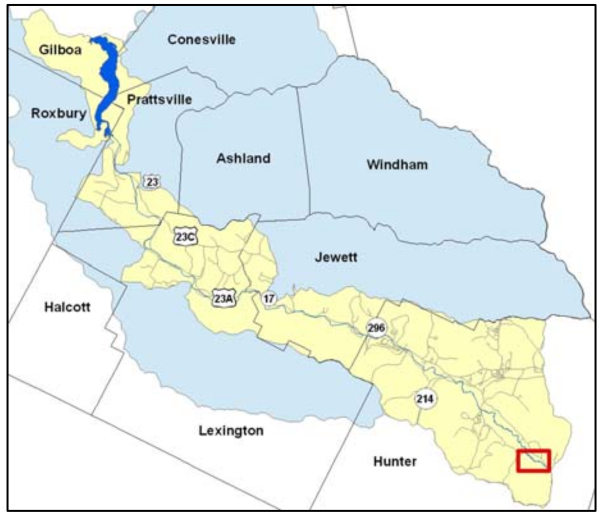
Schoharie Creek Management Unit 1

Town of Hunter - Prediger Rd. (Station 159225) to Dale Lane (Station 151439)



Management Unit 1 location
see figure 4.0.1 for more detailed map

This management unit begins at Prediger Road, continuing approximately 7,786 ft. downstream to Dale Lane in the Town of Hunter.

2006 Stream Feature Statistics

4.2% of streambanks experiencing erosion
0% of streambanks have been stabilized
0% of streambanks have been bermed
136 feet of clay exposures
16 acres of inadequate vegetation
2,020 feet of road within 300ft. of stream

Summary of Recommendations Management Unit 1	
Intervention Level	Preservation
Stream Morphology	No recommendations at this time
Riparian Vegetation	Planting of herbaceous area at downstream end of MU
Infrastructure	No recommendations at this time
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	Remove dwellings in floodplain upstream of Dale Lane Bridge. Mapping of floodway and floodplain
Water Quality	Remediate any wastewater issues from residences immediately upstream of Dale Lane Bridge, and remove the dwellings from the floodplain to protect both water quality and private property.
Further Assessment	No recommendations at this time

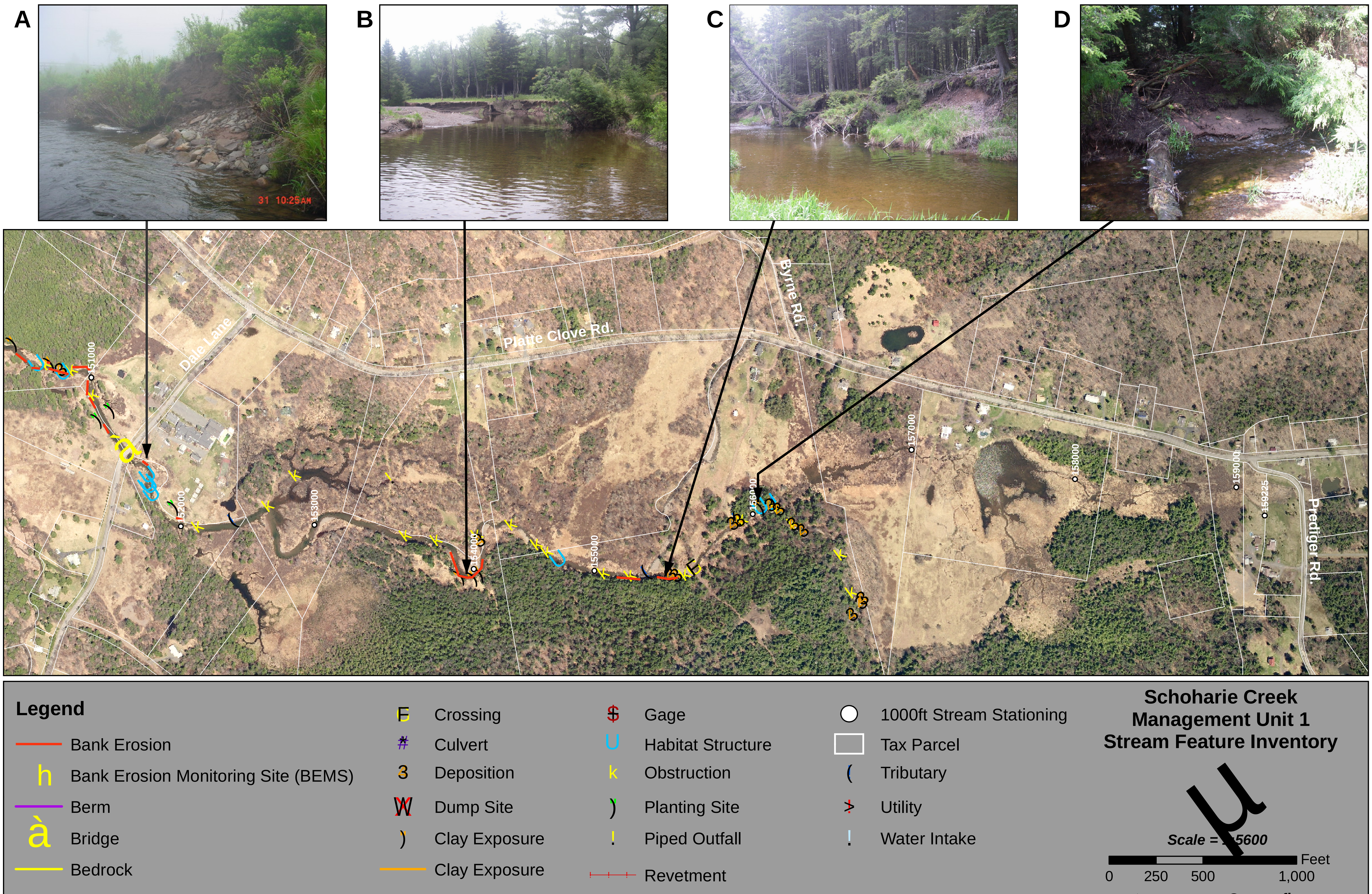
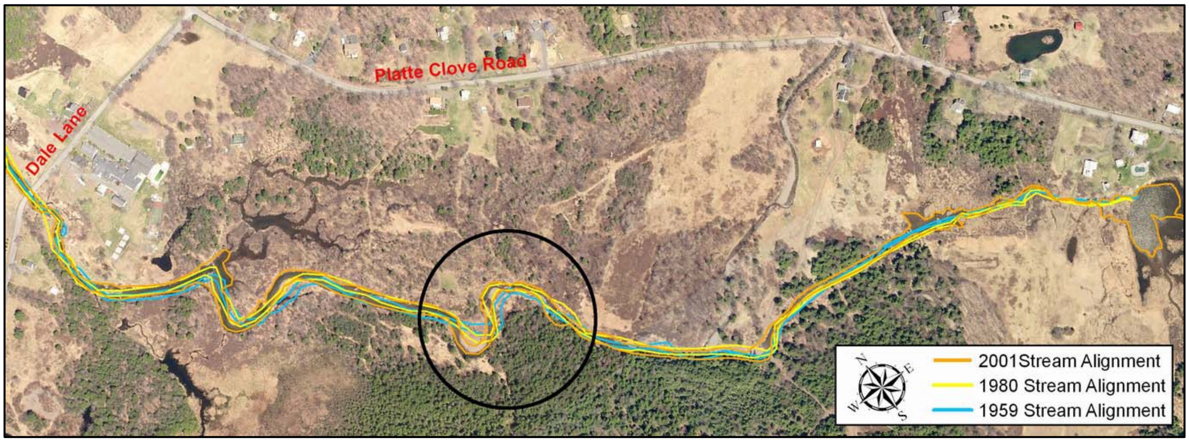


Figure 4.1.1 Management Unit 1 - 2006 aerial photography with stream feature inventory

Historic Conditions

As seen from the historical stream channel alignments (below), with the exception of the *meander* bend in the middle of this management unit, the channel alignment has not changed significantly over the years.



Historic stream channel alignments beginning at Station 157400 overlayed with 2006 aerial photograph

As of 2006, according to available NYS DEC records dating back to 1996, there have been no stream disturbance permits issued in this management unit. There are remnants of many fish habitat structures throughout this unit in various states of functionality. Due to its rural nature and headwater location in the watershed, the unit has a lot of beaver activity. While beaver impoundments can sometimes be a nuisance, beavers have historically played a beneficial and ecologically important role in the stream system. Beaver activity adds organic debris (trees, leaves, etc. which provide the base of the food chain), reduces water velocities and flood-related hazards downstream, and creates wetland areas that filter sediment and release water to the stream and groundwater slowly throughout the year.

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

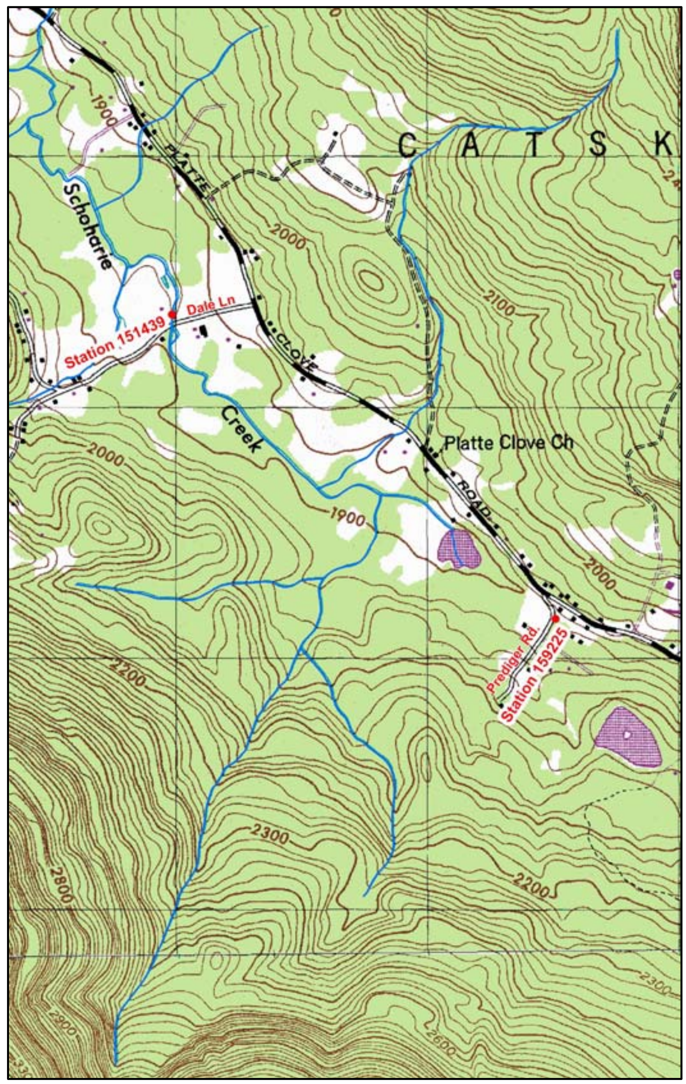
The 2006 stream feature inventory revealed that 4.2% (653 ft.) of the streambanks exhibited signs of active erosion along 15,571 ft. of total channel length (Fig. 4.1.1). The total surface area of active erosion totaled approximately 5,555 ft^2. No *revetment* or *berms* were identified in this management unit during the 2006 stream feature inventory.

Stream Channel Conditions (2006)

The following description of stream channel conditions references insets in foldout, Figure 4.1.1. Stream stationing presented on this map is measured in feet and begins at the Schoharie Reservoir. "Left" and "right" streambank references are oriented looking downstream, photos are also oriented looking downstream unless otherwise noted. Italicized terms are defined in the glossary. This characterization is the result of an assessment conducted in 2006.

Management unit #1 begins at Prediger Road. The drainage area ranges from 0.5 mi^2 at the top of the management unit to 4.84 mi^2 at the bottom of the unit. The valley slope is 0.62%.

Valley *morphology* in this management unit is unconfined with a broad glacial and *alluvial* valley flat. Generally, stream conditions in this management unit were stable with the exception of a few small erosional areas. Management efforts in this unit should focus on preservation of existing wetlands and forested areas as well as enhancing the *riparian* buffer at the downstream end of the unit (Station 152300 to 151750).



1980 USGS topographic map – Kaaterskill Quadrangle contour interval 20ft

The upstream half of this management unit was dominated by a large palustrine wetland (Station 159225 – 156162). Wetlands are important features in the landscape that provide numerous beneficial functions including protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods. This palustrine wetland was approximately 34 acres with forested, shrub-scrub, and emergent vegetation, as well as areas of open water (see Section 2.6 for detailed wetland type descriptions).

Palustrine wetland (Station 159225 – 156162)
Approximate wetland boundary delineated by NYSDEC

As water from these wetlands flows downstream, the defined stream channel of the Schoharie Creek emerged. This section of stream was fairly narrow and shallow with an unnamed *tributary* entering from the left streambank (Station 156100). This tributary drains the slopes of Twin and Indian Head Mountains before it reaches the flatter topography of the valley floor where it enters the Schoharie Creek. As a result of this change in stream slope, the tributary loses its ability to transport sediment gathered from the mountain slopes, and begins to deposit sediment at its mouth and into the more gently sloped Schoharie Creek. This is a common feature of confluence areas, which often contain extensive sediment bars, function as important sediment storage areas, and are typically among the most dynamic and changeable areas in the stream system. The New York State Department of Environmental Conservation classifies streams and rivers based on their "best use" (NYSDEC, 1994). This tributary is classified as C by the NYS DEC, indicating that the best use for this stream is supporting fisheries and other non-contact activities.

Downstream, along the right bank, the stream has undercut the bank exposing a $6ft^2$ area of glacial lake silt/clay (Inset D). Fine sediment inputs into a stream can be a serious water quality concern because they increase *turbidity,* degrade fish habitat, and can act as a transport mechanism for other pollutants and *pathogens*.

As the stream meandered downstream it began to *aggrade* and a transverse bar formed (Station 155440). The *thalweg*, or deepest part of the stream channel flowed up against the right streambank causing the first significant bank erosion in the management unit (Inset C). The streambank was being undermined by toe erosion, resulting in an erosion area of approximately 1,717 ft^2. As a result, many mature trees have fallen into the stream and more of the riparian forest will be lost if this bank continues to erode. This type of erosion is common and part of natural stream process. In stable watersheds, the rate of erosion is slow and a natural healing process usually follows.

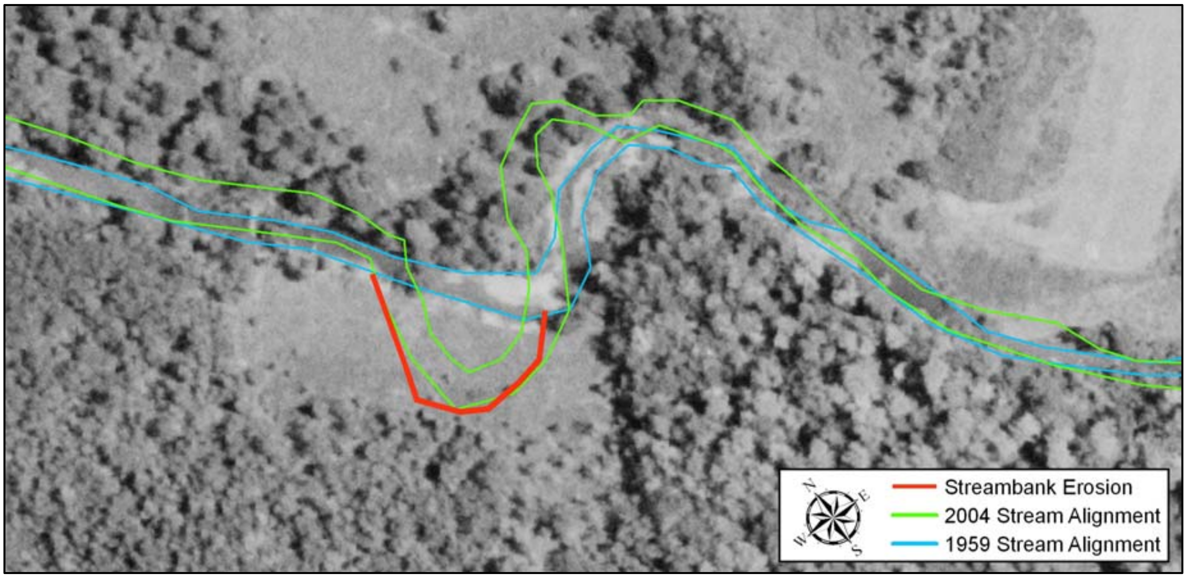
Downstream, a sizable unnamed tributary entered from the right streambank (Station 155270). This tributary is classified as C(t) by the NYS DEC, indicating that the best uses for this stream are the support of fisheries, including trout, and other non-contact activities (NYSDEC, 1994). Originating on steep mountainous slopes, this stream drains parts of Roundtop and High Peak Mountains before crossing under Platte Clove Road where the topography flattens before it enters the Schoharie Creek. As a result of this change in stream slope, the tributary loses its ability to transport sediment gathered from the mountain slopes, and begins to deposit sediment. This increase in runoff and sediment load may have contributed to the streambank erosion directly downstream of the tributary confluence (Station 155250). An area of approximately 1,276 ft^2 of the left streambank was experiencing erosion. As a result, many mature trees fell into the stream and lined the steambank toe providing some protection against future erosion.

Tributary at Station 155270 – looking upstream

Bank erosion at Station 155250

The next stream reach was fairly straight with some minor undercut streambanks and several areas at which woody debris had accumulated. Woody debris is critical to in-stream aquatic habitat, but in some instances may exacerbate erosion.

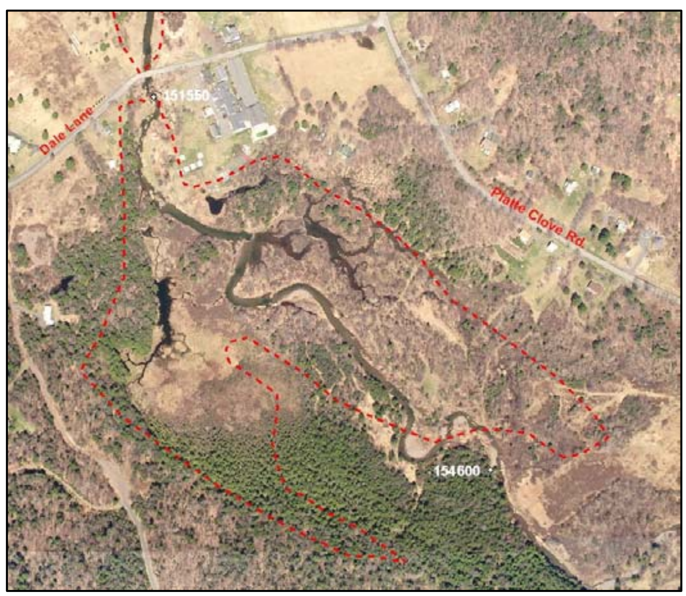
Downstream, the channel began to meander sharply. As shown in the aerial photo, this meander bend has significantly migrated since 1959, causing a 2,245 ft^2 area of erosion on the left bank in 2006 (Station 154070 Inset B). As the stream curved, it cut and eroded



Bank erosion at Station 154070 - Historic stream channel alignments overlayed with 1959 aerial photograph

into the outside of the meander bend and deposited sediment on the inside of the curve. This is due to the fact that the stream flow moves more rapidly on the outside of the curve and more slowly on the inside of the curve. As the erosion and deposition continued, the curve became larger and more circular. This is a natural process and typically happens slowly over time.

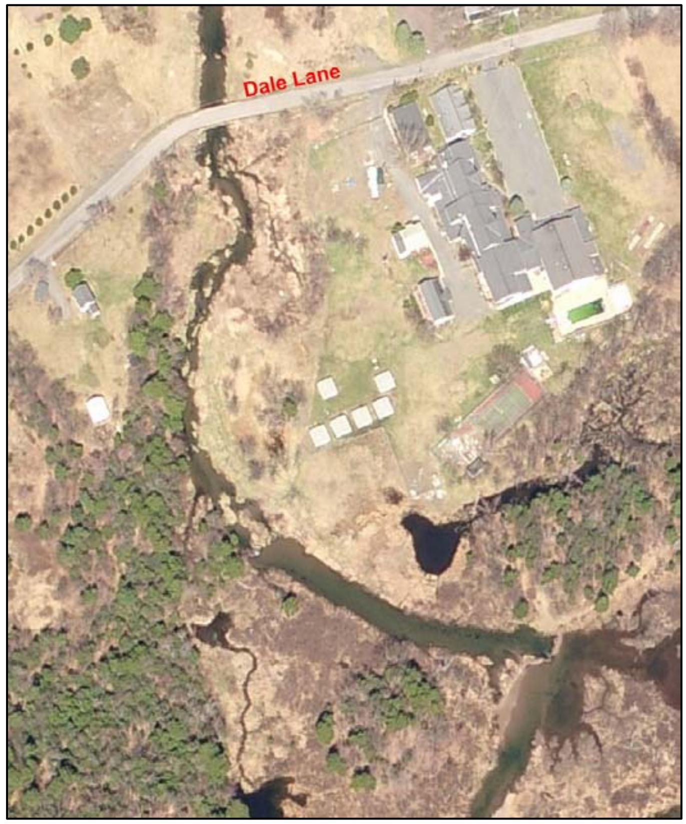
The land adjacent to this erosion appeared to have been cleared sometime prior to 1959 increasing its vulnerability to erosion. The eroding streambank had three clay exposures totaling 130ft. in length. Downstream of this meander the streambanks appeared stable.



Palustrine weltand (Station 154600 – 151550)
Approximate wetland boundary delineated by NYSDEC

Another large wetland encompassed the lower half of this management unit (Station 154600 – 151550). This palustrine wetland was approximately 40 acres with forested, shrub-scrub, and emergent vegetation as well as areas of open water (see Section 2.6 for detailed wetland type descriptions). In 2006, there were three beaver dams documented in this area.

At the downstream end of this management unit the land use on the right streambank changed from forested to residential, with herbaceous vegetation in the riparian zone. Mown lawn or pasture does not provide as much resistance to streambank erosion as the deep and dense root structure found in streamside forest. The complex root systems of trees may also act to filter nutrients and pollutants from the septic effluent, if any, from the adjacent residences. Areas where the riparian zone has been maintained in pasture or lawn present opportunities to improve the streamside buffer with tree plantings in order to promote a more mature vegetative community along the streambank and in the floodplain. Recommendations for this site include planting native trees and shrubs along the edge of the stream bank and the upland area (Station 152300 – 151750). Buffer width should be increased by the greatest amount agreeable to the landowners, but increasing the buffer width by at least 100 feet will increase the buffer functionality. The dwellings situated in the floodplain should also be relocated, to protect both the private property and water quality.



Riparian planting site (Station 152300 – 151750)

There were two minor erosion occurrences in this area. The first was located on the right streambank and was approximately 182 ft^2 in area (Station 152000). The second, with an area of 135 ft^2, was located on the right streambank at the very end of the management unit (Station 151590, Inset A). To prevent future erosion, vegetation plantings are recommended for both of these streambanks, including vegetative protection of the toe. Reshaping these streambanks by grading may be necessary prior to planting. This work should be preceded by a more detailed site assessment.

Bank erosion at Station 152000

At the downstream end of this management unit the stream passed under the Dale Lane Bridge (BIN 3200970). This bridge may constrict the floodplain at very high flows, but appeared to passes most flows effectively. Flood damage to bridges is typically caused by inadequate hydraulic capacity of the bridge, misaligned piers and/or abutments, or accumulation of debris. As bridges are replaced over time, these issues should be evaluated and adjusted if necessary to lessen the probability of flood damage by providing a more effective conveyance channel that promotes water and sediment flow through the bridge opening.

Bridge at Dale Lane

Gabion baskets were placed at the abutments to provide scour protection. Rock-filled gabions are not generally a recommended management practice by the GCSWCD. They have a tendency to be unsightly, and when installed incorrectly they frequently blow out of the bank and scatter rocks and cages downstream. Their correct use requires professional installation and maintenance.

Sediment Transport

Streams move sediment as well as water. Channel and floodplain conditions determine whether the reach aggrades, degrades, or remains in balance over time. If more sediment enters than leaves, the reach aggrades. If more leaves than enters, the stream degrades (See Section 3.1 for more details on Stream Processes).

In general, aggradational conditions were evident at the top half of the unit, but appeared to stabilize as the stream approached the Dale Lane Bridge. Valley form and topography suggested that this unit was a sediment storage zone, mostly supplied by two high gradient tributaries.

Riparian Vegetation

One of the most cost-effective and self-sustaining methods for landowners to protect streamside property is to maintain or replant a healthy buffer of trees and shrubs along the banks and floodplain, especially within the first 50 to 100 feet of the stream. A dense mat of roots under trees and shrubs bind the soil together, making it much less susceptible to erosion. Mowed lawn (grass) does not provide adequate erosion protection on stream banks because it typically has a very shallow rooting system and cannot reduce erosive forces by slowing water velocity as well as trees and shrubs. One innovative solution is the interplanting of revetment with native trees and shrubs which can significantly increase the working life of existing rock rip-rap, while providing additional benefits to water, habitat, and aesthetic quality. *Riparian*, or streamside, forest can buffer and filter contaminants coming from upland sources, shallow groundwater or overbank flows, and slow the velocity of floodwaters causing sediment to drop out and allowing for *groundwater recharge*. Riparian plantings can include a great variety of flowering trees, shrubs, and sedges native to the Catskills. Native species are adapted to our regional climate and soil conditions and typically require less maintenance following planting and establishment. One suitable riparian improvement planting site was documented within this management unit (Station 152300 - 151750).

Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (*Fallopia japonica*), for example, has become a widespread problem in recent years. Knotweed shades out other species with its dense canopy structure (many large, overlapping leaves), but stands are sparse at ground level, with much bare space between narrow stems, and without adequate root structure to hold the soil of streambanks. The result can include rapid streambank erosion and increased surface runoff leading to a loss of valuable topsoil. Japanese knotweed locations were documented as part of the stream feature inventory conducted during the summer of 2006 (Riparian Vegetation Mapping, Appendix B). No Japanese knotweed was found within this management unit during this inventory

An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (Riparian Vegetation Mapping, Appendix B). In this management unit, the predominant vegetation type within the 300 ft. riparian buffer was forested (49%) followed by shrubland (30%). *Impervious* area (2%) within this unit's buffer was primarily the local roadways, private residences and associated driveways. Areas of herbaceous (non-woody) cover may present opportunities to improve the riparian buffer with tree plantings in order to promote a more mature vegetative community along the streambank and in the floodplain.

Flood Threats

As part of its National Flood Insurance Program (NFIP), the Federal Emergency Management Agency (FEMA) performs hydrologic and hydraulic studies to produce Flood Insurance Rate Maps (FIRM), which identify areas prone to flooding. The NYS DEC Bureau of Program Resources and Flood Protection has developed new floodplain maps for the Schoharie Creek on the basis of recent surveys. The new FIRM hardcopy maps are available for viewing at County Soil & Water Conservation District Offices and most town halls. The FIRM maps shown in this plan are in draft form and currently under review. Finalization and adoption is expected by the end of 2007.

There are no floodplain maps available for this management unit. FIRM maps for the Schoharie Creek begin at Elka Park Road and continue downstream to the Schoharie Reservoir. It is recommended that hydraulic analysis be completed to create floodway and floodplain maps from Elka Park Road upstream to Prediger Road. Existing structures in this unit appeared to be situated out of the estimated 100-year floodplain, with the exception of the dwellings upstream of the Dale Lane bridge. The 100-year floodplain is that area predicted to be inundated by floods of a magnitude that is expected to occur once in any 100-year period, on the basis of a statistical analysis of local flood record. Most communities regulate the type of development that can occur in areas subject to these flood risks.

Aquatic Habitat

Generally, habitat quality appeared to be good throughout this management unit. Canopy cover was adequate throughout most of the management unit; however, it could be improved at the downstream end near Dale Lane. Woody debris within the stream channel was observed throughout the unit. This woody debris was providing critical habitat for fish and insects, and added essential organic matter that will benefit organisms downstream. The area was biologically rich with many wetland areas caused by the numerous beaver dams. Red spotted newts were swimming throughout, which is somewhat spectacular to see a cold-blooded amphibian thriving in water temperatures ~ 57 degrees Fahrenheit.

There were seven fish habitat structures installed in this management unit. Habitat structures were historically installed throughout the Schoharie Creek by the New York State Department of Environmental Conservation (NYSDEC), often in an effort to create scour pools. Scour pools offer deeper holding habitat, and the spillways raise the amount of dissolved oxygen in the water. The structures, most often in the form of a flat log weir perpendicular to the channel, also provided temporary grade control. In general, due to the horizontal, channel spanning design, they cause water to back up on the upstream side of the structure which can increase sediment deposition. Because most of these structures do not include an area for concentrated flow that provides for sediment transport, sediment deposition often occurs downstream from an initial scour area under the structure. This can cause widening of the channel, which further decreases sediment transport. In some settings, this can promote lateral channel migration, increase stream channel width-to-depth ratios and result in bank erosion up or downstream. In wild streams, these functions – both positive and negative – are performed to a large extent by large woody debris. It is recommended that an aquatic habitat study be conducted on the Schoharie Creek with particular attention paid to springs, tributaries and other potential

Habitat structure

thermal refuge for cold water fish, particularly trout. Once identified, efforts should be made to protect these thermal refugia locations in order to sustain a cold water fishery throughout the summer.

<u>Water Quality</u>

Clay/silt exposures and sediment from stream bank and channel erosion pose a potential threat to water quality in the Schoharie Creek. Fine sediment inputs into a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. There were four significant clay exposures in this management unit.

Stormwater runoff can also have a considerable impact on water quality. When it rains, water falls on roadways and parking areas before flowing untreated directly into Schoharie Creek. The cumulative impact of oil, grease, sediment, salt, litter and other unseen pollutants found in road runoff can significantly degrade water quality. However, there were no stormwater culverts in this management unit in 2006.

Nutrient loading from failing septic systems can be another potential source of water pollution, though no evidence of this was noted in this unit during the 2006 stream feature inventory. Leaking septic systems can contaminate water with nutrients and pathogens making it unhealthy for drinking, swimming, or wading. There were a few houses located in close proximity to the stream channel in this management unit. These homeowners should inspect their septic systems annually to make sure they are functioning properly. Servicing frequency varies per household and is determined by household size, tank size, and presence of a garbage disposal. Pumping the septic system out every three to five years is recommended for a three-bedroom house with a 1,000-gallon tank; smaller tanks should be pumped more often. To assist watershed landowners with septic system issues, technical and financial assistance is available through two Catskill Watershed Corporation (CWC) programs, the Septic Rehab and Replacement program and the Septic Maintenance program (See Section 2.12). Through December 2005, five homeowners within the drainage area of this management unit had made use of these programs to replace or repair a septic system.

References

NYSDEC, 1994. New York State Department of Environmental Conservation. Water Quality Regulations: Surface Water and Groundwater Classifications and Standards, NYS Codes, rules and regulations, Title 6, Chapter 10, Parts 700-705.