition is outlined in Article 24 of the Winooski FERC license issued on August 29, 1983. Also, the State of Vermont, Department of Water Resources and Environmental Engineering issued a 401 Certification in December 1982 with several conditions. Condition A states that the project should be operated in a strict run-of-the-river manner. Condition B requires a minimum flow of 25cfs or greater to maintain the bypassed plunge pool.

Since these conditions were issued prior to January 1987, the reviewer contacted the State to ensure that the facility is in compliance with flow release schedules. According to an email from a State of Vermont Water Quality Specialist at the Dept. of Environmental Conservation dated 6/13/2011, the project is in compliance with their flow requirements.

If YES, go to B

If NO, go to A3.

PASS.

B. Water Quality

1) **Is the Facility either:**

- a) **In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or**
- b) **In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?**

Yes under 1b). Email correspondence dated 8/26/2011 from Brian Fitzgerald, State of Vermont Water Quality Specialist at the Department of Environmental Conservation, stated that "there is reasonable assurance that the waters at these facilities and in the downstream reaches are in compliance with Vermont's quantitative water quality standards for this project."

If YES, go to B2.

If NO, project fails.

- 2) **Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?**

NO. Email correspondence dated 1/10/2011 from the Vermont Agency of Natural Resources, Department of Environmental Conservation, states that this reach of the Winooski River is not listed on the most recent (2008) list of impaired waters.

If YES, go to B3.

If NO, go to C.

PASS.

C. Fish Passage and Protection

- 1) **Is the Facility in Compliance with *Mandatory Fish Passage Prescriptions* for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?**

NA. There was no prescription issued after December 31, 1986.

If YES, go to C5.

If NOT APPLICABLE, go to C2.

If NO, project fails.

- 2) **Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)?**

No. There are no historic records of migratory fish movement this far up in the Winooski basin. Lake Champlain supports a landlocked Atlantic salmon population that continues to spawn in the so-called Salmon Hole downstream of Winooski Falls (the Winooski One site).

NO, go to C3.

- a) **If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?**

NA. Salmon are not known to have ever been present in the Facility area. Dams were built on the lower Winooski as early as the 18th century and would have blocked upstream fish movement, if not naturally blocked, well before the construction of the dam at the project site. (The project dam was specifically built for hydropower generation.)

NOT APPLICABLE, go to C2b.

- b) **If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?**

NA. No resource agency has recommended passage facilities at this site, either at the time of licensing or subsequently.

NOT APPLICABLE, go to C3.

- 3) **If, since December 31, 1986:**

- a) **Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a**

above), and

- b) **The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,**
- c) **Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?**

No resource agency has considered prescribing fish passage at this site.

NOT APPLICABLE, go to C4.

- 4) **If C3 was not applicable:**

- a) **Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? Or**
- b) **If the Facility is unable to meet the fish passage standards in 4.a, has the Applicant either i) demonstrated, and obtained a letter from the U.S. Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource, or ii) committed to the provision of fish passage measures in the future and obtained a letter from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service indicating that passage measures are not currently warranted?**

The current condition can be considered *appropriately protective of the fishery resource* given that the fisheries agencies have no current interest in passage facilities at this site for migratory fish.

YES, go to C5.

- 5) **Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of *Riverine* fish?**

NA. No prescription has been issued.

If YES, go to C6.

If NOT APPLICABLE, go to C6.

If NO, project fails.

- 6) **Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?**

NA. The Winooski Hydroelectric Project was licensed by FERC in 1983 and Article 11 provides for modification of project structures or operation if prescribed by the resource agencies. The agencies did not request any special measures to prevent fish entrainment.

If YES or NOT APPLICABLE, go to D
If NO, project fails.

PASS.

D. Watershed Protection

- 1) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline**

NO.

If YES = Pass, go to E and receive 3 extra years of certification
If NO = go to D2

- 2) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1., and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?**

NO.

If YES = Pass, go to E and receive 3 extra years of certification
If NO = go to D3

- 3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)**

NO.

If YES = Pass, go to E
If NO = go to D4

4) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.

NA. No management plan was required.

If YES = Pass, go to E

If No = Fail

PASS.

E. Threatened and Endangered Species Protection

1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?

NO.

If YES, go to E2.

If NO, go to F.

PASS.

F. Cultural Resource Protection

1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?

Yes. The facility is FERC-regulated, however, there were no requirements listed in the license regarding Cultural Resource protection, mitigation or enhancement.

If YES, go to G.

PASS.

G. Recreation

1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?

Yes. No recreational facilities were required, however, Article 13 requires the Licensee to allow the public free access to a reasonable extent to project lands and waters for recreational purposes. The applicant provided documentation that free public access is being provided at the project site.

If YES, go to G3.

If NOT APPLICABLE, go to G2.

If NO, project fails.

3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?

YES.

If YES, go to H.

If NO, project fails.

PASS.

H. Facilities Recommended for Removal

1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?

NO.

If NO, facility is low impact.

If YES, the project fails.

PASS.

FACILITY IS LOW IMPACT

RECORD OF CONTACTS

Date of Conversation: 6/13/2011
Application Reviewer: Jackie Dingfelder, Consultant
Person Contacted: Brian Fitzgerald, Vermont Dept. of Environmental Conservation
Telephone/email: 802.241.3468/brian.fitzgerald@state.vt.us
Areas of Expertise: Streamflow Protection Coordinator

Jackie,

Thanks for your voicemail and email.

Compliance with water quality certification conditions at both projects includes meeting flow requirements, so both projects are in compliance with respect to flows.

For comments specifically on fisheries impacts, you should contact the appropriate district fisheries biologist in the Vt. Department of Fish and Wildlife:

Slack Dam: Jay McMenemy, jay.mcmenemy@state.vt.us or 802.885.8829

Winooski-8: Rich Kirn, rich.kirn@state.vt.us or 802.485.7566

Please let me know if you need additional information.

BT

Brian T. Fitzgerald
Streamflow Protection Coordinator

Vermont Agency of Natural Resources
Department of Environmental Conservation
Water Quality Division
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Waterbury, VT 05671-0408

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802.793.0454 (cell)

brian.fitzgerald@state.vt.us
<http://www.vtwaterquality.org>

Date of Conversation: 8/26/2011
Application Reviewer: Jackie Dingfelder, Consultant
Person Contacted: Brian Fitzgerald, Vermont Dept. of Environmental Conservation
Telephone/email: 802.241.3468/brian.fitzgerald@state.vt.us

Areas of Expertise: Streamflow Protection Coordinator

Jackie:

Fred Ayer requested confirmation of compliance with Vermont's quantitative water quality standards for the Winooski-8 (Winooski River) and Slack Dam (Black River) hydroelectric projects. Based on available information, there is reasonable assurance that the waters at these facilities and in the downstream reaches are in compliance.

Please contact me if you have questions.

BTF

Brian T. Fitzgerald
Streamflow Protection Coordinator

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