

**APPLICATION REVIEW FOR  
LOW IMPACT HYDROPOWER INSTITUTE  
CERTIFICATION  
of the  
CAVENDISH PROJECT NO. 2489**



**October 29, 2012**

**Application Reviewer: Patricia McIlvaine**

**WRIGHT-PIERCE**   
Engineering a Better Environment

**APPLICATION REVIEW FOR LOW IMPACT HYDROPOWER  
INSTITUTE CERTIFICATION**

**CAVENDISH PROJECT - FERC PROJECT NO. P-2489**

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

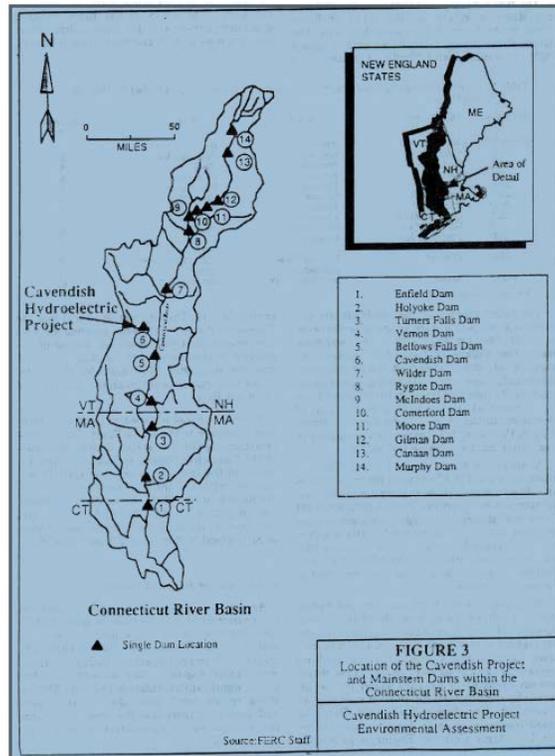
Prepared by:  
Patricia McIlvaine  
October \_\_, 2012

## I. INTRODUCTION AND OVERVIEW

This report reviews the application submitted by Central Vermont Public Service Corporation (Applicant or CVPS) to the Low Impact Hydropower Institute (LIHI) for Certification of the Cavendish Hydroelectric Project P-2489 (Cavendish Project or Project), located on the Black River in Cavendish, Windsor County, Vermont.

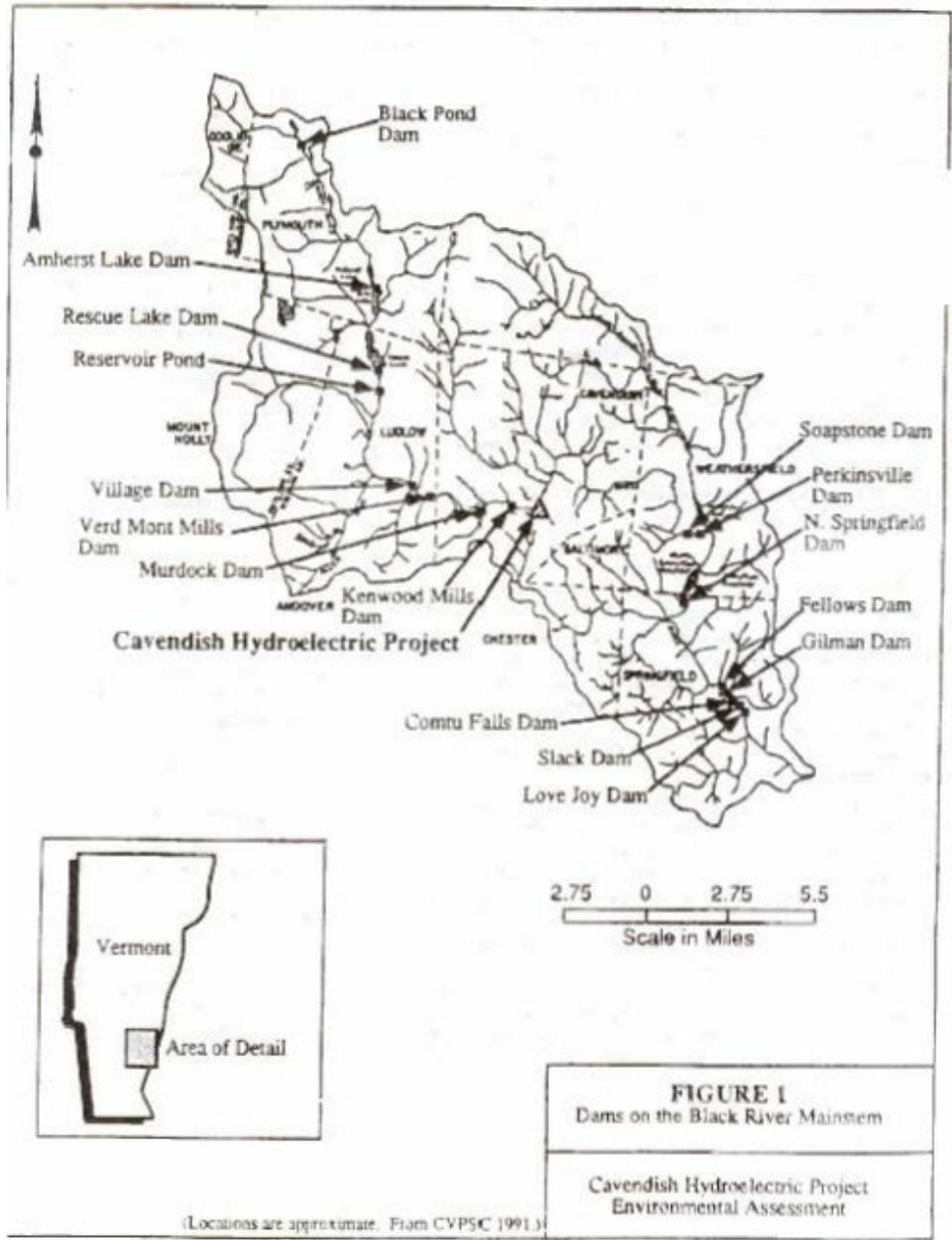
## II. PROJECT'S GEOGRAPHIC LOCATION

The **Cavendish Project** is located in southeastern Vermont, on the Black River, approximately 20.8 miles from where the Black River joins the Connecticut River. Figure 1 illustrates where the Black River joins the Connecticut River, as well as locations of other dams on the Connecticut River.



**Figure 1 – Location of the Cavendish Project and Other Dams on the Connecticut River**

The 1,513 acre Proctor-Piper State Forest is located one-half mile southwest of the Project, while the Hawks Mountain Wildlife Management Area borders the Project on the northeast. Figure 2 shows the location of the eight, non-power related, dams upstream of the Cavendish Dam on the Black River and eight dams downstream, five of which include power generation. None of 16 dams are owned by CVPS. The closest upstream dam is Kenwood Mills Dam located about one mile upstream and the Soapstone Dam, located about six miles downstream. Neither of these two dams include hydropower facilities.



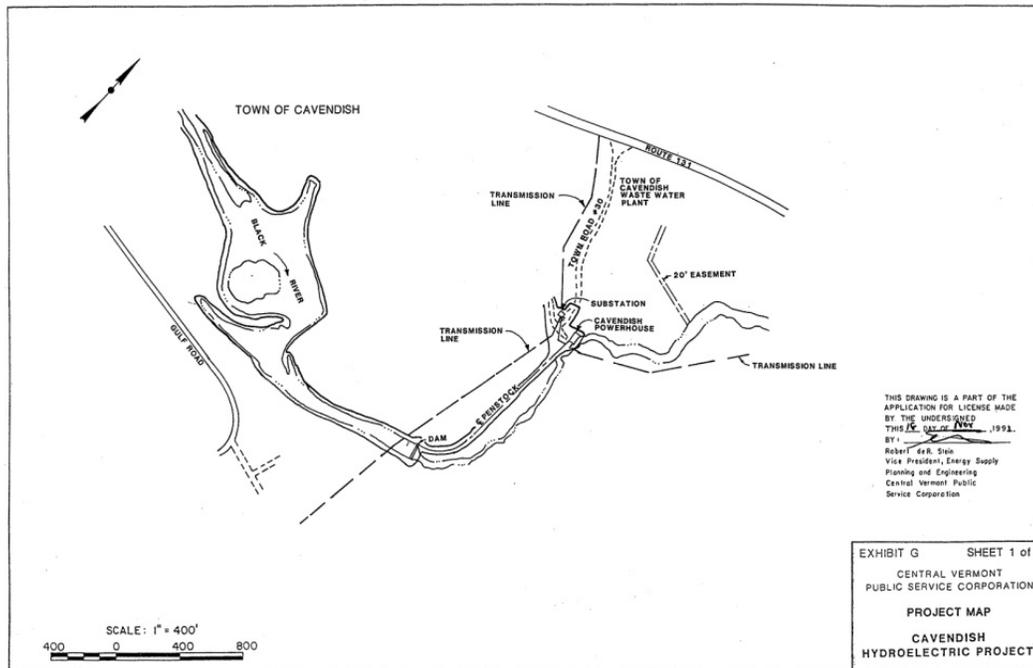
**Figure 2 – Dams on the Black River**

### III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Cavendish concrete gravity dam is 75 feet high and set into ledge outcroppings on both sides of the river. The north spillway section is 25 feet high, topped with a 6-foot inflatable rubber flashboard. The south spillway section is 6 feet high and topped with 2.5-foot flashboards. There is a concrete intake structure on the north bank of the river, which is equipped with manually operated headgates and an inclined trashrack.



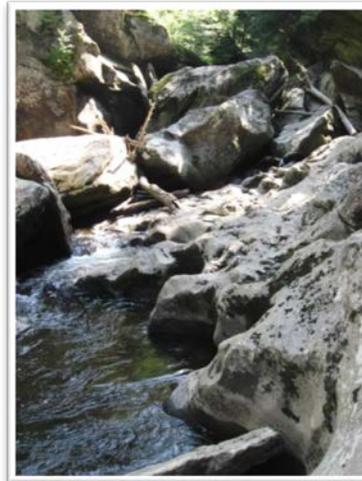
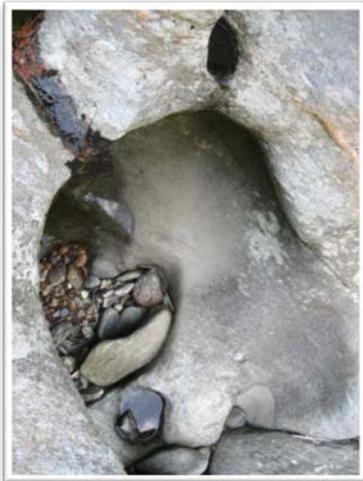
The powerhouse contains three Francis turbine generators, each with a capacity of 480 kW, for a total of 1,440 kW of installed capacity. Maintenance buildings are co-located with the powerhouse and substation. A steel 1,250-foot long penstock moves the water from the dam to the powerhouse, as illustrated on Figure 3.



**Figure 3 – Cavendish Project Features**

The 10-acre impoundment extends 3,000 feet upstream from the dam. The Project is operated as

a run-of-river facility. When the project is not operating, all flows are spilled from the dam. The 1,570-foot long bypass reach includes Cavendish Gorge, a series of waterfalls and cascades that flow over boulders and between steep cliffs, with numerous pools and glacial potholes formed in the channel. The following photographs show the gorge features.



#### **IV. REGULATORY AND COMPLIANCE STATUS**

On December 31, 1991, CVPS filed an application to the Federal Energy Regulatory Commission (FERC) for a subsequent license to continue to operate and maintain the Cavendish Hydroelectric Project. Timely motions to intervene were filed by the Vermont Agency of Natural Resources (VANR), the U.S. Department of Interior, and American Rivers. None of the entities opposed relicensing of the project. The FERC license states that comments received from interested agencies and individuals were fully considered in determining conditions associated with license issuance. The license was issued on December 8, 1994 for a 30 year term.

According to CVPS's application for LIHI certification, no regulatory proceedings or license amendments have been issued. A review of FERC's eLibrary from January 2007 through mid-October 2012, and other FERC documents appears to generally support this position. No license modifications were noted within this period.

CVPSC filed an application in 1992 for Water Quality Certification from the Vermont Agency of Natural Resources (VANR) for the Cavendish Project. The water quality certification was ultimately issued on October 7, 1993.

The FERC license denotes that certain conditions contained in the Water Quality Certificate extend beyond the authority of such a certification and there for were not incorporated, or were modified, within the FERC license. These include:

- Conflicts that may arise regarding fish passage between the authority reserved under Section 18 of the Federal Power Act, and those of VANR specified at this time, shall be resolved at the time the fish passage facilities are required.

- FERC determined that VANR's requirement to review and approve all project maintenance and repair work including their scheduling inappropriately attempts to govern activities at the project which fall under the jurisdiction of FERC, not VANR.
- FERC did not accept VANR's requirement to have all future project changes be subject to VANR review and approval. FERC contends that such broad authority extends beyond the authority provided under Section 401 of the Clean Water Act.

Review of FERC's eLibrary and specific questioning of the applicant did not identify any reported license deviations in the past five years or license compliance delays other than that described above.

Resource agency comments obtained during telephone contact and emails received were generally supportive of the compliance activities at this site, with no issues identified. Telephone communications are summarized in Appendix A, followed by copies of written communications received from the resource agencies.

## **V. PUBLIC COMMENT RECEIVED BY LIHI**

The deadline for submission of comments on the certification application was April 6, 2012. No public comments letters were received.

## **VI. SUMMARY OF COMPLIANCE WITH CRITERIA AND ISSUES IDENTIFIED**

**Criterion A - Flows** - The facility appears to be operated in compliance with the established minimum flow requirements, and reservoir fluctuation and re-filling rates and deviation reporting. No specific areas of concern were identified by the resource agencies contacted.

**Criterion B - Water Quality** - The facility appears to be operated in compliance with all water quality related conditions of the FERC license and Water Quality Certificate. No specific areas of concern were identified by the VANR contacted.

**Criterion C - Fish Passage and Protection** - Downstream fish passage for anadromous fish has been installed and operating since September 1995. The fish passage effectiveness monitoring demonstrated the passage is providing safe passage based on analysis by the USFWS. The USFWS reserved their authority within the FERC license under Section 18 of the FPA for construction of upstream passage and for modifying the downstream fish passage requirements as changes in needs arise, but neither have been requested to date. The VANR issued Water Quality Certificate has similar fish passage requirements. American eel are not common in the Black River. Consultation with VANR did not identify eel passage as an issue. Passage to the Black River is blocked by several dams on both the Black River and further downstream on the Connecticut River. No passage requirements have been identified for riverine species. Effective July 2012, the USFWS ended their program for restoration of Atlantic Salmon to the Connecticut River basin.

**Criterion D - Watershed Protection** - There are no requirements for a buffer zone, shoreline protection fund or shoreline management plan for the Facility. Thus, as all requirements, of which there are none, are nonetheless being met, this Facility passes for this criterion. No additional term for certification is appropriate.

**Criterion E - Threatened and Endangered Species Protection** - There are no federally or state endangered or threatened species found in the area that would potentially be affected by Facility operations. The Bald Eagle, a state endangered species is considered a potential transient only. Studies performed to study effects of bypass flows on a rare moss found that the originally mandated flow of 10 cfs was found to be most protective.

**Criterion F - Cultural Resources** - The Project is subject to the provisions of "Programmatic Agreement Among FERC, the Advisory Council on Historic Preservation and the Vermont State Historic Preservation Officer (SHPO)." Annual reports have been submitted as required by the single Cultural Resources Management Plan to both FERC and the Vermont State Historic Preservation Office. There are no issues identified with adherence to cultural resources protection requirements at the Facility.

**Criterion G - Recreation** - The Project was found to be in compliance with all recreational requirements.

**Criterion G - Facilities Recommended for Removal** - No resource agencies have recommended dam removal.

## **VII. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION**

Based on my review of information submitted by the applicant, the additional documentation noted herein, the public comments submitted in writing or through my consultations with various resource agencies and other entities, I believe that the Project is in compliance with the LIHI criteria, as discussed in detail later in this report.

Therefore, I recommend that the Cavendish Project be certified to be in compliance with LIHI's criteria with a certification term of five years.

### **THE CAVENDISH PROJECT MEETS THE LIHI CRITERIA FOR CERTIFICATION**

## **VIII. DETAILED CRITERIA REVIEW**

### **A. FLOWS**

**Goal:** The Flows Criterion is designed to ensure that the river has healthy flows for fish, wildlife and water quality, including seasonal flow fluctuations where appropriate.

**Standard:** For instream flows, a certified facility must comply with recent resource agency recommendations for flows. If there were no qualifying resource agency recommendations, the applicant can meet one of two alternative standards: (1) meet the flow levels required using the Aquatic Base Flow methodology or the "good" habitat flow level under the Montana-Tennant methodology; or (2) present a letter from a resource agency prepared for the application confirming the flows at the facility are adequately protective of fish, wildlife, and water quality.

**Criterion:**

- 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 conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?**

**YES** - No exceptions to these flow requirements were reported in the FERC eLibrary in the past five years, nor were any reported by the applicant. VANR (Rod Wentworth and Shayne Jaquith) confirmed no known deviations from these requirements. These flow requirements were contained in both the FERC License and WQC. In summary these flow requirements, which remain valid, include:

- a minimum flow of 83 cfs from Oct 1 to March 31, 332 cfs from April 1 to May 31 and 42 cfs or inflow from June 1 through September 30 to the tailrace;
- continuous minimum flow of 10 cfs to the Black River bypass;
- restrictions on impoundment refilling rates;

- matching of instantaneous outflow approximately with inflows to minimize reservoir fluctuations, modified to 90% of inflow if low flows prevent appropriate refilling of the impoundment of such action is needed following flashboard replacement and
- reporting of minimum flow deviations, the cause and corrective actions taken to minimize reoccurrence to FERC within 30 days of the deviation.

***This Project passes Criterion A - Flows- Go to B***

## **B. WATER QUALITY**

***Goal:*** The Water Quality Criterion is designed to ensure that water quality in the river is protected.

***Standard:*** The Water Quality Criterion has two parts. First, an Applicant must demonstrate that the facility is in compliance with state water quality standards, either through producing a recent Clean Water Act Section 401 certification or providing other demonstration of compliance. Second, an applicant must demonstrate that the facility has not contributed to a state finding that the river has impaired water quality under Clean Water Act Section 303(d).

***Criterion:***

**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 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.** The operation of Cavendish appears to be in compliance with the requirements of the 401 Water Quality Certification and the FERC License, based on review of information provided, FERC's eLibrary and consultation with Shayne Jaquith of the Water Quality Division of VANR. These requirements remain valid.

**YES, go to B2**

**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?**

**YES.** Review of the 2010 Clean Water Act Section 303(d) List of Impaired Waters issued by the Vermont Agency of Natural Resources, Division of Water Quality did not identify the waters in the area of the Project as impaired. Sections of the Black River both upstream and downstream, however, are so listed, **GO TO B3**

**3) If the answer to question B.2. is yes, has there been a determination that the Facility is not a cause of that violation?**

**YES.** The Cavendish Project is not identified as causing or contributing to this water quality impairment of the impaired sections of the Black River. The listed causes are combined sewer overflows, urban runoff, erosion and nutrient enrichments from waste water discharges.

*The Project Passes Criterion B - Water Quality - Go to C*

**C. FISH PASSAGE AND PROTECTION**

**Goal:** The Fish Passage and Protection Criterion is designed to ensure that, where necessary, the facility provides effective fish passage for riverine, anadromous and catadromous fish, and protects fish from entrainment.

**Standard:** For riverine, anadromous and catadromous fish, a certified facility must be in compliance with both recent mandatory prescriptions regarding fish passage and recent resource agency recommendations regarding fish protection. If anadromous or catadromous fish historically passed through the facility area but are no longer present, the facility will pass this criterion if the Applicant can show both that the fish are not extirpated or extinct in the area due in part to the facility and that the facility has made a legally binding commitment to provide any future fish passage recommended by a resource agency. When no recent fish passage prescription exists for anadromous or catadromous fish, and the fish are still present in the area, the facility must demonstrate either that there was a recent decision that fish passage is not necessary for a valid environmental reason, that existing fish passage survival rates at the facility are greater than 95% over 80% of the run, or provide a letter prepared for the application from the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service confirming the existing passage is appropriately protective.

**Criterion:**

**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?**

**YES.** Articles 405, 406 and 407 specify the requirements mandated by the USFWS (under Section 18 of the Clean Water Act) and VANR, and accepted by FERC for the construction and effectiveness testing of initially temporary, then permanent, downstream passage for anadromous fish, especially salmon smolt, fry of which are stocked upstream annually. All plans, designs and studies required approval by VANR, USFWS and FERC. The permanent downstream passage was operational in September 1995.

Required effectiveness testing, following an agency approved plan, was conducted from 1996 through 2001. In a letter dated April 17, 2002 from the USFWS, it was found that “safe passage at the Project was found to be acceptable”. A copy of this letter is contained in Appendix B.

FERC license Articles 408 specifies that the USFWS has reserved their authority for modifying the current downstream passage requirements and mandating upstream fish passage under Section 18 of the CWA. To date, upstream passage for anadromous species has not yet been requested. Upstream passage is blocked by a number of downstream dams that do not have upstream passage. Effective July 2012, the USFWS ended its program for Atlantic salmon restoration of the Connecticut River basin, thus in the opinion of the Reviewer, upstream passage may not be expected to be requested unless this restoration plan is again changed.

***GO TO B2 for catadromous species***

- 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)?**

There is limited data for American eel in this section of Vermont based on applicant provided data, specifically the 2005 Vermont Wildlife Action Plan. American eel were historically plentiful in the Lake Champlain and Connecticut River watersheds, however this Report identifies that numerous large dams on the Connecticut River prevent the passage of eel currently. Based on applicant provided information, to date there is no American eel passage on the mainstem of the Connecticut River dams downstream of the Black River (e.g., Bellows Falls and below that) and none on dams downstream of Cavendish on the Black River. American eels were not identified by Rod Wentworth as a concern at the Cavendish Project. ***Go to C2a***

- 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?**

**YES.** Numerous dams downstream on the Connecticut and Black River are barriers for upstream passage of both anadromous and catadromous species. ***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?**

**YES** The USFWS has reserved authority for mandating upstream fish passage and for modifying the downstream fish passage requirements as changes in needs arise. This is included as Article 408 in the FERC license. As written, this prescription is not limited to any specific species. The Water Quality Certificate also has a non-species specific condition requiring such installation within a two year notice from the VANR for such passage. No upstream passage has been requested to date based on consultation with the VANR. ***Go to C5***

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

**NOT APPLICABLE.** No fish passage prescriptions have been issued for riverine fish. *Go to C6*

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

**YES.** Systems to attract fish to the downstream passage were installed including a FishPath system (current and turbulence generator), restriction plate at the bypass opening and blocking curtain as required by the agency-approved plan.

*The Project Passes Criterion C - Fish Passage and Protection - Go to D*

**D. WATERSHED PROTECTION**

**Goal:** The Watershed Protection criterion is designed to ensure that sufficient action has been taken to protect, mitigate and enhance environmental conditions in the watershed.

**Standard:** A certified facility must be in compliance with resource agency and Federal Energy Regulatory Commission (“FERC”) recommendations regarding watershed protection, mitigation or enhancement. In addition, the criterion rewards projects with an extra three years of certification that have a buffer zone extending 200 feet from the high water mark or an approved watershed enhancement fund that could achieve within the project’s watershed the ecological and recreational equivalent to the buffer zone and has the agreement of appropriate stakeholders and state and federal resource agencies. A Facility can pass this criterion, but not receive extra years of certification, if it is 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.

**Criterion:**

**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 average annual high water line for at least 50% of the shoreline, including all of the undeveloped shoreline?**

**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, go to D3**

**3 ) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders, with 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, *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.**

**NOT APPLICABLE.** No Shoreland Management Plan, buffer zone or enhancement fund was required for the Cavendish Project.

*The Project Passes Criterion D - Watershed Protection - Go to E*

## **E. THREATENED AND ENDANGERED SPECIES PROTECTION**

**Goal:** The Threatened and Endangered Species Protection Criterion is designed to ensure that the facility does not negatively impact state or federal threatened or endangered species.

**Standard:** For threatened and endangered species present in the facility area, the Applicant must either demonstrate that the facility does not negatively affect the species, or demonstrate compliance with the species recovery plan and receive long term authority for a "take" (damage) of the species under federal or state laws.

**Criterion:**

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

**YES.** Bald Eagle, a state endangered species under the Vermont Endangered Species Law, is a known occasional transient in the Cavendish Project area. The Cavendish Gorge area, located downstream of the Project, was identified as the only known location in the state to have a rare byrophyte (*Scapania umbrosa*) a moss-like species of liverwort present at six sites. This species is not listed as rare, threatened or endangered at the state or federal levels. Article 409 of the License and Condition I of the WQC required CVPS to undertake a five-year study of the effects of alternative bypass flow regimes on the species. FERC approved the study plan on May 10, 1996. Results from the 5-year study indicated that alternative flows were more detrimental than the 10 cfs minimum flow required under Article 402 and WQC Condition C. ***Go to E2***

**2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?**

**NOT APPLICABLE.** Vermont Fish and Wildlife has drafted a recovery plan for the bald eagle, dated October 2010. The plan includes a bald eagle recovery initiative in the Lake Champlain region, to aid in the establishment of breeding pairs along the Lake, and through educational efforts, set the stage for necessary habitat protection for bald eagles on Lake Champlain. Efforts under this Recovery Plan are undertaken remote from the Cavendish Project and CVPS is not involved with this restoration program as the bald eagle is only a transient in the vicinity of the Cavendish Project. *Go to E3*

- 3) If the Facility has received authority to Incidentally Take a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental take statement; (ii) Obtaining an incidental take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authorization?**

**NOT APPLICABLE, *Go to E5***

- 5) If E2 and E3 are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?**

**YES.** The Environmental Assessment notes that the VANR indicated during re-licensing that the continued operation would not adversely affect the bald eagle or peregrine falcon (which is no longer on the State's list of endangered species), both of which are only transients in the area.

Studies done to ensure protection of the rare byrophyte (*Scapania umbrosa*) found that mandated flows in the bypass are protective of the species. Review of the VT ANR Natural Resources Atlas for current known presence of protected species, as recommended by Shayne Jaquith of VANR, was conducted by the Applicant as part of the Application submission. This review confirmed that no additional protected species are found in the project area.

*The Project Passes Criterion E - Threatened and Endangered Species Protection - Go to F*

## **F. CULTURAL RESOURCE PROTECTION**

**Goal:** The Cultural Resource Protection Criterion is designed to ensure that the facility does not inappropriately impact cultural resources.

**Standard:** Cultural resources must be protected either through compliance with FERC license provisions, or through development of a plan approved by the relevant state or federal agency.

**Criterion:**

**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.** License Article 412 requires implementation of the "Programmatic Agreement Among FERC, the Advisory Council on Historic Preservation and the Vermont State Historic Preservation Officer (SHPO)", which was executed on September 8, 1994. A Cultural Resources Management Plan (CRMP) was developed and approved in 1999. The powerhouse, dam and gatehouse are considered eligible for inclusion in the National Register of Historic Places. Phase 1A archeological surveys and identified a canoe and boat landing along the impoundment, and a canoe portage and put-in around the dam. Annual reports associated with surveys of the project shoreline are submitted to both the FERC and the Vermont SHPO. Documentation provided by the applicant has demonstrated compliance with cultural resources protection requirements. Likewise communications with Scott Dillon, who handles archaeological issues for the SHPO, has confirmed his satisfaction with the Project's compliance history. Calls to the contact for historical review were not returned.

*The Project Passes Criterion F - Cultural Resource Protection - Go to G*

**G. RECREATION**

**Goal:** The Recreation Criterion is designed to ensure that the facility provides access to the water without fee or charge, and accommodates recreational activities on the public's river.

**Standard.** A certified facility must be in compliance with terms of its FERC license or exemption related to recreational access, accommodation and facilities. If not FERC-regulated, a certified facility must be in compliance with similar requirements as recommended by resource agencies. A certified facility must also provide the public access to water without fee or charge.

**Criterion:**

**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.** The Project is in compliance with Article 413 and 415 of the License and WQC Conditions M and N for recreational access, accommodation and facilities, and occupancy and use. The FERC Order that approved the recreational facilities plans included agency comments. Recreational improvements were to be completed within one year (by 1997). There is no record of when those improvements were actually completed, nor any record of CVPS requesting an extension of time to do so. However, all improvements had been made by 2000 when CVPS submitted a letter and as-builts to FERC at that time. FERC responded in a letter (September 22, 2000) accepting the recreation improvements. That letter did not indicate that CVPS had been non-compliant in the timing of making improvements. All recreational facilities were completed

at that time, and no additional facilities were or are planned .

***Go to G3***

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

**YES.** A statement issued by the applicant indicates that such access is provided free of charge.

***The Project Passes Criterion G - Recreation - Go to G***

## **H. FACILITIES RECOMMENDED FOR REMOVAL**

**Goal:** The Facilities Recommended for Removal Criterion is designed to ensure that a facility is not certified if a natural resource agency concludes it should be removed.

**Standard:** If a resource agency has recommended removal of a dam associated with the facility, the facility will not be certified.

**Criterion:**

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

**NO.** No resource agency has recommended removal of this dam.

***The Project Passes Criterion H -Facilities Recommended for Removal***

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**APPENDIX A**  
**RECORD OF CONTACTS**

## INDEX OF PRIMARY CONTACT INFORMATION FOR LIHI CRITERIA

<b>LIHI CRITERION</b>	<b>PRIMARY CONTACT INFORMATION</b>
<b>Flows</b>	Shayne Jaquith, VANR, DEC - Water Quality Division
<b>Water Quality</b>	Shayne Jaquith,,VANR, DEC - Water Quality Division
<b>Fish Passage &amp; Protection</b>	Shayne Jaquith, VANR, DEC - Water Quality Division Rod Wentworth, VT Dept. of Fish and Wildlife John Warner, USFWS Hydropower Coordinator *
<b>Watershed Protection</b>	None required
<b>Threatened &amp; Endangered Species</b>	Shayne Jaquith, VANR, DEC- Water Quality Division
<b>Cultural Resources Protection</b>	Devin Colman, Vermont State Historic Preservation Office* Scott Dillon, Vermont State Historic Preservation Office Awq
<b>Recreation</b>	None required
<b>Facilities Recommended for Removal</b>	None required

\* Individuals contacted but no response received.

## RECORD OF CONTACTS

**NOTE:** The information presented below was gathered from contacts by email and/or telephone. Copies of emails follow this page.

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Date: July 26, 2012 Telephone call  
Contact Person: Scott Dillon  
Vermont State Historic Preservation Office  
Contact Information: 802-828-3048; Scott.dillon@state.vt.us  
Area of Expertise: Cultural Resources – Archaeological resources

Scott did not discuss any specifics regarding the Cavendish Project but stated that in general, CVPS has always initiated appropriate consultation with the SHPO Office and that resolution of issues has always been to the SHPO's satisfaction. He described CVPS as a 'good steward' in terms of cultural resource protection. No issues regarding impacts to archaeological resources have been identified.

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Date: April 13, May 22 and May 30 emails and May 31, 2012 telephone call  
Contact Person: Shayne Jaquith, VANR, Department of Environmental Conservation, Water Quality Division  
Contact Information: 802-338-4853; Shayne.jaquith@state.vt.us  
Area of Expertise: Water Quality Certification

See attached emails dated April 13, May 22 and May 30 summarizing communications regarding compliance with conditions under the Water Quality Certifications issued for all of the CVPS the sites seeking LIHI certification. When contacted on May 31 regarding protected species, Shayne suggested I review the VT ANR Natural Resources Atlas for known presence of protected species in lieu of his office conducting such a review. (Note: Such a review was completed as part of the LIHI Application preparation.) Shayne Jaquith also stated that the VANR is appreciative of the LIHI process in that they are seeing projects undergoing improved compliance programs as a result of LIHI conditions required to obtain certification.

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Date: August 21, 2012  
Contact Person: Rod Wentworth, VT Division of Fish & Wildlife  
Contact Information: 802-654-8949; rod.wentworth@state.vt.us  
Area of Expertise: Fisheries

Mr. Wentworth reported that no upstream passage for anadromous species, nor any up- nor downstream passage for catadromous species, are required due to the lack of these species in the Project area. He stated that although he does not have an opportunity to visit such sites, he has no

reason to believe there any concerns as he has not received any complaints. Most often concerns are raised at projects that have downstream flow gages that are showing unusually low flows. The Cavendish Project does not have such a gage.

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**Patricia B. McIlvaine**

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**From:** Jaquith, Shayne [Shayne.Jaquith@state.vt.us]  
**Sent:** Wednesday, May 30, 2012 10:26 AM  
**To:** 'Patricia B. McIlvaine'  
**Cc:** Wentworth, Rod  
**Subject:** RE: Review of LIHI Certification Candidate Projects

Pat,

I cannot confirm that the projects are in compliance. I am only able to confirm that we do not have any information to suggest that the projects are out of compliance. This is respect to all conditions of the water quality certifications.

**Please note that my phone number has changed to 802-338-4853**

Shayne Jaquith  
Streamflow Protection Program  
Department of Environmental Conservation  
Water Quality Division  
103 S. Main St, 10 North, 1st Floor  
Waterbury, VT 05671-0408  
802-338-4853  
shayne.jaquith@state.vt.us

---

**From:** Patricia B. McIlvaine [mailto:Pat.McIlvaine@wright-pierce.com]  
**Sent:** Tuesday, May 22, 2012 2:21 PM  
**To:** Jaquith, Shayne  
**Subject:** FW: Review of LIHI Certification Candidate Projects

Good afternoon Ms. Shayne

I am the independent reviewer working for the Low Impact Hydropower Institute on the CVPS projects for which certification is being sought. I just wanted to confirm that in the various confirmation statements noted in your email below, whether you are addressing just those aspects of the water quality certification that directly deals with water quality (e.g. flow requirements, etc.) or if you are also confirming that the projects listed are in compliance with ALL of the conditions of the certifications, including those such as dealing with downstream fish passage, installation of recreational features , etc.

Thanks so much for your help on this.

Pat

**Pat McIlvaine | Project Manager**

**Wright-Pierce | Water, Wastewater & Infrastructure Engineers**

**Please note my new e-mail address:** [pat.mcllvaine@Wright-Pierce.com](mailto:pat.mcllvaine@Wright-Pierce.com)

[www.wright-pierce.com](http://www.wright-pierce.com)

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5/31/2012

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**From:** Maryalice Fischer [<mailto:MFischer@normandean.com>]  
**Sent:** Friday, April 20, 2012 1:33 PM  
**To:** [gabriela@goldfarbconsulting.com](mailto:gabriela@goldfarbconsulting.com); [pbm@wright-pierce.com](mailto:pbm@wright-pierce.com)  
**Cc:** [fayer@lowimpacthydro.org](mailto:fayer@lowimpacthydro.org); John King  
**Subject:** FW: Review of LIHI Certification Candidate Projects

Hello Gabriela and Pat,

CVPS was successful with obtaining the information below from Vermont relative to compliance with their water quality certifications. As you know, the WQCs (included as part of the LIHI applications) are not limited strictly to issues of water quality itself, but also to other resource protection measures included as conditions within those certifications.

Please let me know if you have any questions.

Maryalice Fischer  
Normandean Associates, Inc.  
917 Route 12  
Westmoreland NH 03467

603.757.4011 voice  
603.903.4702 mobile

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**From:** Jaquith, Shayne [<mailto:Shayne.Jaquith@state.vt.us>]  
**Sent:** Monday, April 16, 2012 10:09 AM  
**To:** Eliason, Beth  
**Subject:** RE: Review of LIHI Certification Candidate Projects

Beth,

In addition to the reviews I sent you on the 13<sup>th</sup>, you had requested a review of the Silver Lake project. I've conducted that review and my comments follow.

*Silver Lake*

The Silver Lake Hydroelectric Project was certified in 2008 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

If you have any further questions, don't hesitate to contact me.

Take care,  
Shayne

**Please note that my phone number has changed to 802-338-4853**

Shayne Jaquith  
Streamflow Protection Program  
Department of Environmental Conservation  
Water Quality Division

5/31/2012

103 S. Main St, 10 North, 1st Floor  
Waterbury, VT 05671-0408  
802-338-4853  
[shayne.jaquith@state.vt.us](mailto:shayne.jaquith@state.vt.us)

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**From:** Jaquith, Shayne  
**Sent:** Friday, April 13, 2012 1:17 PM  
**To:** 'beliaso@cvps.com'  
**Subject:** Review of LIHI Certification Candidate Projects

Hi Beth,

BT asked me to review the LIHI candidate projects that you had submitted to him. I have completed review of most but not all of the projects you submitted and wanted to provide you with my comments on those projects. I will continue my review of the remaining projects and expect to have comments to you by the end of next week. My comments are provided below.

*Cavendish FERC Project No. 2489*

The Cavendish Hydroelectric Project was certified in 1993 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

*Middlebury Lower FERC Project No. 2737*

The Middlebury Lower Hydroelectric Project was certified in 1999 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

*Weybridge FERC Project No. 2731*

The Weybridge Hydroelectric Project was certified in 1993 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

*Pierce Mills FERC Project No. 2396*

The Pierce Mills Hydroelectric Project was certified in 1994 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

*Arnold Falls FERC Project No. 2399*

The Arnold Falls Hydroelectric Project was certified in 1994 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

*Gage FERC Project No. 2397*

The Gage Hydroelectric Project was certified in 1994 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the

project is not operating in full conformance with the conditions of its water quality certification.

*Passumpsic FERC Project No. 2400*

The Passumpsic Hydroelectric Project was certified in 1994 by the Department of Environmental Conservation (the Department). Conformance with the conditions of the certification would assure that the project does not violate Vermont Water Quality Standards. At this time the Department has no information to suggest that the project is not operating in full conformance with the conditions of its water quality certification.

Take care,  
Shayne

**Please note that my phone number has changed to 802-338-4853**

Shayne Jaquith  
Streamflow Protection Program  
Department of Environmental Conservation  
Water Quality Division  
103 S. Main St, 10 North, 1st Floor  
Waterbury, VT 05671-0408  
802-338-4853  
[shayne.jaquith@state.vt.us](mailto:shayne.jaquith@state.vt.us)

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## **APPENDIX B**

### **KEY AGENCY CORRESPONDENCE**



## United States Department of the Interior



FISH AND WILDLIFE SERVICE

New England Field Office  
70 Commercial Street, Suite 300  
Concord, New Hampshire 03301-5087

REF: FERC No. 2489  
Central Vermont Public Service Corporation

April 17, 2002

Mr. Michael Scarzello  
Central Vermont Public Service Corporation  
77 Grove Street  
Rutland, VT 05701

Dear Mr. Scarzello:

We have completed our review of the reports on the 2000 and 2001 Downstream Smolt Bypass System Evaluation studies and the 2000 Assessment of Smolt Safety for the Cavendish Hydroelectric Project, located on the Black River in Vermont. These reports were transmitted by your letter dated February 4, 2002.

### 2000 Assessment

The evaluation in 2000 tested the FishPath flow inducer, along with an oil boom used to assist guidance to the bypass. Bypass flows of 5 cfs and 7 cfs were evaluated.

The test results were confounded by spill conditions during the testing periods, whereby passage efficiencies were reduced as tagged smolts spilled over the dam. Bypass efficiencies were better for later releases when spill subsided.

### 2001 Assessment

The 2001 evaluation tested the same system as in 2000, with a 7 cfs discharge. Once again, spill confounded results. However, despite spill, overall bypass efficiency over the course of the study was 57%.

### Smolt Safety Study

In order to assure that bypassed smolts are safely conveyed downstream, the bypass chute and plunge pool were evaluated at the 7 cfs bypass test flows. During initial tests, fish survived passage into the plunge pool but a significant percentage of the fish were found to remain in

the plunge pool and not leave. In all cases, smolts survived and appeared in good shape. Delayed mortality was assessed for a 72 hour period with only one delayed mortality.

In order to address the failure of smolts to exit the plunge pool, a submerged orifice and pipe was installed in lieu of the overflow weir. CVPS thought that the smolts were reluctant to exit via the weir given the surface turbulence and air entrainment since smolts in the plunge pool remained in deeper in a quieter area of the plunge pool. Three tests of the modified plunge pool exit were conducted. Egress was vastly improved by the modification.

### Discussion

The 2000 and 2001 bypass evaluations tested a bypass configuration with the flow inducers and oil boom and a bypass discharge of 5 to 7 cfs. Evaluations in 1999 also tested these lower bypass discharges, which are significantly below a standard bypass passing 20 cfs. Although the reduction in bypass size and discharge likely reduces bypass efficiency, this reduction was needed in order to protect a rare bryophyte species that inhabits the Cavendish Gorge below the dam. In addition, the bypass plunge pool proved to be an unsafe passage route at a 20 cfs discharge.

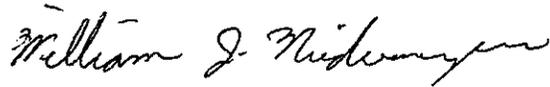
The 1999, 2000 and 2001 evaluations of the FishPath system with reduced fish bypass discharges demonstrated reasonable passage efficiency, given the periodic spill that occurred during the evaluations. Smolts likely use a downed or overtopped rubber dam section when spill occurred. Therefore, overall safe passage at the project is likely higher than the bypass monitoring alone indicated. Since periodic spill is common during the smolt migration period, we would expect that on average, safe passage past the project to be acceptable.

The plunge pool safety evaluations demonstrated that the bypass and plunge pool, when operated at a reduced 7 cfs, flow provided a safe passage route. The modification to the plunge pool of an orifice in place of a overflow weir proved effective in speeding egress. On a conference call on April 11, 2002, your consultant, Jeff Wallin, suggested that further improvements in egress from the plunge pool could be achieved if the orifice location were moved to the upstream portion of the plunge pool. This would provide for egress from the quiet area smolts congregated in and would assist in transition from the plunge pool to the natural spill pool area below the dam apron. A pipe would be attached to the orifice if this was deemed necessary to convey fish to the natural pool. We concur with this proposed modification.

With the proposed plunge pool modifications we recommend that CVPS implement the current bypass systems with a 7 cfs bypass flow as the project's permanent smolt passage system.

We appreciate this opportunity to comment. If you have any questions, please contact John Warner of this office at (603) 223-2541 or e-mail at [john\\_warner@fws.gov](mailto:john_warner@fws.gov).

Sincerely,

A handwritten signature in cursive script that reads "William J. Neidermyer".

**William J. Neidermyer  
Assistant Supervisor Federal Projects  
New England Field Office**