

Reach 5c (Red Falls to below Conine)

Reach 5c begins at Red Falls and continues downstream approximately 2,500 feet to a point just below the Conine farmstead (**Map VI-6**). The reach is located entirely in the Town of Prattsville, and is referred to as the “Conine” site. Drainage area ranges from 68.6mi² at Red Falls, to 71.2 mi² at the bottom of the reach. One larger tributary enters the Batavia Kill at the top of the reach, and drains the sub-basin along Dent Road and County Route 4. The reach is located in Valley Zone I (**Figure V-11**), which has an average valley slope of 1.2%. The valley morphology is characterized by a narrow valley with lateral and terminal moraines, alluvial terraces, and narrow floodplains. These characteristics result in a moderately entrenched stream channel through portions of the reach. A low channel sinuosity results from the narrow valley and a moderately steep valley slope.

Stream Morphology/Stability

The Phase I Inventory and Assessment in 1997, identified two isolated sections of streambank erosion. The eroding banks represented a 6% of the reach length, with approximately 0.25ft² of exposed streambank per foot of channel length. Due to the potential water quality impacts from clay exposures within the reach, a Phase III/IV assessment strategy was initiated in 1998. The assessment activities included 9 monumented cross sections, 2,500 feet of streambed survey, and sediment regime analysis.



Figure IV-91: 1959 planform in area behind Conine Farm. Planform is stable.

A review of aerial photographs from 1959 to 2000 indicated that the top of reach 5c has been relatively stable for over 41 years, with little change in planform. The lower portion of the reach, was shown to be much more active in regards to channel planform changes, with a significant change in meander pattern noted in the area of a former bridge.

As seen in **Figure IV-91**, in 1959 a private bridge crossed the stream on the Conine Farm. The bridge is still present in 1967, but by the 1980 aeriels, the bridge is gone and the reach has experienced lateral migration on the right bank. In 1995, the planform is rapidly changing (**Figure VI-92**) and the reach is starting to experience severe instability. The channel has divided into 2 main threads and is showing signs of further braiding in some locations.

The first sixteen hundred feet below Red Falls can be characterized as being fairly stable, but was included in the monitoring strategy to allow evaluation of any migration of instability from the lower portion of the reach, and to provide continuity with the Red Falls

assessment. The right bank just below Red Falls has significant protection provided by rock rip-rap both above and below the confluence of the Dent Road tributary, and exposed bedrock ledges (**Figure VI-96 photo C,I**). Stability is assisted by the presence of a narrow floodplain on the opposite bank, which effectively reduces channel entrenchment (**Figure VI-96 photo C,D,I**). Stream type in the upper portion of the reach is predominately C3, with short isolated sections of F3 stream associated with localized stream confinement. The GCSWCD has been monitoring 3 cross sections at the top of the reach, and has observed only minimal erosion.



Figure VI-92: 1995 aerial of lower end of reach 5c. Note split channel in location of former bridge.

Continuing down the reach, the Batavia Kill meanders against the south side of the valley floor, running along the downstream limits of the moraine discussed in reach 5b. In this area, the channel has been gradually widening, and developed a split channel. The high slopes on the left streambank have been experiencing fairly high rates of erosion, as well as geo-technical failure. The widening process has diverted velocities against the exposed banks (**Figure VI-96 photo F**), and an extensive slope failure extends several hundred yards up the slope. Extensive failure scarps can be found over 100 feet above the streambed elevation located quite a distance up the slope (**Figure VI-96 photo A,G**).

The bank erosion and slope failure are well represented by cross section #7, which is located just behind the Conine farmstead (**Figure VI-93**). As shown by the cross section below, the channel has aggraded on the right and eroded the left bank. The monitoring also detected the changes associated with the geo-technical slope failure. The non-hatched area on the top of the left bank representing a scarp (a fracture on the earth's surface into which water can flow and that eventually can break off and fall or slump) that had developed above the bank. The distance between the line and yellow hatched area is represents the height of the slippage.

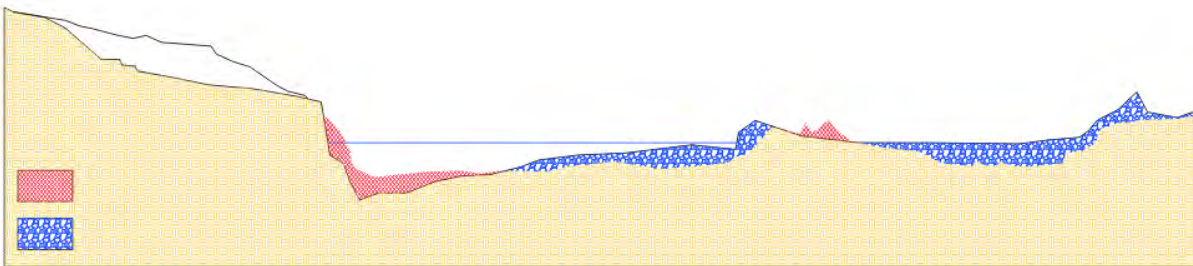


Figure VI-93: Monitoring of a cross section behind the Conine Farm has revealed multiple stability problems, including aggradation, lateral erosion and geo-technical slope failure between 1998 and 2000.

It is interesting to note that the soil that has slid towards the channel due to the geotechnical failure, was been quickly eroded away, setting an ideal condition for accelerating the slope failure. As the stream flows down the valley, the high slopes on the left bank moderate and the channel is bounded by a narrow, low terrace (**Figure VI-96 photo F**). As noted in **Figure VI-94**, the right hand channel has become almost completely filled, and lateral erosion is still occurring on the left bank. Note that the left bank height has been greatly reduced.

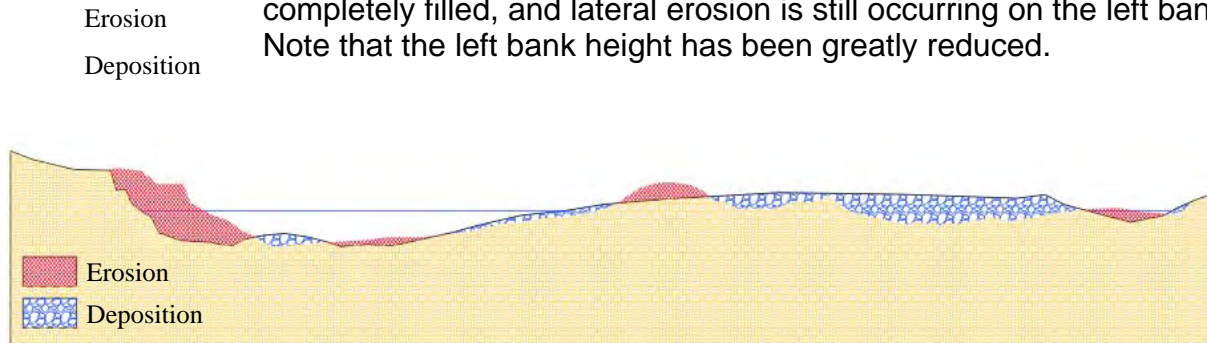


Figure VI-94: Monitoring at cross section #8 between 1998-2000. Right channel has completely aggraded and the left bank continues to experience lateral erosion of the low terrace.

At the bottom of the reach, the stream meanders back across the narrow valley floor, with significant erosion located on the right bank (**Figure VI-95**). The channel has returned to a single thread, and it appears to be attempting to increase sinuosity and rebuild a floodplain on the left bank.

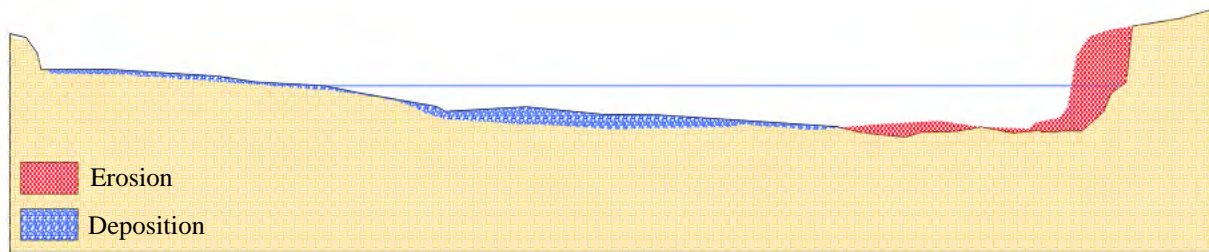


Figure VI-95: At the bottom of reach 5c, the stream is running along a high terrace on the north side of the valley, with significant erosion and aggradation of the channel. 1998 - 2000.

The streambanks through reach 5c are primarily composed of unconsolidated alluvial material associated with a glacial moraine. These soils have a significant silt and clay fraction which contributes to increased turbidity and suspended sediments.

Riparian Vegetation

The riparian condition in reach 5c is in relatively fair condition at the very top of the reach, with the exception of a short stretch on the right bank. In the area along NY Route 23, where the rip-rap is located, the buffer is dominated by grasses and small shrubs, with no trees present. Below this, the riparian condition is relatively good on both sides of the

stream with a well forested floodplain and slopes. The riparian condition is much poorer in the center and lower reach, with little to no buffer remaining. As seen in **Figure VI-96**, the instability process has greatly exceeded the limits of the existing vegetation, and it is unlikely that any sense of stability will be possible without intervention.

Water Quality

The primary water quality concern in reach 1c involves *turbidity* and *TSS* impacts from in-stream sources. The degradation of the channel, the large slope failures, and the significant exposures of clay and lodgement tills in the reach all contribute to water quality impacts.

During Phase I of the Batavia Kill project, the GCSWCD investigated what appeared to be excessive levels of turbidity coming from the Dent Road tributary. In 1989, the GCSWCD discovered a significant failure zone approximately 2500 feet upstream from the Batavia Kill. While not surveyed, the site is characterized as an A2/A3 stream type with its vertical stability badly compromised. The GCSWCD observed severe downcutting, with a deep ravine cut into lodgement till materials. Groundwater seeps from the exposed banks ran turbid and large debris jams were located in the bottom of the channel. The debris jams were causing localized divergence of stream flow, accelerating the degradation. The GCSWCD observed the failure area during and after several storm events, and noted a significant visual contrast between upstream and downstream flows. The site has not been evaluated since 2001.

Infrastructure

The only infrastructure feature located in reach 5c is NY Route 23. A short section of the road runs close to the stream at the top of the reach, and as noted earlier NYSDOT has used rock rip-rap to protect the road right-of-way. The rip-rap is effectively arresting channel migration in this area, which may result in lateral erosion being pushed downstream to a point where the banks are not protected. There is also a large concrete box culvert which carries the Dent Road tributary under NY Route 23.

Habitat

While the first 1500 feet of the reach appear to have fair habitat value, the center and lower end of the reach are unstable. Rapid changes in streambed structure, channel aggradation and the lack of riparian vegetation are all factors that would be expected to negatively impact habitat. The culvert that carries the Dent Road tributary under NY Route 23 also appears to present a significant barrier to fisheries access. The culvert invert is located a significant distance above the stream (**Figure VI-96 photo I**), preventing access to the tributary.

Flooding issues

The GCSWCD did not note any current flooding issues in reach 5c. The biggest impact from flooding is property damage associated with eroding streambanks. At the lower end of the reach, a home with several out buildings is located on the high terrace which runs along the right bank. Geo-technical slope failure (**Figure VI-96 photo A**) in the area behind the home has a high probability of extending, and threatening the property. Extreme flood events, coupled with the high degree of instability exhibited by the stream channel, can be expected to accelerate this problem.

Reach 5c Summary

Similar to reach 5b, the Conine reach is experiencing extreme instability and is currently impacting water quality. The upper reach, just below Red Falls, is relatively stable most likely due to past management of the right bank along NY Route 23 (rip-rap), as well as the presence of a stable, well vegetated floodplain on the opposite bank. In the center and lower end of the reach, the GCSWCD has observed significant acceleration of instability since 1998. While erosion was noted in the 1997 inventory, the stream is now experiencing extreme slope instability, degradation of the channel bottom, as well as over widening and aggradation.

The GCSWCD and NYCDEP have identified the Conine reach as being a high priority for restoration due to water quality impacts. Funding for the project is included in the Batavia Kill Phase II contract between the GCSWCD and NYCDEP, and full restoration of the center and lower reach is targeted for 2005.

Table VI-20: Management Recommendations Reach 5c.

Reach 5c: Red Falls to Below Conine.	
Intervention Level	Full Restoration
Stream Morphology	Reach 5c exhibits significant instability in its center and lower sections. The channel is adjusting laterally in an accelerated rate, as well as degrading and over widening. A significant slope failure exists on the left and right bank, and it does not appear that natural recovery is likely. The reach will require a full restoration effort to restore stable stream form, and the GCSWCD and NYCDEP have identified the site as a high priority, and with restoration targeted for 2005.
Riparian Vegetation	Some benefit could be realized by enhancing the buffer at the top of the reach. Plantings in those areas where woody vegetation is not present (i.e. along NY 23) could proceed at any time. Restoration of riparian conditions in the center and lower reach must be delayed until stability is restored.
Water Quality	Primary impact is from <i>turbidity</i> and <i>TSS</i> associated with extreme streambank failure. Water quality impacts would be mitigated by restoration of the reach. See Section V-A Water Quality Assessment.
Infrastructure	No specific problems noted. Any future rehabilitation or other work on NY Route 23 must be done so as to avoid any further modification of the channel.
Habitat	Fair to poor condition. Habitat will be addressed in the restoration design.
Further Assessment	Continue to monitor reach stability in preparation for restoration.



A



B

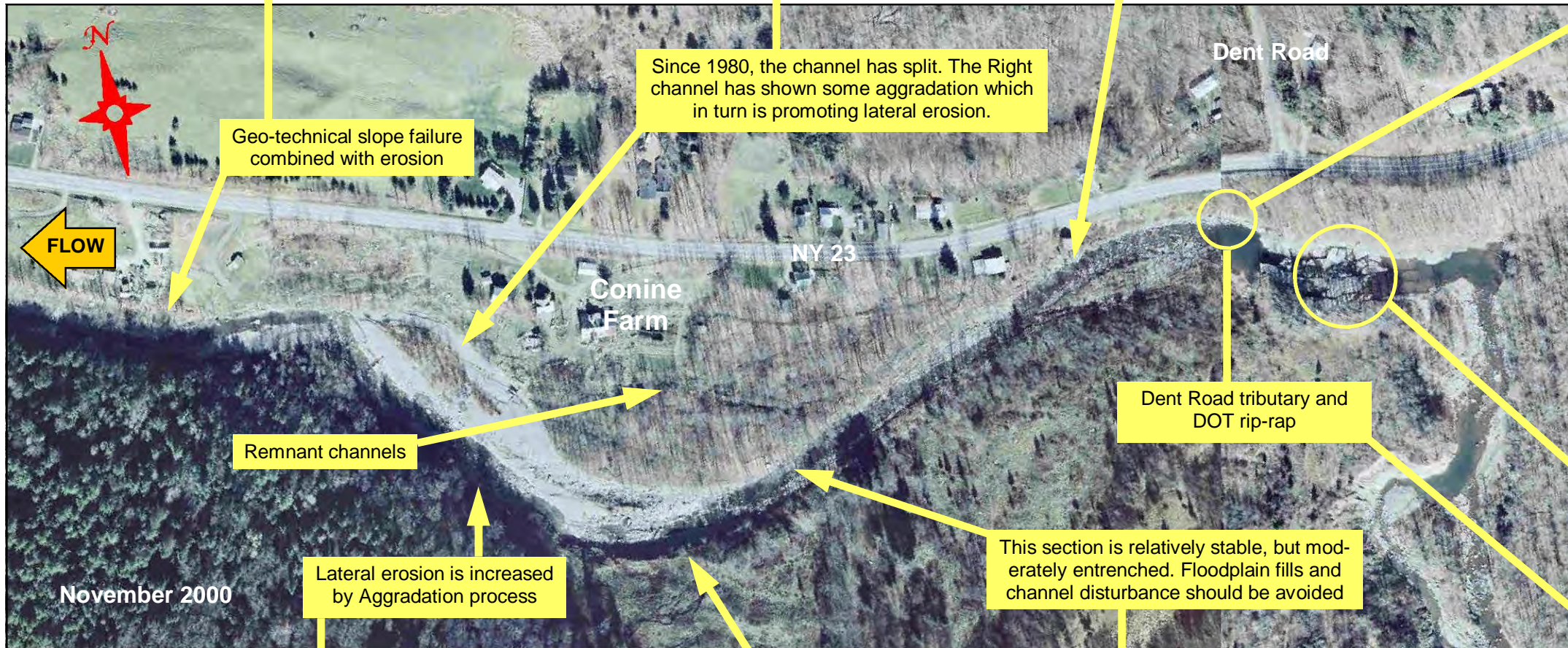


Bedrock outcrop on Right bank

C



D

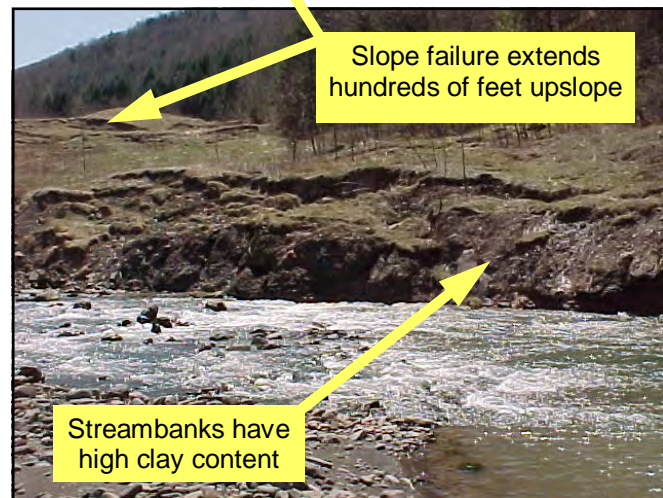


E

Bedrock exposures such as those at "Red Falls", provides grade control, and allows for stable transition in slope.



F



G

Slope failure extends hundreds of feet upslope

Streambanks have high clay content



H



I