

**TO:** Federal Energy Regulatory Commission  
Office of Energy Projects  
888 First Street, N. E.  
Washington D. C. 20426

By electronic filing

**FROM:** John T. B. Mudge  
25 Lamphire Hill Lane  
Lyme, N. H. 03768-3108  
Tel: 603-795-4350 Fax: 603-795-4355  
Email: [JMudgeNH@aol.com](mailto:JMudgeNH@aol.com)

**RE:** **Wilder Project, FERC No. 1892-026**  
**Bellows Falls Project, FERC No. 1855-045**  
**Vernon Hydroelectric Project, FERC No. 1904-073**

**ILP Study 2 & Study 3, Riverbank Transect and Riverbank  
Erosion Studies dated February 4, 2017**

**DATE:** May 8, 2017

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**CONTENTS: Landowner's comments re the above referenced document submitted  
by TransCanada / Great River Hydro on February 4, 2017.**

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To the reader:

My comments include pictures and references to land along the Connecticut River that my family has owned since 1962. Anyone wishing to visit these fields should contact me at the above address and phone. The 2016-2017 snows have melted and the erosion on these fields is very evident. — *John Mudge*

## **Introduction**

On February 24, 2017, I submitted comments to FERC related to the February 4, 2017, ILP Study 2 & 3, Riverbank Transect and Riverbank Erosion Final Studies submitted by TransCanada, the company now to be referred to as Great River Hydro. This second response is necessitated because of what I consider to be erroneous and misleading statements that were made at the Updated Study Results Meeting on March 30, 2017, and summarized in TransCanada's (Great River Hydro's) filing of May 14, 2017.

The company continued to claim on March 30, 2017, that the operations of the Wilder Dam are not a factor in the erosion that is found on this section of the Connecticut River. Over four years ago, on January 28, 2013, at a FERC Scoping Meeting in West Lebanon, New Hampshire, Mr. John Ragonese (Ragonese), then of TransCanada and now of Great River Hydro, dismissed the need for any erosion studies since in 2012 a group of company employees had taken a boat trip on the entire Wilder pool and had seen no evidence of erosion.

Erosion along the Connecticut River has been greatly impacted by the operations of the dams that are here. Now is the correct time and opportunity to recognize this and modify the operating licenses of the dams.

## Who has talked about the erosion on the Connecticut River?

As stated earlier, Ragonese claimed in 2013 that there was no erosion on the river.

*Others think differently:*

1. In 2013, it was state and federal agencies, different private organizations, towns and municipalities, and individuals that requested the erosion studies.
2. In 2017, at least ten towns in both New Hampshire and Vermont voted at their Town Meetings on warrant articles related to erosion on the Connecticut River. Many towns have forwarded copies of those warrant articles to FERC. The residents of this valley, the people who know this river the best, all recognize that there is a tremendous erosion problem. They are aware of this problem if they own land along the river, if they use the river for recreation, or when they see the erosion as they travel across the river.
3. The Public Archaeology Laboratory (PAL) conducted digs on the Mudge property in Lyme in 2015. Their report states that this land is eligible for inclusion on the National Historic Register. The report also reads: "The riverbank along the wooded field break and field to the south has a steep vertical face and is severely undercut in some locations (Figure 3-8)." (Page 20 of PAL's report dated August 2016.)
4. Agencies of the U. S. Government, the Army Corps of Engineers and the U. S. Department of Agriculture, (both the Natural Resources Conservation Service and the Grafton County FSA office within that department) have awarded grants related to emergency watershed and erosion control and land stabilization on the Connecticut River.
5. The Mudge fields are under conservation easements with the State of New Hampshire (Department of Agriculture) and the Upper Valley Land Trust. The Land Trust inspected the property on March 30, 2017, and reported the following: "*There is evidence of continued bank undercutting and slumpage, even after coarse (4"-6") rubble fill has been applied (unsure when) at several river-edge gullies, in an attempt to hold back bank erosion.*" (That erosion control project was funded in part by the U. S. Department of Agriculture.)
6. As reported in the Claremont (NH) *Eagle Times*, on April 21, 2017, Great River Hydro held an informational meeting in Westminster, Vermont, on April 20<sup>th</sup>. The newspaper reported that the Town Administrator for Charlestown, New Hampshire, stated "erosion is a big concern... We just want to make sure it is thoroughly addressed in the studies." The newspaper article did not indicate Ragonese's response to that comment.
7. It is ironic that *erosion*, the topic that Ragonese once stated did not need to be studied, always is scheduled for and always takes up the most time at meetings such as the March 30, 2017, meeting in White River Junction, Vermont.

**There is an erosion problem on the banks of the Connecticut River. The people who live here will not be fooled by anyone who states otherwise.**

## **What is the erosion cycle?**

To begin with, the operations of the dam cause the water level to be raised and lowered every day. Ragonese has repeatedly stated that they do not raise and lower the water that frequently, but the many pictures of the lowered water level that have been submitted to FERC in both different study reports and my letters discredit and disprove that assertion.

We must remember that this is a river and there is always a current in it though the current is manipulated by the operations of the dam.

Next, we must recognize that the banks of the Connecticut River are composed of highly permeable sandy soils. We are not talking about riverbanks of erosion-resistant bedrock. This is very valuable agricultural land composed of very permeable soils.

If we assume that the water level is at 385 feet, then the water saturates the soil at that point. Particles of soil become suspended in the water. The current, that is always a part of the river, in combination with the lowering of the water level due to dam operations carries away the particles of soil that become suspended in the water.

The consequence of the particles of soil being washed away is the formation of a sculpted riverbank near the water and in some cases cavities that may extend many feet into the riverbank.

Over time the sculpted bank or the cavities collapse and soil from above falls down to the water level. This is then washed away by either the current in the river or a combination of the current and the lowering of the water level as a result of dam operations. This cycle will continuously repeat itself as long as there is a water level of 385 feet. We must remember that it is dam operations, with a raised water level of 385 feet, that initially caused the soil to become saturated, the banks to be sculpted, and the soil to fall to the level of the water.

The ever widening of the river as a result of this erosion cycle causes more and more land to be eroded.

I do not believe that there is any correlation between the height of the bank and any erosion that is found on the riverbank. My letter to FERC of April 26, 2016, includes pictures on page 14 of where there is no measurable riverbank but where I have now lost nearly twelve feet of land. A water level of 385 feet saturates the bank, the soil becomes suspended in the water, and the soil is then carried away resulting in lost land.

To correct this in the future, dam operations should be modified. Both the maximum elevation of the water should be reduced and the maximum daily change in water elevations should be minimized. You have to get the water away from the permeable riverbank in order to stop the erosion.

## How much erosion is there?

Again, on January 28, 2013, Ragonese claimed that there was no erosion on the riverbank and that no studies were needed.

Studies were requested by numerous parties, including myself, and they were conducted by Field Geology (Field).

Field's reports conclude that 40% of the riverbank has erosion. That is very different from the no erosion claimed by Ragonese. However, the 40% figure is not correct. Using different definitions of erosion, Field shows the following:

Erosion category	August 2016 study, p. 79	February 2017 study, p. 80
Eroding	11%	11%
Vegetated eroding	22%	22%
Failing armor	6%	6%
Sub-total	39% (Approx. 40%)	39% (Approx. 40%)
Armored	15%	15%
No longer eroding	4%	4%
<b>Total</b>	<b>58% (Approx. 60%)</b>	<b>58% (Approx. 60%)</b>

No property owner has ever "armored" their property if there was no erosion. Land that is "no longer eroding" was once eroding. Therefore, there is evidence of much more erosion on the riverbank than the company and its consultant want to acknowledge.

Today, using these numbers, 60% of the riverbank shows erosion, and as shown earlier, others share this opinion about erosion being a problem.

I have previously submitted historic photographs of the riverbank that existed prior to the construction of the Wilder Dam. All of those photographs show a healthy riparian buffer with vegetation and a gentle slope to the river. Historically the riverbank survived spring melts and large storms as the old photographs show no evidence of erosion.

FERC will find the old photographs of the riverbank in the following:

1. My Study Request dated February 25, 2013, page 12.
2. My Study Request dated February 25, 2013, page 22.
3. My response to Study One dated April 26, 2016 pages 7 & 9.

## The Erosion Ratio

Field uses an “Erosion Ratio” to argue that there is no erosion. It must be asked if that ratio has any merit at all.

In the Study of February 4, 2017, the citation for this ratio is for “Field, 2007a.” That citation reads: “Fluvial Geomorphology Study of the Turners Falls Pool on the Connecticut River between Turners Falls, MA and Vernon, VT: Unpublished report prepared for Northfield Mountain Pumped Storage Project, 131 p.” That work appears to have been done for TransCanada. Therefore, a “ratio” may have been *created* to support TransCanada’s position about erosion.

Furthermore, in the February 4, 2017, study Field writes: “The Field (2007a) report was accepted by FERC with no substantive stakeholder comments regarding the erosion ratio, *so the approach should be considered valid and accepted* for the study area given the proximity and similarity in setting to the Turners Falls impoundment.” (Emphasis added.)

On the contrary, FERC should take the position that it may have been fooled once, but it will not be fooled twice.

For the “Erosion Ratio” to have any merit, it must be in more than an “unpublished report.” It must be independently tested and reviewed on a river with similar riverbanks, with similar soils, and with dams that are raising and lowering the water level on a daily basis. There is no evidence of any such testing of this hypothesis. To blatantly declare that the untested “erosion ratio” “should be considered valid and accepted” is little more than very self-serving nonsense. We are all being told that the “erosion ratio” is a “truth” — the “Field Theorem of Erosion.”

Validation requires peer review.

A totally unproven hypothesis should not be accepted as a truth.

The “erosion ratio” has no merit and is little more than a combination of voodoo geology and junk science.

## **Erosion and Historical and Cultural Resources**

Archeological digs on the Mudge property in 2015 identified it as eligible for inclusion on the National Register of Historic Places. This is described in the PAL report of August 2016. As noted earlier, the PAL report describes the erosion near the site of the dig. My letter of January 17, 2017, includes my photograph of the erosion near the site of the PAL dig, page 2.

Since then, I have been told that there are four sites in Vermont, all in the Wilder Pool, that are also eligible for listing on the National Register.

In its letter of March 3, 2017, page A-3, FERC clearly addresses the question of identifying and protecting cultural resources. The FERC letter reads in part: "The FLAs should describe each site that was identified and evaluated during Phase IA and IB, and II surveys, and indicate whether each site is eligible or ineligible for inclusion in the National Register of Historic Places (National Register)... The FLAs should also describe any project-related effects on each historic property, archaeological site, and traditional cultural property in the APEs."

I think that it would be appropriate for any discussion about historic sites in the FLAs to be shared with the affected landowners.

In the presentations about erosion I have never heard either Ragonese or Field discuss the issue of cultural and historical sites. There is no mention of this in the February 4, 2017, revised erosion study, Studies 2 & 3.

I have never been contacted to discuss how the site on the Mudge property might be further protected.

The Connecticut River was the "highway" for the people who lived here as they traveled between northern and southern New England. I am sure that further research would discover more sites that they used.

At this point I must leave it up to FERC to insure that not only the newly found historic site on the Mudge property, but also the other sites mentioned in Vermont, are protected from the adverse affects caused by the operations of the dams. In addition, there should be discussion about what further research will be done to identify and protect other historic sites.

### A well surveyed and discussed boundary line.

Three surveys, all by licensed surveyors, of a line on the Mudge property are summarized below.

Survey	Length of line
July 10, 1961 K. A Leclair	943.0
April, 19, 1989, K. A Leclair	918.6
December 8, 2015, H. J. Burgess	903.1

I have previously submitted photo-copies of the 1961 and 1989 surveys and the letter from my 2015 surveyor that states that the line has been shorted by 40 feet due to erosion along the river. (A difference of fifteen (15) feet between 1989 and 2015.)

When Field measured this line in the summer of 2015 he determined that there was “an additional 8 ft. of erosion” since 1989. For that to be true, the line that Field measured would have to be 910.6 feet. Field addressed this at the March 30 meeting.

Consider the following:

1. Field is not a licensed surveyor.
2. Survey measurements are made from point-to-point— In the case of this line, from one iron pin, IP, beside the River Road in Lyme to a second iron pin near the river.
3. On March 30, 2017, Field argued that his measurement was correct and that his measurement was to the top of the bank rather than to the pin that was set back from the bank.
4. In situations like this, it is standard practice for a surveyor to put in a pin that is “set back” from the end of the line, and that distance is a “setback.”
5. What Field failed to address is that there was a “setback” with the original 1961 pin. I remember it. There was a foot-path between the two fields that went between the pin and the riverbank. The 1961 pin was not on the very edge of the riverbank but was “set back.”
6. The setbacks that existed in 1961 and 1989 have been 100% eroded.
7. If Field wants to include his “setback” in his measurement, then he must also include the 1961 eroded setback in the total erosion.
8. Therefore, when all is considered, **forty (40) feet of riverbank have eroded at this location.** We must again remember that Ragonese claimed in 2013 that there was no evidence of erosion based on observations made during the 2012 TransCanada boat trip.
9. It seems that Field wants to measure from one IP, iron pin, beside the road, to a second IP near the river, but the second IP that he wants to measure to is not an “iron pin.” The second IP that Field wants to measure to is an **Imaginary Point.**



And the erosion at this location continues today.

The below picture was taken on April 20, 2017. This is the western (river end) of the boundary line being discussed.



The iron pin put in by Field in 2015 is indicated with the pink flagging near the top of the picture. The erosion, exposed roots, and sculpted riverbank are obvious. In the foreground, at the bottom of the picture, is grass / sod that has fallen *from the top* of the riverbank down to the mud, the toe of the bank. This grass is obviously no longer at the top of the bank. The river is low in the picture, but remember that they say that they do not lower the level of the water. *The fallen grass / sod was at the top of the bank when Field did his measurement and would have been included in his setback. Field's "setback" is eroding and is less than it was in 2015, and in time the pin that he placed there will be gone. This has been more erosion since 2015.* This grass / sod will be washed away when the water level is raised. The dirt will then become suspended silt / sediment in the water and this adversely affects the water quality in the river.

This is not a made up erosion ratio that "shows" there is no erosion.

This is photographic, professional, and measured evidence of erosion.

Erosion is occurring all along the Connecticut River throughout Vermont and New Hampshire.

## Conclusion

There is a great deal of erosion on the Connecticut River.

This erosion is recognized to be a problem by landowners, town officials, federal government agencies, Vermont and New Hampshire agencies, and even town votes at Town Meetings. Unfortunately Great River Hydro, its employees, consultants, and predecessor companies have been reluctant to acknowledge that erosion is a problem.

Study 2/3 reads: “FERC contends (in its March 1, 2013 Pre-Application Document (PAD) Deficiencies, Additional Information Requests, and Comments letter) that although erosion, in and of itself, is not necessarily an adverse effect, *areas of excessive erosion that are a direct result of project operations or that may be having an adverse effect on another resource are of concern.*” (Emphasis added.)

I believe that FERC can easily find that the erosion that is clearly evident on the Connecticut River is having an adverse effect on all of the resources that exist here including but not limited to: historical and cultural sites, farmland and other private property, town roads and public infrastructure, and the water quality in the river. Any relicensing of the dams should take this into consideration and new limits and constraints should be imposed on the dams so as to minimize any future damage that the project operations may cause.

I was recently referred to an article in *BioScience*, Volume 47, No. 11, December 1997) entitled *The Natural Flow Regime* by N. Leroy Poff, et al. Brief excerpts are quoted here: “The extensive ecological degradation and loss of biological diversity resulting from river exploitation is eliciting widespread concern for conservation and restoration of healthy river ecosystems among scientists and the lay public alike... Society’s ability to maintain and restore the integrity of river ecosystems requires that conservation and management actions be firmly grounded in scientific understanding... The first step toward better incorporating flow regime into the management of river ecosystems is to recognize that extensive human alteration of river flow has resulted in widespread geomorphic and ecological changes in these ecosystems... However, growing understanding of the ecological impacts of flow alternation has led to a shift toward an appreciation of the merits of free flowing rivers... Setting specific goals to restore a more natural regime in rivers with altered flows (or, equally important, to preserve unaltered flows in pristine rivers) should ideally be a cooperative process involving river scientists, resource managers, and appropriate stakeholders.”

Could the re-licensing of the dams on the Connecticut River follow such a process?

Document Content(s)

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