

JOHN BRUNO

CONSULTING ENGINEER & LAND SURVEYOR

13 Jenkins Road

802-269-0011

Hartland, VT 05048

April 15, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

**Re: Great River Hydro Connecticut River Dams Relicensing
FERC Project No. 1855-045, 1892-026 & 1904-073 Study Comments on
November 15, 2017-Supplemental Erosion Report Studies 1,2 and 3 (Riverbank
Transect and Riverbank Erosion)**

Dear Secretary Bose:

I am offering the following comments in response to the above referenced Erosion Studies 1, 2 and 3 and the related Supplemental Study. I have serious concerns regarding Erosion and Studies 1, 2 and 3 Riverbank Erosion Studies as well as the Supplemental Study dated November 15, 2017.

Bank erosion has significant impacts on many of the factors related to the re-licensing of the Vernon, Bellows Falls and Wilder Dams to include but not limited to: loss of agricultural land, water quality, aquatic habitat, endangered species, fish spawning, aesthetics, cultural and historic resources, etc. It is also an accepted fact that riparian vegetative buffers are extremely important to maintaining water quality. Obvious existing embankment erosion along the Connecticut River affected by Great River Hydro's relicensing threatens these riparian vegetative buffers as well as impacting other study issues.

There are substantial areas of significant erosion within the impoundment of the Bellows Falls Dam as well as the Vernon and Wilder impoundments. With the extensive bank erosion in the Bellows Falls impoundment particularly along the Great Meadows in both New Hampshire and Vermont as well as other areas.

The following pictures show severe erosion at the Southwest corner of property formerly owned by my wife and I located at 1334 Bellows Falls Road in Charlestown.

Page 2 of 6
Great River Hydro Connecticut River Dams Relicensing
FERC Project No. 1855-045, 1892-026 & 1904-073 Study
April 15, 2018



Looking south from the southwest property corner. Vertical and undercut banks. This erosion was existing when we purchased the property and has continued over the 11 years that we lived there.

Page 3 of 6
Great River Hydro Connecticut River Dams Relicensing
FERC Project No. 1855-045, 1892-026 & 1904-073 Study
April 15, 2018



Looking north from the southwest property corner. Vertical and undercut banks. This erosion was existing when we purchased the property and has continued over the 11 years we have lived here.

This demonstrates that a 2 year study period is not adequate and continued monitoring should be required during the license period.

Also, to emphasize the erosion concern, the voters of the town of Charlestown, New Hampshire at the March, 2017 Town vote, voted the following warrant.

Great River Hydro Connecticut River Dams Relicensing
FERC Project No. 1855-045, 1892-026 & 1904-073 Study
April 15, 2018

ARTICLE 9.

Resolved, that the Town of Charlestown, at the Town Meeting Deliberative Session on February 7, 2017, was presented with information on the erosion on the Connecticut River. If it is shown that there is a causal relationship between the operation of the Bellows Falls Dam by the TransCanada Corporation or subsequent owners resulting in deterioration of the riverbank and attendant roads and farmland, it is recommended that the Town of Charlestown formally request that TransCanada or subsequent owners modify current dam operations and create a mitigation fund to reimburse towns and landowners for any and all damages.

**Comments related to Studies 1, 2, 3 and the Supplemental Study
dated November 15, 2017**

- I question the accuracy of determining the historical bank locations from old aerial photography and mapping. I am a licensed land surveyor for almost 40 years and have experience working with aerial photography and aerial mapping. I do not believe that an accurate measurement of historical limits of erosion can be determined using the methods in Study 1.
- The relatively short time period (2 years) of observing erosion at the established transects is insufficient to obtain sufficient data to make conclusions as to the extent of erosion in the study areas. Erosion occurs and continues over many years.
- The study claims that boat wakes are a major cause of erosion. I lived approximately 4 miles upriver from the Bellows Falls Dam for over 11 years. Even on the hottest days and Holiday periods in the summer, I have never observed more than a half a dozen boats in the Great Meadows erosion areas. It is my opinion that the few number of boats over the relatively short boating season would not have the effect on erosion that the studies represent.
- Although the intent of the studies was to determine the causes of bank erosion in the study area and the studies do identify the potential causes, there is no technical data prepared or analyzed to provide any conclusions as to the degree of erosion as it is related to the potential causes, particularly, dam operations, thereby not meeting the study objectives.
- None of the studies included any geotechnical or hydrogeological studies to determine the effects of the operational water elevation fluctuations on the riverbank erosion. This would be the only way to determine the effects of water elevation fluctuation on streambank erosion.
- John Field utilized a ratio method to reach his conclusions on the causes of riverbank erosion. At the August 25, 2016, public meeting John Field publicly stated that the Ratio Method is **not** an accepted Standard or methodology nor has it been peer reviewed.

Great River Hydro Connecticut River Dams Relicensing
FERC Project No. 1855-045, 1892-026 & 1904-073 Study
April 15, 2018

- There are accepted modeling methods and procedures for determining bank erosion, i.e. Bank and Toe Erosion Model from the USDA.
- One of the conclusions of the report is that Great River Hydro's operations are not a significant cause of the riverbank erosion. I find this hard to believe since boat traffic and ice only occurs over a relatively short period while the water level fluctuation occurs 24/365, i.e. 24 hours a day 365 days a year even under the ice during winter.
- At all of the public meetings that I have attended, Great River Hydro strongly opposed any studies that would determine the effects of water level fluctuations. As a matter of fact, riverbank erosion within the water level fluctuation zone provides Great River Hydro with increased storage volume. Consequently, it is in Great River Hydro's best interest to have increased erosion.
- The Supplemental Study studied near bank entrainment of soil particles. By the study near bank was 20 feet from the shoreline and the HEC-RAS model shows zero velocity at the shoreline. The zero velocity at the shoreline as the model states does not represent reality as I have observed velocities at the shoreline along my former property.
- By USGS definition entrainment is the movement of soil particles from the bed of the river channel while bank erosion is defined as the movement of soil particles from the river bank due to shear forces.
- Although there has been analysis of entrainment, granted 20 feet from the shoreline and at depths to 5 feet, **there has been no analysis of bank erosion as defined by the USGS caused by fluctuation in impoundment levels caused by dam operations. I and others have been requesting these Geotechnical and Hydrogeological Studies since the beginning of the study process.**
- **As a result of not having these bank erosion studies, there is no basis for the conclusions of the GRH Studies that "...project operations, while perhaps causing sediment entrainment in isolated incidents, cannot be responsible for wide spread bank sediment entrainment or bank erosion."**

Conclusions:

- **The methodologies utilized to determine the historical erosion limits were not sufficient to accurately determine how much erosion has historically occurred.**
- **Two-year observations are not sufficient to draw conclusions related to riverbank erosion.**
- **There were no geotechnical, hydrogeological studies and/or modeling studies conducted to determine the effects of water elevation fluctuations on riverbank erosion.**

Great River Hydro Connecticut River Dams Relicensing
FERC Project No. 1855-045, 1892-026 & 1904-073 Study
April 15, 2018

- **John Field's conclusions are based on a ratio methodology that he admitted at the August 25, 2016 public meeting that that method is not an accepted standard or methodology.**
- **John Field's Supplemental Study relies on an entrainment analysis as the basis for his conclusion that project operations cannot be responsible for bank erosion. This is a conclusion without basis since the studies required to make that conclusion have not been undertaken. As defined entrainment and river bank erosion are two separate areas that need to be studied separately.**
- **The report's conclusions are based on observations and insufficient technical data and results of accepted modeling methods.**

Recommendations:

- **To fully determine the effects of water level fluctuations and meet the study objectives to determine the likely causes of erosion, conduct geotechnical, hydrogeological and/or modeling studies as supported by the Princeton Hydro peer reviews.**
- **Expand erosion study sites, particularly, in the Bellows Falls impoundment to ensure that a full analysis of erosion sites is evaluated and included in the Study Plan. Include in the permit a condition that provides for continuous monitoring of erosion during the duration of the permit and determine the cause of the erosion.**
- **Establish a mitigation fund during the period of the license to remediate erosion and any other impacts caused by Great Rivers operation of the Vernon, Bellows Falls and Wilder Dams.**
- **Continue monitoring impacts resulting from dam operations and adjust operations to mitigate impacts.**
- **Implement an Operations Plan that would minimize water level fluctuations, frequency and ramping rates or consider a run of river operation that would minimize the erosion potential.**

I have outlined my comments and concerns above and support and endorse comments submitted by the Connecticut River Joint Commissions (CRJC), Upper Valley River Subcommittee, John Mudge and the peer reviews by Princeton Hydro.

Thank you for your consideration.

Very truly yours,

John Bruno

Document Content(s)

JBlErosionStudyComments.PDF.....1-6