

TO: Federal Energy Regulatory Commission
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2016 APR 28 P 4: 15

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FEDERAL ENERGY
REGULATORY COMMISSION

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

**TransCanada Hydro Northeast Inc.'s ILP Study 1 — Historical Riverbank
Position and Erosion Study released March 1, 2016**

DATE: April 26, 2016

CONTENTS: Landowner's comments, Study #1, (Comment period ends May 2, 2016).

To the reader:

For further information or to visit the Mudge fields referred to on the following pages please contact me at the above address and phone. — *John Mudge*

List of Abbreviations used in this document:

CRJC Connecticut River Joint Commission
FERC Federal Energy Regulatory Commission
NRCS U. S. Natural Resource Conservation Service (U.S. Dept. of Agriculture)

A Dilemma—

On March 1, 2016, TransCanada released and I received a copy of “ILP Study 1 — Historical Riverbank Position and Erosion Study — *Study Report*” prepared by Field Geology Services of Farmington, Maine. The purpose of this report was to study the historical erosion on areas of the Connecticut River affected by the operations dams owned by TransCanada and was prepared for FERC, the federal agency that licenses and re-licenses dams.

On March 1, 2016, I was in my fields on the Connecticut River in Lyme, New Hampshire, with employees of another federal agency, NRCS, examining areas of recent erosion on the riverbank. That agency will now determine whether I am eligible for federal financial assistance to control the erosion that many believe is directly related to the operation of the dams owned by TransCanada.

The dilemma that I immediately recognized on March 1, 2016, should be clearly stated.

That dilemma is: How does one federal agency license and approve the operation of privately owned dams, on a river that is the border between two states, and then another federal agency must use federal resources to repair the environmental damages to farmland and private and public property caused by the operations of those dams.

This dilemma was very clear to me that evening as I read Study #1 and thought of my conversations earlier in the day as I walked over my fields and along the riverbank. I am sure that it is a question that will come up again and again when the other two erosion studies are released later this year.

Issues raised in the “Historical” study, Study #1—

Three Erosion Studies

On January 28, 2013, at a FERC Scoping Meeting in West Lebanon, New Hampshire, a spokesman for TransCanada stated that the company did not “propose” a study on geology and soil resources as a part of the license renewal procedures for the dams that the company owns on the Connecticut River. It was stated that TransCanada employees had taken a boat tour of the entire Wilder Pool and concluded that there were no erosion problems that needed to be studied. After that statement a number of people attending the FERC meeting, including myself, spoke about the erosion on the river. Subsequent to the meeting a number of Study Requests, including my own dated February 25, 2013, were submitted to FERC. The result is that there are to be three studies of erosion as a part of the relicensing of TransCanada’s dams on the Connecticut River:

Study 1	Historical River Position and Erosion	Released March 1, 2016
Study 2	Riverbank Transect Study	To be released July 2016
Study 3	Riverbank Erosion Study	To be released July 2016

Beginning in the Executive Summary of Study 1, it is clear that the three studies must be looked at together. The Executive Summary reads: “Further analysis *as part of Study 3* (emphasis added)—Riverbank Erosion Study is needed...” The Introduction to Study 1, page 1, includes references to Studies 2 & 3. Study 1 includes numerous other references to Studies 2 & 3. Study 1 reads (page 2): “Taken together, *the three related erosion studies* (emphasis added) are intended to provide conclusions as to the association and effect of project operations on active erosion at various locations within or areas affected by the three projects.” Page 7 of the Study 1 reads: “Information gathered will be incorporated into the Study 2 and Study 3 analysis as warranted.” Page 9 reads: “*This study (#1) was largely a data collection effort* (emphasis added) with detailed analysis to occur as part of other related studies, particularly Study 3. As such, the results of this study alone are insufficient to make an accurate assessment of project effects. *An assessment of project effects on erosion will be included in the Study 3 report.* (Emphasis added.)” On March 17 & 18, 2016, TransCanada held meetings to discuss the studies that had been released on March 1. At that meeting it was stated that the three erosion studies were “integrally linked.” Furthermore, the presentation about Study 1 included slides and data from the unreleased Studies 2 & 3.

However, despite the frequent comments and statements, written and spoken, that the three different erosion studies must be examined as a group, interested parties must now respond to Study #1 only. Inevitably future responses to Studies 2 & 3 will have references back to Study #1 just as Study #1 itself has so many references to the yet unpublished studies.

It can only be hoped that the responses now to Study #1 and future responses to Studies 2 & 3 will be clearer than the presentation of the three erosion studies has been.

The “Historical Study” has several serious problems.

1. Missing is a discussion of previous erosion studies paid for by the federal government.
2. There is no historical review of the riparian buffer.
3. There are poor comparable pictures
4. Old data is used on maps

1. Previous erosion studies.

Neither Study #1 nor the literature cited in that study, (page 10 of the study), makes any reference to different erosion studies that were done by the Grafton County (NH) Conservation District in 1992 and then in Cheshire and Sullivan counties (NH) in 1998.

Both TransCanada and the geologist who did Study #1 knew about these studies, for they were told about them on June 24, 2013. On that date there was a walk across my fields to witness the erosion problems along the Connecticut River. The field trip was sponsored by the Connecticut Joint River Commission, and approximately 30 people were there including Mr. John Ragonese of Trans Canada and John Field of Field Geology Services. At that event James Kennedy, the author of the 1992 and 1998 studies, talked about them.

If work from 1958 and 1978 are to be included and featured in a “Historical Riverbank Position and Erosion Study” being completed in 2016, then a review of federally funded studies from 1992 and 1998 must also be included rather than omitted. FERC should request that TransCanada provide copies of these studies and include those findings in its analysis.

2. Historical Review of the Riparian Buffer on the Connecticut River

No discussion of erosion is complete without a discussion of the riparian buffer on the affected stream or river. In 2000, the CRJC distributed a publication *Riparian Buffers for the Connecticut River Watershed* (not included in the literature cited at the end of Study #1) that reads: "Natural riparian buffers have been lost in many places over the years." (The CRJC material is available online.)

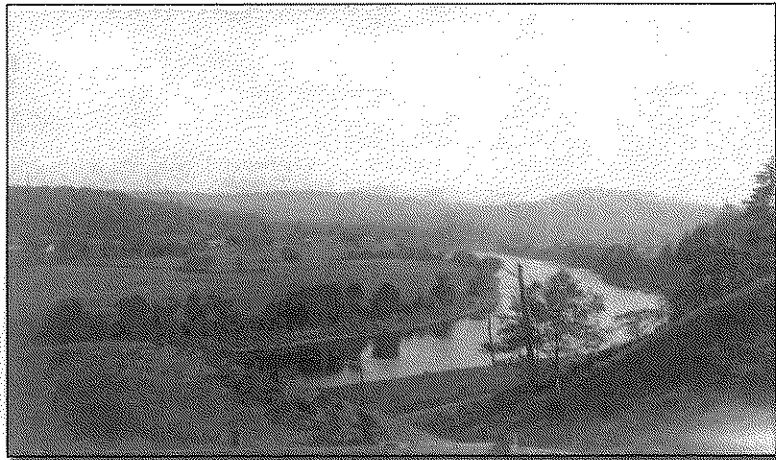
The only use of the word "riparian" in Study #1, is in the list of literature cited, see Merritt & Cooper, 2000.

Study #1, the Historical Study, does not compare the riparian buffer of today with the riparian buffer before the construction of the Wilder Dam. That should have been done. Photographic evidence about the loss of the riparian buffer exists as is shown below.

Riparian buffer, Mudge property, Lyme, N. H.

The below photographs show the riparian buffer that existed on the Mudge fields before the Wilder Dam was constructed.

Pre 1896 photograph:

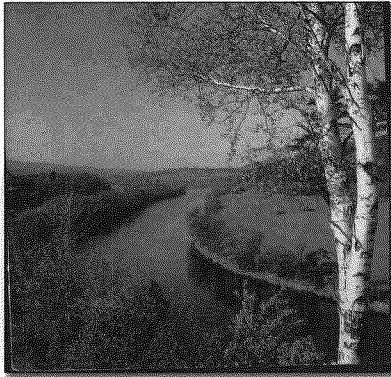


Looking south, and taken from north of East Thetford, Vermont, the riparian buffer by the fields is very obvious. There is a stable, gently sloping bank, vegetation, and then trees on top of the slope at the edge of the field. The riverbank survived for many years, even thousands of years, with spring melts and major storms.

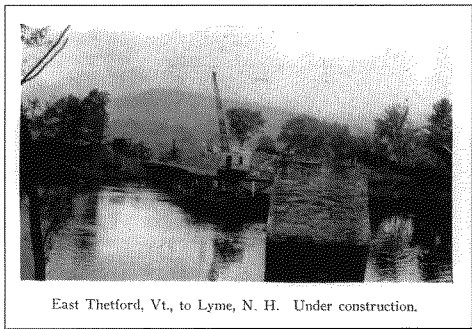
Winston Pote's photograph of the Mudge fields, next page left, was taken in the early 1940s and appeared on the cover of *New Hampshire Profiles* in April 1974. Clearly evident is a gently sloping vegetated riverbank with trees at the top of the bank and other bushes below them.

B. Anthony Stewart's photograph from the April 1943 National Geographic, next page right, shows the same view, the same fields, the same river, *and* the gently sloping vegetated riverbank / riparian buffer. The caption for this picture reads in part, "Flood and hurricane have not dismayed it."

These two pictures were taken a few years after the hurricane of 1936 but there is no evidence of that storm in the pictures. The riparian buffer was healthy and strong and survived.



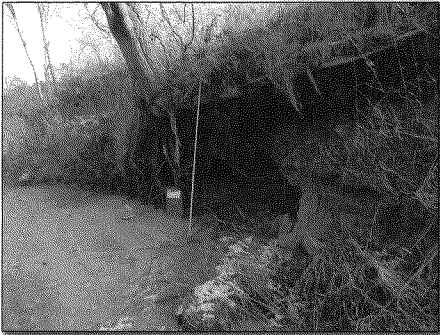
The riparian buffer survived spring melts, storms, and floods, but the bridges, man made structures, between Vermont and New Hampshire have not always survived as was the case with the bridge between Lyme and East Thetford in 1936, below:



East Thetford, Vt., to Lyme, N. H. Under construction.

Today: The land is eroding. The riverbank on the Mudge property no longer has a healthy riparian buffer. There is no gently sloping beach or sandbar at the water's edge. The grasses and shrubs are gone. The larger trees are gone. The following pictures show the

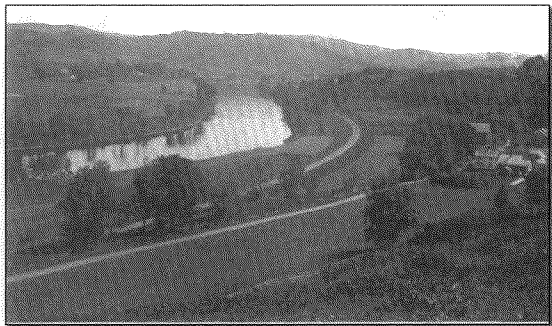
riverbank today— trees and bushes falling into the water, an unstable bank, slumping, and eroding. There is no riparian buffer. This is the result of the erosion on this river.



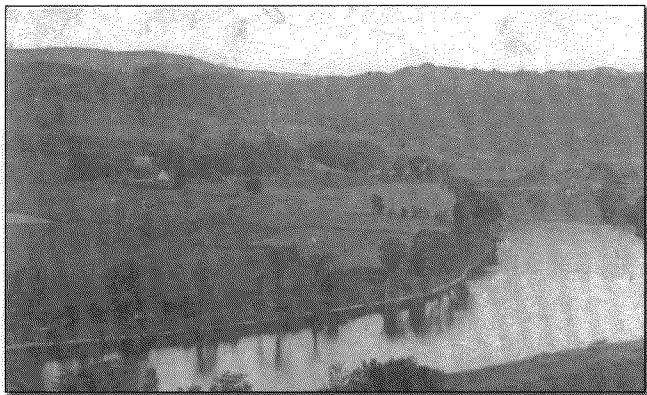
The destroyed riparian buffer.

Another section of the riverbank— from north of North Thetford, Vermont.

Below is an old postcard, the photo taken from north of North Thetford, Vermont, looking over to New Hampshire. The house and barns on the right, in Vermont, are still standing on Route 5.



Below is an enlarged detail of the riverbank in Lyme:



A gentle slope to the river, vegetation, bushes, and trees— a good riparian buffer.

Below, that same area today—



March 2016: No riparian buffer, no gentle slope to the river, an unstable bank that is failing with blocks of material toppling and collapsing into the river. Prime agricultural soil is being forever lost.

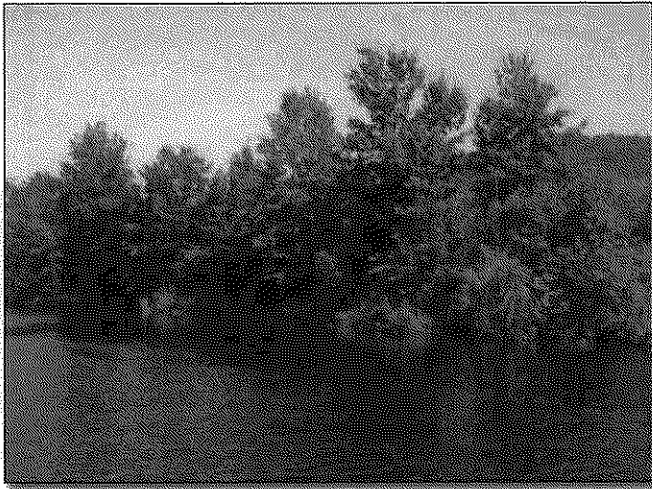
This is the history of the riparian buffer along the Connecticut River. It was a buffer that withstood all of the forces of nature for thousands of years but no longer exists today, and because the buffer is gone, the problem of erosion is that much greater.

There is no discussion of the lost riparian buffer in Study #1, the “Historical” riverbank study. Why not? Will that be in Studies 2 & 3?

3. Poor Comparable Pictures

Appendix B of Study #1 does include a “comparison” of historical ground photographs. However, Study #1 includes no discussion of the photographs in the appendix. Perhaps that discussion will be a part of Studies 2 & 3.

One problem anyone encounters when trying to assemble photographs of the riverbank is the summer foliage that can hide the erosion. In Study #1, Appendix B, Photo Match 59 appears to be of the Mudge land in Lyme. Photo 2015-88 (Match 59), below, was obviously taken in the summer and shows the thick summer foliage.



I know this land, and I am certain that I know exactly where this picture was taken. I can see in Photo 2015-88 collapsed material near the river, and behind that collapsed material is a large tree. Another view of this area, taken in the fall, is below.



Again, the riparian buffer destroyed, the bank slumping and eroding, a tree about to fall into the river and valuable topsoil to be forever lost. This is a very different picture of the same section of riverbank than is shown in Study 1, Appendix B, Match 59, 2015-88. This is the same section of the riverbank, with a strong riparian buffer, as shown in the photographs on pages six and seven.

Everyone should be careful. *When reading Study #1, and looking at the photographs in Appendix B, readers should not think that pictures of foliage are evidence of a strong riverbank, for the foliage may be hiding some very extensive, severe, and active erosion.*

I have always had questions about the history of a fence in Orford, New Hampshire.

The fence that I wonder about:



What is the history of that fence?

Did a farmer really build it with two posts just hanging in the air?

How much land was between the fence and the river when the fence was built?

How many acres of farmland has the farmer lost?

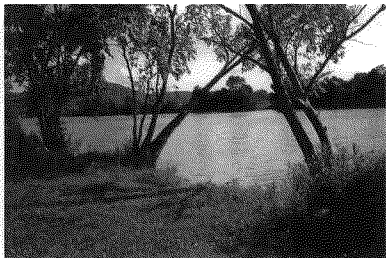
When will the top of the riverbank fall in?

How much more land will the farmer lose?

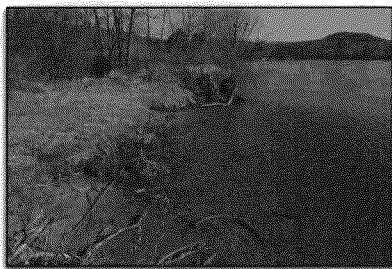
This is all part of the history of the extensive erosion of the riverbank on the Connecticut River.

A once-upon-a-time Butternut tree, on the Mudge property—

Taken in the early 1990s, the below picture shows two Butternut trees at the very south western corner of the Mudge fields.



Time marches on, and today those trees do not exist. Perhaps six to eight feet of land has been eroded. Clumps of eroded grass surround the stumps of the trees today. These are the historical pictures of a small corner of the riverbank.

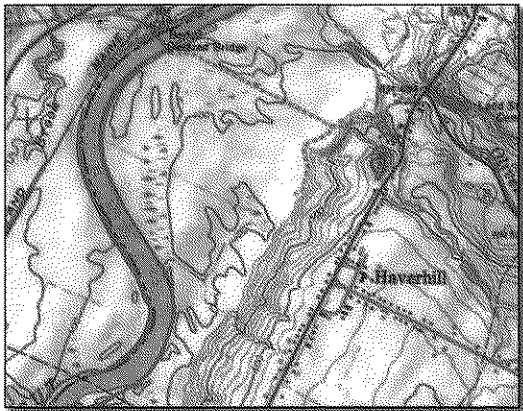


2016 stumps of Butternut trees. Destroyed by erosion— that's the history of these trees.

4. Old Data on Maps: From Study #1 — Appendix A – Maps of the Connecticut River

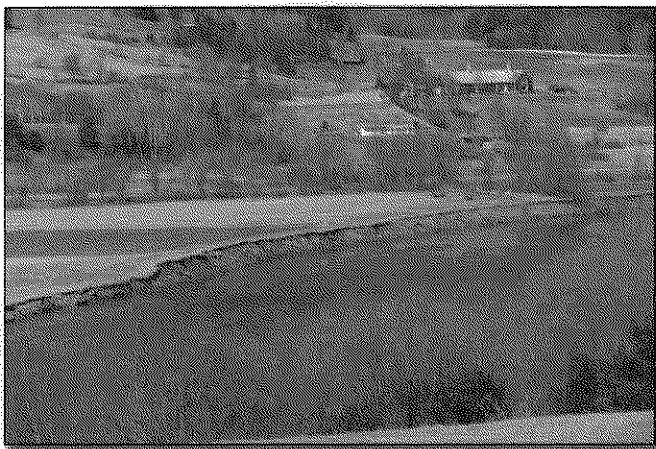
Appendix A of Study #1 takes data from 1958 and 1978 and now, 58 and 38 years after that data was collected, it is presented in Study #1. At the meeting on March 17, 2016, great effort was made telling the attendees that this data would be more analyzed in Studies 2 & 3. A lot has happened since that data was collected. A lot needs to be analyzed. What new data will be added to this old data?

Some specifics: The detail below is from Appendix A – Plate A-2, Haverhill, New Hampshire and Newbury, Vermont.



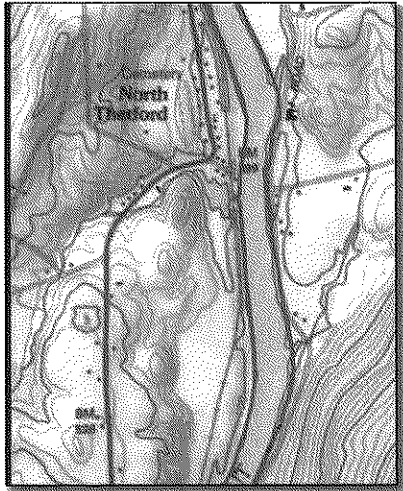
Note the green area on the Vermont side of the river. In 1978 that was described as “Still Stable.”

The below photograph was taken from Haverhill, New Hampshire, in March 2016, and shows the riverbank in Vermont. Do the consultant and TransCanada still consider this to be “Still Stable? I have driven that section of Route 10 many times and remember seeing the erosion in Vermont many years ago. I doubt that it was “Still stable” in 1978.

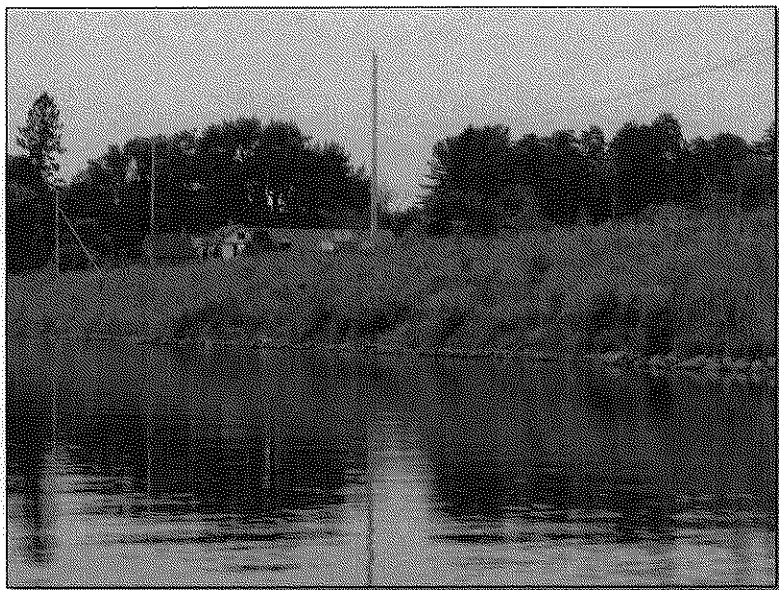


That is several thousand feet of undercut riverbank with extensive erosion. Farmland is being lost into the Connecticut River. That is the history of the riverbank.

The below detail was taken from Study 1, Appendix A. Plate A-4, of the River Road in Lyme, New Hampshire, across from North Thetford, Vermont.

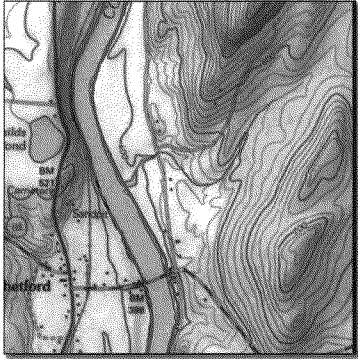


The green section of the River Road in Lyme is identified in this exhibit as "Still Stable." There may be no clear records of how that classification was determined in 1978. However, we do know that in 2010-2012 that section of road was closed because engineers determined it to be very unstable. The town spent \$685,000 repairing this 1,200± feet of road of which \$287,247 was a grant from NRCS (U. S. Department of Agriculture.) The below photograph shows this section of riverbank, repaired, in 2014.

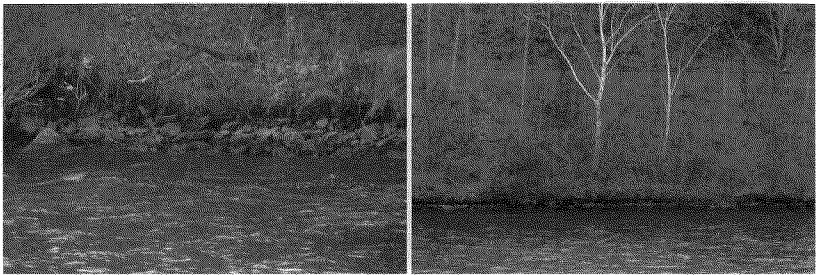


The River Road in Lyme, a historic road, perhaps 250 years old, that has withstood spring melts and large storms, nearly collapsed because of the operations of a dam.

The below detail is from Study #1, Appendix A, Plate A-5 and shows the Mudge fields on the New Hampshire side of the river directly across from some riverbank in Vermont identified in green as "Still Stable." Does "Still Stable" mean that the riverbank was *never stabilized*?



Is that correct? That riverbank, just below the railroad tracks, was stabilized before 1962, the year the fields were purchased by my parents. Perhaps they were "stabilized" about 1950 when the Wilder Dam was built. The rocks that have been put there to stabilize the bank are clearly evident in the below two pictures taken in March 2016.



In the picture on the right, the railroad tracks are the gray line (gravel) towards the top of the picture, the rocks to stabilize the riverbank are obvious, and the river is relatively low. Great care must be made when characterizing different sections of the riverbank. A close look at it will probably show many more destabilized areas than are indicated in the study.

A more recent stabilization project undertaken by the railroad near North Thetford, Vermont, is shown below.

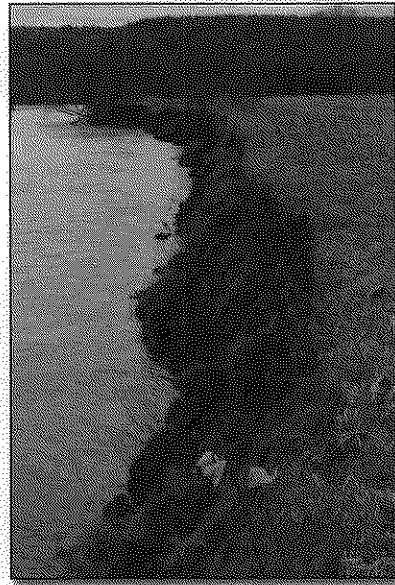
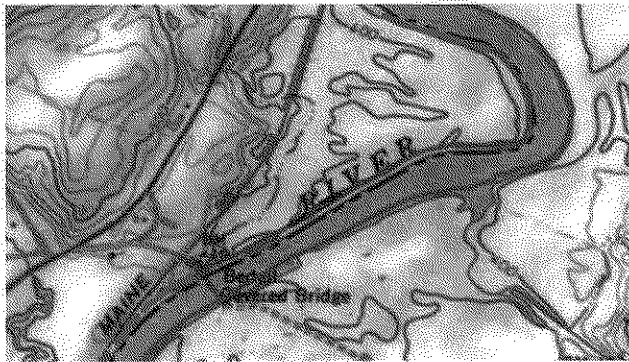


Farmland in Newbury, Vermont

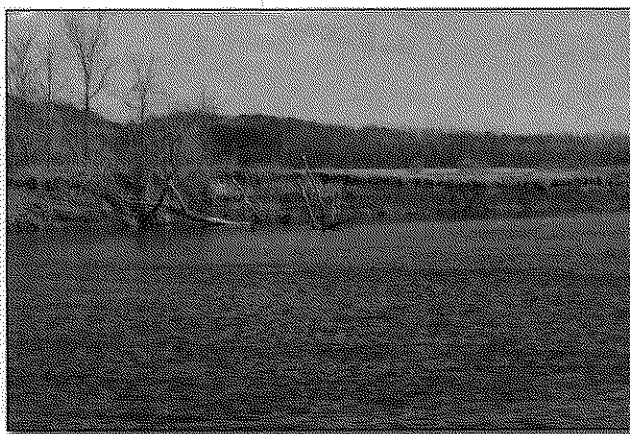
The map in Study #1, Appendix A, Plate A-2 (detail below) describes this Vermont farmland, just north of the site of the Bedell Covered Bridge, as "Still Stable," a *green line*—

Really?

Picture, right, taken on this farmland, March 2016:

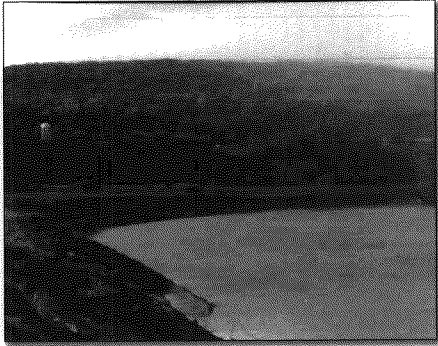


Pictures below of the same farmland taken from across the river in the Bedell Bridge State Park in Haverhill, New Hampshire, March 2016:

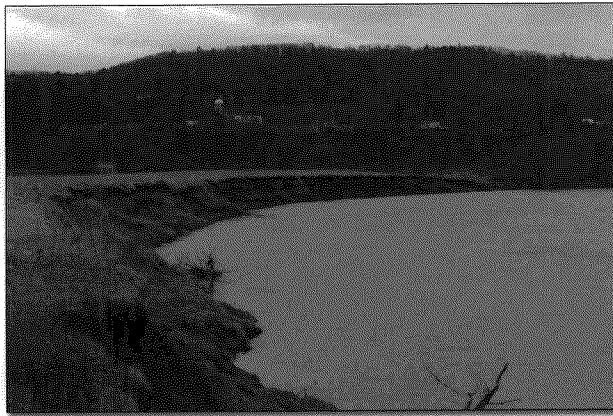


Still Stable? This is extensive erosion of the riverbank. That is the history of the riverbank.

An important question to ask is: Is the land still “stabilized” after money, federal and landowner’s, is spent on a stabilization project? Look at the history of one project. The below picture was taken in Newbury, Vermont, in 1984 *after* stabilization work was done, a cost sharing project with federal and landowner’s money, and the riverbank was graded to 45° and rock was added at the water.



Today, March 2016:



In Study 1, Appendix B, Photo Match 19 is of this same land. The top photo in the appendix, from 1991, shows the erosion control work that was done in 1984. The bottom photo in the appendix shows the continuing erosion that is shown in the above March 2016 photo. Today there is no evidence of the 1984 erosion control project. Land is continuing to erode and is being destroyed. Erosion control projects with the U. S. Department of Agriculture have not necessarily worked, and erosion continues. Study #1 does not mention that this was the site of an erosion control project.

After reviewing the maps in Appendix A, reportedly based on data from 1958 and 1978, I have come to the conclusion that this material should not be too heavily relied upon today to characterize the riverbank. Riverbank that was “Still stable” in 1958 in fact had extensive rip-rap dumped on it prior to 1962, most likely before 1958— probably as early as 1950, in order to stabilize the bank before the completion of the Wilder Dam. Riverbank that was “Still stable” in 1958 has seen extensive erosion and sometimes stabilization work since then. Those sections should be labeled as “Stabilized” rather than “Still stable.” We must wait for Studies 2 & 3 to be completed in order to see how data from 38 and 58 years ago is used in 2016 by TransCanada in preparing and presenting the other two erosion studies— erosion that in 2013 TransCanada asserted did exist.

Conclusion:

1. I am disappointed that the “Historical” study does not include references to other known studies of the riverbank erosion.
2. The “Historical” study makes no reference to the history of the riparian buffer and how it has been destroyed.
3. The use of data that is 58 and 38 years old, and making maps of the erosion with that information, is very misleading if the reader in fact knows the land or even if you just look at it today as you drive by.
4. The “Historical” study fails to address how and why federally funded erosion control projects have failed. Is that because of the operation of the Wilder dam?
5. Page 1 of the study states: “The goal of this study was to assess the historical erosion and riverbank movement.” Then page 2 reads, “Study 1 was largely conceived as a data collection exercise.”

An assessment should be more than a data collection exercise.

6. Readers of Study #1 will have to wait until the completion of Studies 2 & 3 before they can fully respond to TransCanada’s three erosion studies — studies that in January 2013 TransCanada asserted were not necessary.