

**Pierce Mills hydroelectric generating station (FERC No. 2396 VT)  
Arnold Falls hydroelectric generating station (FERC No. 2399 VT)  
Gage hydroelectric generating station (FERC No. 2397 VT)  
Passumpsic hydroelectric generating station (FERC No. 2400 VT)  
St. Johnsbury, Waterford and Barnet, Caledonia County, Vermont**

**2009 Annual CRMP Report**

November 30, 2009

This letter report is provided on behalf of the Central Vermont Public Service Corporation (CVPS) in fulfillment of its obligations regarding the Cultural Resource Management Plan (CRMP) for the Pierce Mills, Arnold Falls, Gage and Passumpsic hydroelectric generating stations, collectively referred to as the Project.<sup>1</sup>

Articles 408, 408, 410, and 408 of the licenses for the Pierce Mills, Arnolds Falls, Gage and Passumpsic generating stations<sup>2</sup>, respectively, require implementation of the provisions of the Programmatic Agreement (PA) executed on November 4, 1994.<sup>3</sup> Under federal law, the FERC is required to consider the effects of hydroelectric projects that it licenses on historic properties. The PA requires the filing of an annual report on activities conducted under the CRMP on the anniversary date of issuance of the license.

***Monitoring Action to Protect Archaeological Historic Properties***

Section 3.2.3. of the CRMP describes that the Project will be monitored annually to limit or prevent bank erosion and protect historic properties in conjunction with other resources. Charity Baker, an archaeologist qualified under 36 CFR 61, and Beth Eliason, CVPS Environmental Engineer, conducted the annual monitoring of Project shorelines on October 10 and 29, 2009. The inspection was conducted via canoe to document existing conditions using a handheld Magellan GPS 320 unit, a Canon PowerShot A85 digital camera, and manual notes. Photographs taken during the 2009 annual inspection are presented in this report with their locations, as indicated on accompanying USGS topographic maps, to document riverbank characteristics.

Provisional 2009 data from the U.S. Geological Survey Passumpsic River gaging station at Passumpsic, Vermont (01135500) indicates that the mean discharge was 737 cubic feet per second (cfs) on October 10 and 608 cfs on October 29. Daily streamflow statistics for 80 years

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<sup>1</sup>Frink, Douglas (1998) *Cultural Resource Management Plan for Archaeological and Historic Resources within the Pierce Mills, Arnold Falls, Gage, and Passumpsic Hydroelectric Facilities, St. Johnsbury, Waterford and Barnet in Caledonia County, Vermont (FERC Nos. 2396, 2399, 2397 and 2400)*. Archaeology Consulting Team, Inc. (ACT), Essex, Vermont. Prepared for CVPS, Rutland, Vermont.

<sup>2</sup> Order Issuing Subsequent License, all issued December 8, 1994.

<sup>3</sup> The Programmatic Agreement was executed among the Commission, the Advisory Council on Historic Preservation and the Vermont State Historic Preservation Officer, with the licensee as a concurring party, pursuant to Section 106 of the National Historic Preservation Act and its regulations under 36 CFR 800.

of record (Chart 1) indicate that this volume at the Passumpsic gaging station was above the mean of daily mean values for October 10 (514 cfs), but below the mean for October 29 (731 cfs).

From the upper Project limit, below Great Falls Dam and just north of the St. Johnsbury–Lyndon town boundary, to Pierce Mills Dam, the river channel remains relatively unchanged since the 2008 inspection, although several noted exceptions are described below. The right bank just above the limits of the project continues to slump in the vicinity of a power pole that was reset after erosion documented during past inspections (Location 1). Just downstream, minor undercutting of the left bank noted in the 2008 report has continued and a 60-meter length of the bank has slumped and exposed soils (Location 2). The slumping bank at this location supports a cornfield with minimal riparian growth along the shoreline. Consistently high precipitation rates in July 2009 may have contributed to this recent bank failure (Chart 2). No archaeological information was observed during the surface inspection of exposed soils at Location 2.

The eroding bank, pictured as Location 3, and noted in past annual reports has remained stable during the past several years. An instance of minor erosion noted in September 2008 on the right bank below Location 3, which supports a healthy riparian zone, has not significantly deteriorated since 2008. However, a cedar tree has been undercut and now leans over the river, and the rate of erosion may accelerate in the future (Location 4). This location will be monitored during future annual inspections to determine if the bank deteriorates further and severe erosion develops.

No inspection of the Project shorelines was conducted between the Pierce Mills and Arnold Falls dams during the 2009 field season. Construction activities related to the installation of concrete dams immediately downstream of the existing north and south log-crib dams at the Arnold Falls generating station prohibited use of the canoe takeout at Arnolds Falls. For additional details regarding construction at Arnold Falls Dam, refer to the 2008 annual report that includes the architectural historian's complete Section 106 report. The section of the river above the generating station is bound by relatively steep banks, and lacks a suitable substitute takeout in the vicinity of the station. While scouting for landing alternatives, construction progress at Arnolds Falls was inspected and documented (see Location 5 photographs).

Riverbank conditions between the Arnold Falls and Gage generating stations remain relatively unchanged from those documented in prior reports. One instance of minor erosion, new since the 2008 inspection, was observed during this inspection. Soils have been lost at the base of a steep, wooded area along an 8-meter length of the right bank (Location 6). The soils are shallow at this location and the erosion exposed bedrock ledge, which is expected to minimize the rate of further erosion, although the steepness of the bank may result in further destabilization. Exposed soils were inspected for archaeological information, although no artifacts were observed and none were anticipated due to the landform's steep slope (greater than 8%).

As noted in past annual reports, stone rip-rip installed by VTrans on the left bank adjacent to US Route 5 upstream from the Gage generating station has slowed the rate of erosion on the steep bank. This section of the riverbank is the most severe example of erosion in the Gage impoundment, although it has not noticeably deteriorated during the past year (Location 7).

Below the Gage generating station, a 28-meter length of slumping bank was observed both upstream and downstream of stone rip-rap installed in 2008 on the right outside bank (Location 8). As with other exposed sediments along the Project impoundment shorelines, the newly exposed bank was closely inspected for archaeological information, but no cultural materials were observed.

Exposed soils along a slumped, 50-meter length of shoreline, opposite Location 8, were inspected (Location 9). The sheared bank at this left, inside bend of the river supports a cornfield with no riparian buffer along the shoreline. As with Location 2, consistently high precipitation rates in July 2009 may have contributed to this bank failure (see Chart 2). No archaeological information was observed during the surface inspection of exposed soils at Location 9. This location will be closely monitored during future inspections.

The broad, outer bend on a 255-meter length of the right bank of above a railroad bridge continues to be subject to moderate erosion, as reported in the past. The bank is slowly being undercut and this grassy shoreline continues to slump its soils (see Location 10 photographs). Archaeological identification studies have been sponsored by CVPS in the past<sup>4</sup>, but no significant information was encountered. Likewise, exposed soils inspected in 2009 failed to reveal any cultural information.

The left bank between the Passumpsic generating station and the railroad bridge approximately 300 meters downstream has remained stable since the 2008 inspection. The steep sandy bank appears to have reached a stable angle of repose (Location 11).

An instance of undercutting and erosion observed in 2007 near the lower limit of the Project appears to have changed very little during the past year, with one exception. A cluster of four young trees noted and pictured as being undercut in the 2007 and 2008 reports, collapsed into the river in the intervening year (Location 12). As noted in the past, hundreds of tires have been observed in this section of the river channel, and the tires continue to collect sediments and create low, wide channel bars. The sediment collection may displace enough water to cause lateral erosion along this narrow strip of bank, which is bound by US Route 5 to its immediate west and by railroad tracks roughly 50 meters to the east.

## Summary

With the few exceptions noted above, the shorelines within the Project remain stable and relatively unchanged from previous inspections. While all instances of documented erosion

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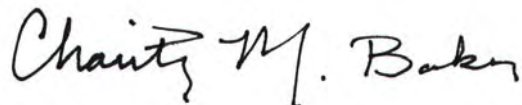
<sup>4</sup> Louis Berger and Associates, Inc. (1994) *Phase IB Archaeological Survey of the Gage and Passumpsic Hydroelectric Projects Town of St. Johnsbury and Village of Passumpsic Caledonia County, Vermont*, Waltham, Massachusetts.

will be monitored for evidence of deterioration during future inspections, the relatively new erosion events observed at Locations 2 and 9 will be closely monitored for evidence of accelerated deterioration in the future. Both shorelines are bordered by cornfields which lack riparian buffers, and consultation with other interested partners may be warranted if the shorelines continue to deteriorate. Currently, no known or potential archaeological sites are threatened by the identified erosion events within the Project.

CVPS proposes the following management actions for 2010:

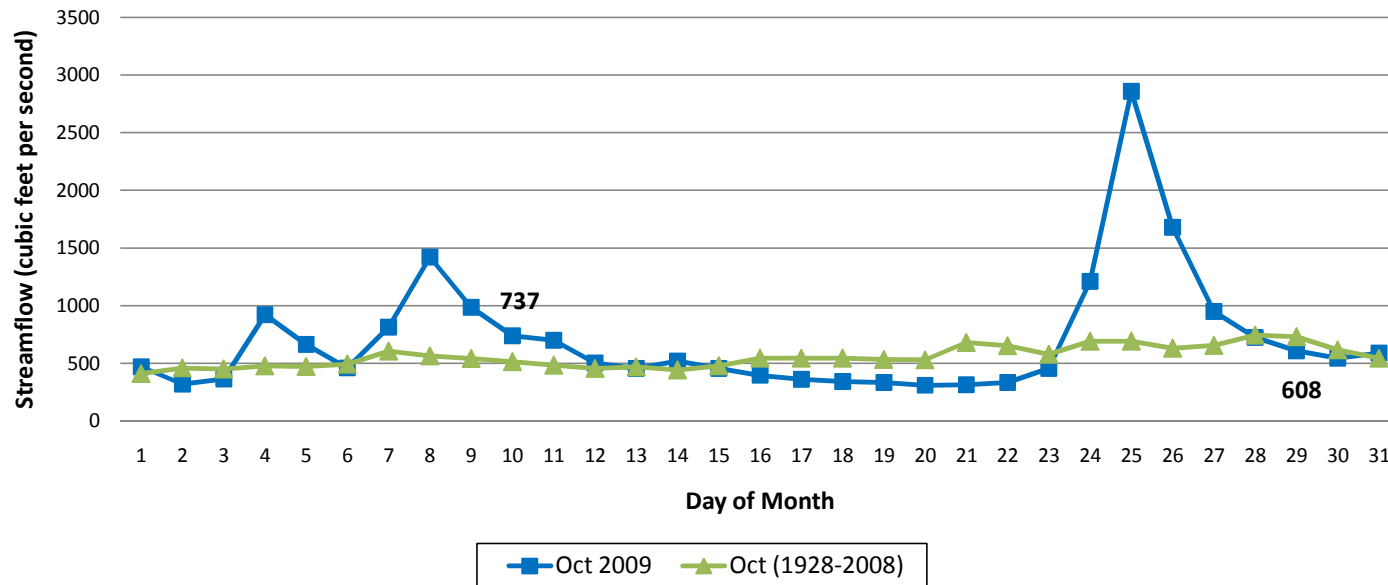
- Continue annual monitoring of the Project shoreline with emphasis on archaeologically sensitive areas and comparisons with previously observed areas of disturbance. Monitoring will include close examination of moderately or severely eroded banks for evidence of exposure of archaeological information.
- Work with the Caledonia County Natural Resources Conservation District (NRCD) and other organizations interested in protecting and managing resources in the river corridor.

Sincerely,

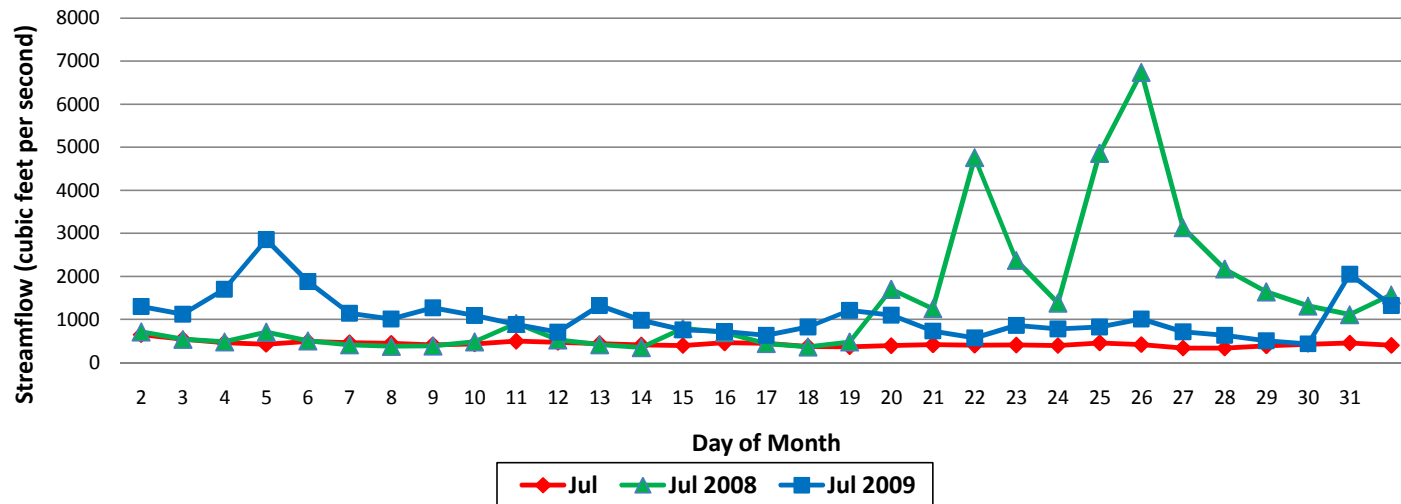
A handwritten signature in cursive script that reads "Charity M. Baker".

Charity Baker  
cc. Abenaki Nation  
Kimberly D. Bose, FERC  
Jeff Cueto, Water Quality Division, Vermont Agency of Natural Resources  
Beth Eliason, CVPS  
Kerry Gemmett O'Brien, NRCD  
John Greenan, CVPS  
Hugh Henry, Architectural Historian  
Nancy Boone, Interim SHPO, Vermont Division for Historic Preservation  
Mike Miller, Environmental Innovations  
Mike Scarzello, CVPS

**Chart 1: USGS water resources data, daily streamflow statistics, 80-year mean of daily mean values for October, 1928-2008, and provisional data for October 2009, USGS Passumpsic, VT gaging station (01135500) on the Passumpsic River**



**Chart 2: USGS water resources data, daily streamflow statistics, 80-year mean of daily mean values for July, 1928-2008, and for July 2008 and 2009, USGS Passumpsic, VT gaging station (01135500) on the Passumpsic River**







**Location 1: Erosion near powerline at upper limit of the Project, looking southwest. October 10, 2009.**



**Location 2: Erosion on left bank first observed in 2008, looking south. October 10, 2009.**





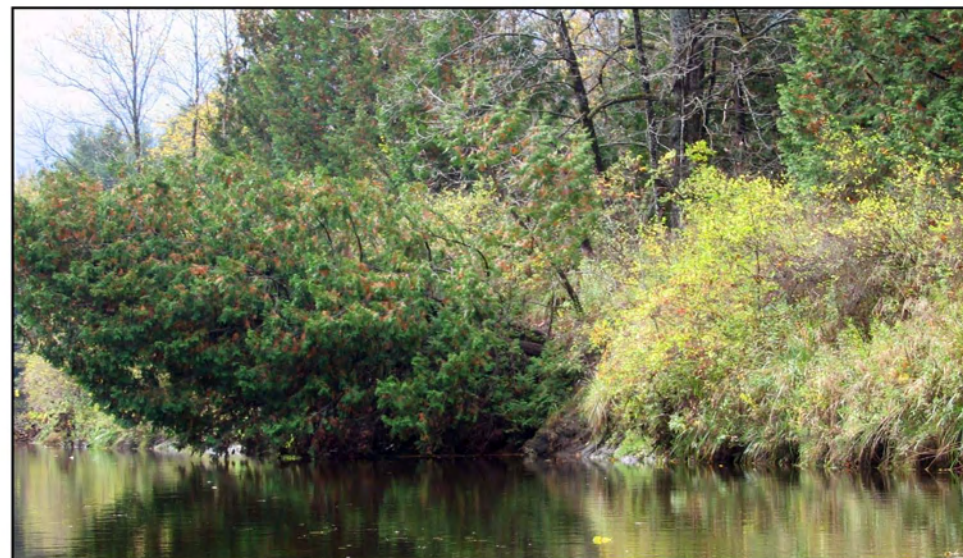
0 100 200 400 Meters



NAIP 2008 Vermont Dataset, Collected Summer 2008  
 USDA-FSA-APFO Aerial Photography Field Office, Published April 30, 2009  
 NAIP\_1M\_CLRIR\_2008 Digital Ortho Photo Image,  
 m\_4407133\_NW\_19\_1\_20080823.jp2; m\_4407240\_NE\_18\_1\_20080823.jp2  
 Available at <http://www.vcgi.org/>



**Location 3: Erosion on left outer bend of the river within the Pierce Mills impoundment, looking southeast, October 10, 2009.**

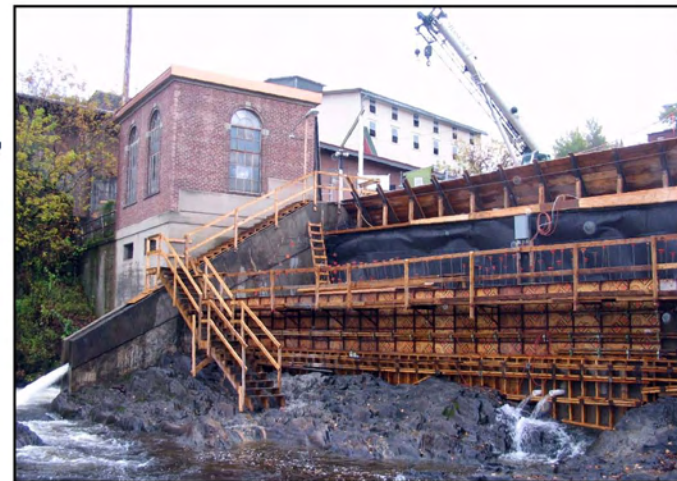


**Location 4: Erosion undercutting cedar tree on right bank first observed in 2008, looking southwest. October 10, 2009.**





**Location 5: Partially constructed south dam at Arnold Falls generating station, looking southwest, October 10, 2009.**



**Location 5: Completed north dam at Arnold Falls generating station, looking northeast, October 10, 2009.**



**Location 5: Waterflow diversion pipes required by VT ANR during dam construction, looking north in left image and looking southwest in right image. October 10, 2009.**





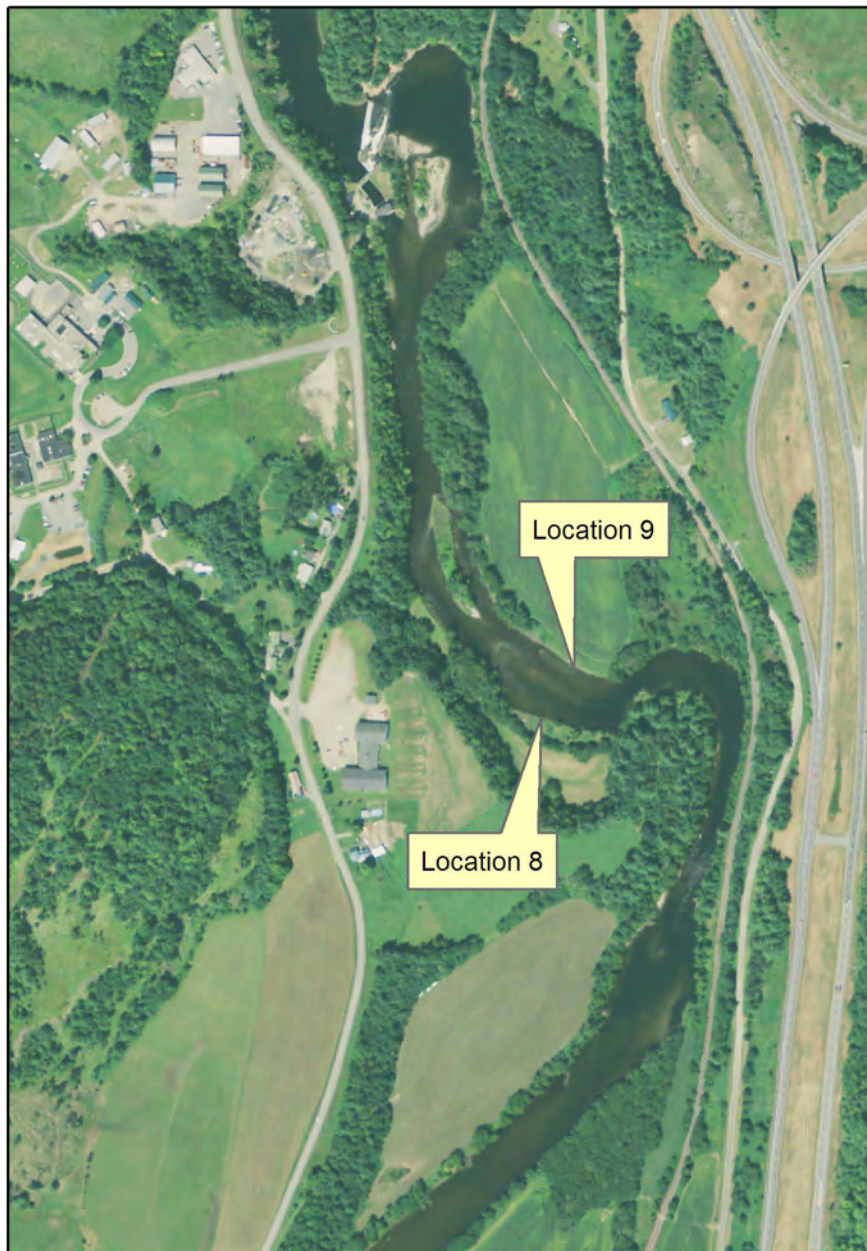


**Location 6: Newly documented erosion exposing bedrock ledge at the base of a steeply, wooded bank within the Gage impoundment, looking northwest. October 29, 2009.**



**Location 7: Stone rip-rapped right bank adjacent to US Route 5 upstream of the Gage generating station, looking southwest, October 29, 2009.**





Location 9

Location 8

0 150 300 600 Meters



NAIP 2008 Vermont Dataset, Collected Summer 2008  
 USDA-FSA-APFO Aerial Photography Field Office, Published April 30, 2009  
 NAIP\_1M\_CLRIR\_2008 Digital Ortho Photo Image,  
 m\_4407240\_SE\_18\_1\_20080823.jp2  
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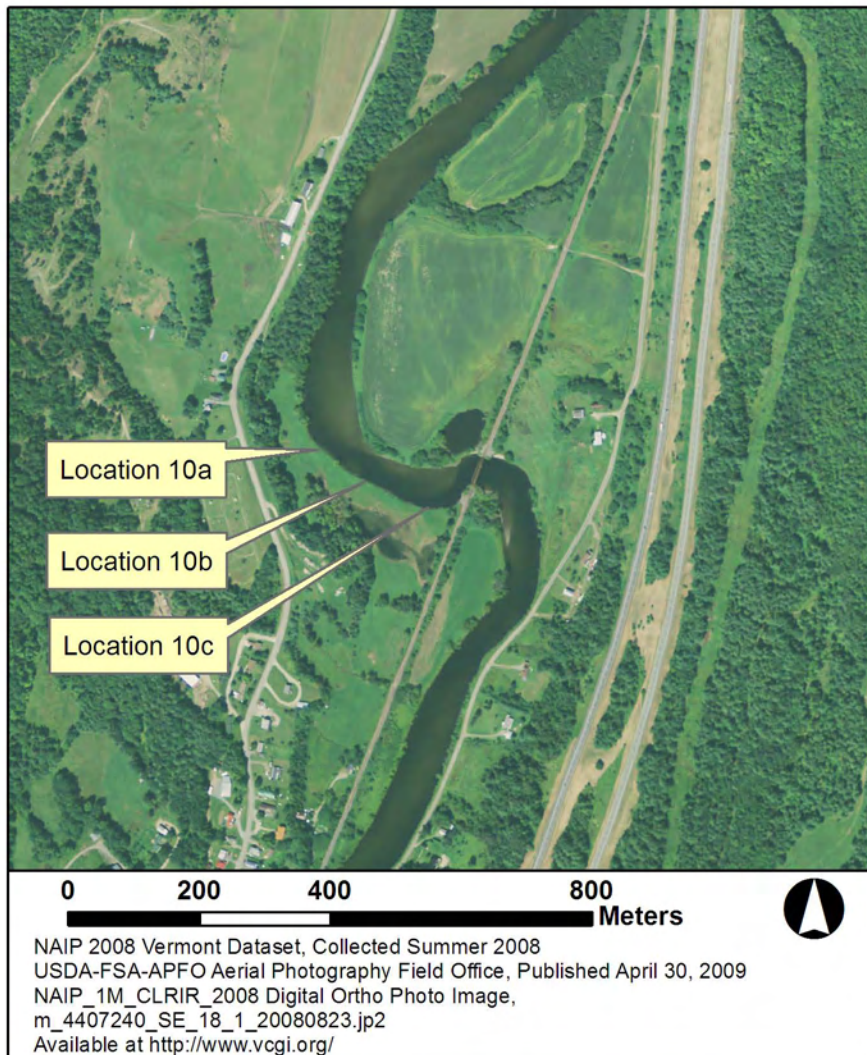


**Location 8: Slumping bank just upstream of stone rip-rap installed circa 2008 on the right outside bank, looking northwest. October 29, 2009.**



**Location 9: Slumping left bank on inner bend of the river adjacent to a cornfield within the Passumpsic impoundment, looking northeast, October 29, 2009.**





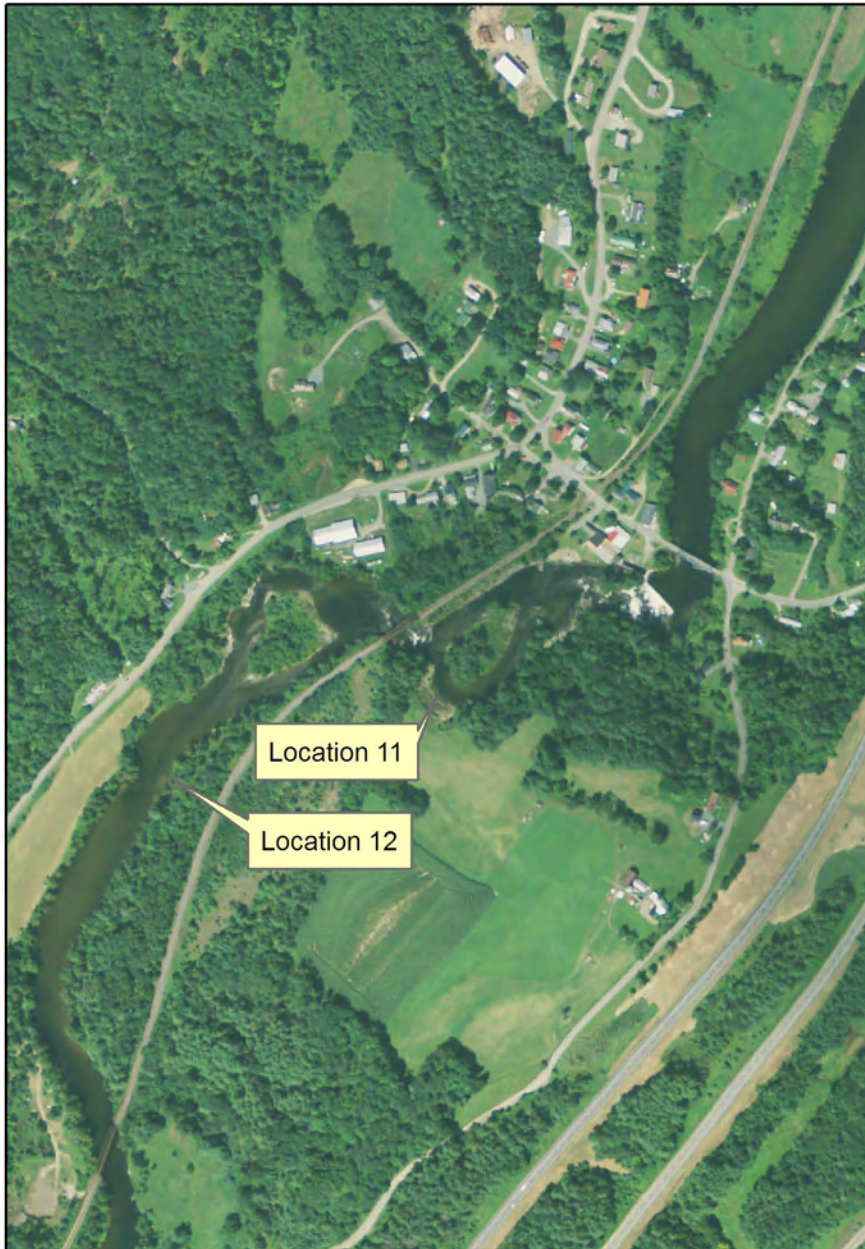
**Location 10a: Slumping soils on right bank along broad, outer bend above a railroad bridge, looking southeast. October 29, 2009.**



**Location 10b: Slumping soils on right bank along broad, outer bend above a railroad bridge, looking southeast. October 29, 2009.**

**Location 10c: Slumping soils on right bank along broad, outer bend above a railroad bridge, looking east. October 29, 2009.**





NAIP 2008 Vermont Dataset, Collected Summer 2008  
 USDA-FSA-APFO Aerial Photography Field Office, Published April 30, 2009  
 NAIP\_1M\_CLRIR\_2008 Digital Ortho Photo Image,  
 m\_4407240\_SE\_18\_1\_20080823.jp2; m\_4407248\_NE\_18\_1\_20080822.jp2  
 Available at <http://www.vcgi.org/>



**Location 11: Steep sandy left bank below Passumpsic generating station appears to have reached a stable angle of repose, looking west. October 29, 2009.**



**Location 12: Undercutting and erosion observed on the left bank near the lower limit of the Project has resulted in the collapse of cluster of four young trees (center of photo) within the past year, looking southeast, October 29, 2009.**