Schoharie Creek Management Unit 3

Town of Hunter – Bunny Lane (Station 148641) to Station 138610

This management unit begins at Bunny Lane, continuing approximately 10,031 ft. to Station 138610 in the Town of Hunter.

Stream Feature Statistics

1.9% of streambanks experiencing erosion
3.6% of streambanks have been stabilized
0% of streambanks have been bermed
65 feet of clay exposures
17 acres of inadequate vegetation
0 feet of road within 300ft. of stream

Management Unit 3 location
see figure 4.3.1 for more detailed map

Summary of Recommendations Management Unit 3	
Intervention Level	Preservation, Passive, Assisted Self-Recovery
Stream Morphology	No recommendations at this time
Riparian Vegetation	Interplanting of rip-rap and enhancement of riparian buffer at three locations.
Infrastructure	No recommendations at this time
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	No recommendations at this time Mapping of floodway and floodplain
Water Quality	Enhancement of riparian buffer to filter potential pollutants from adjacent lawns
Further Assessment	No recommendations at this time

A

B

C

D

Legend

- Bank Erosion
- Bank Erosion Monitoring Site (BEMS)
- Berm
- Bridge
- Bedrock
- Crossing
- Culvert
- Deposition
- Dump Site
- Clay Exposure
- Clay Exposure
- Gage
- Habitat Structure
- Obstruction
- Planting Site
- Piped Outfall
- Revetment
- 1000ft Stream Stationing
- Tax Parcel
- Tributary
- Utility
- Water Intake

Schoharie Creek
Management Unit 3
Stream Feature Inventory

N E S W

Scale = 1:6500

Feet
0 250 500 1,000

Stream flow

Figure 4.3.1 Management Unit 3 - 2006 aerial photography with stream feature inventory

Historic Conditions

As seen from the historical stream alignments, the *planform* of the channel has remained fairly stable since 1959 (below). There were 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 had 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.

Historic stream channel alignments overlayed with 2006 aerial photograph

As of 2006, according to available NYS DEC records dating back to 1996, there were no stream disturbance permits issued in this management unit.

Stream Channel and Floodplain Current Conditions (2006)

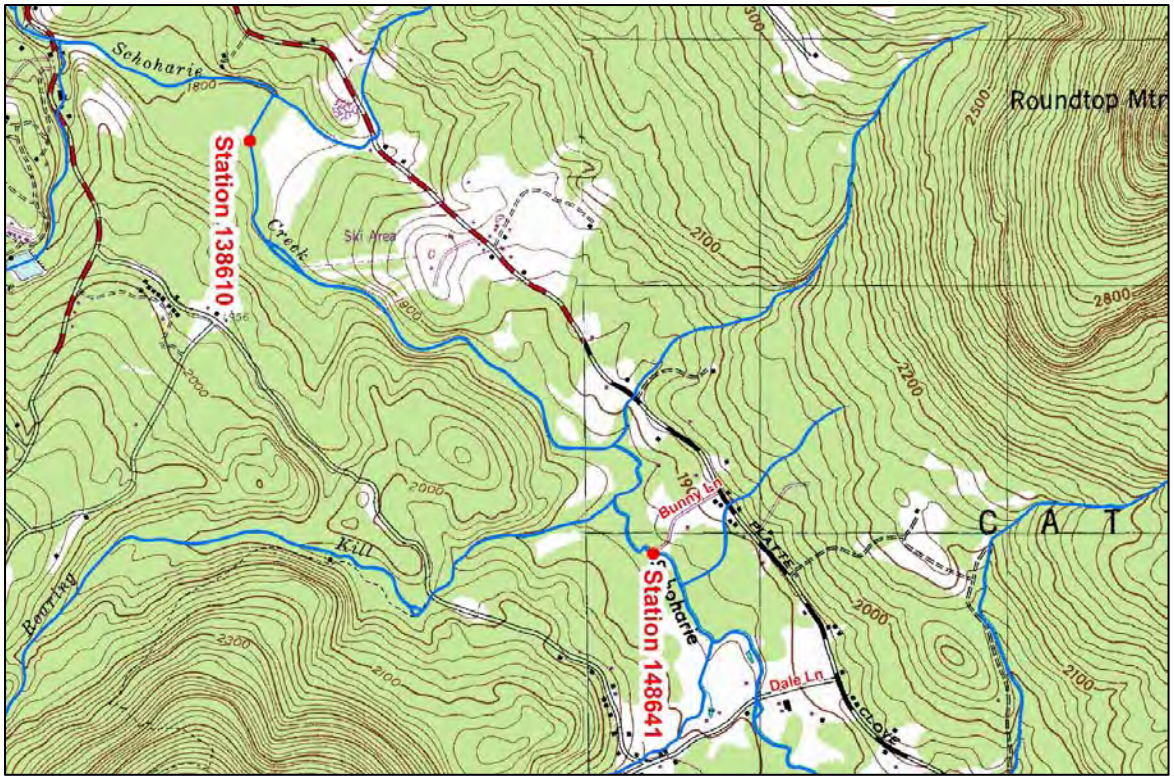
Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 1.9% (378 ft.) of the streambanks exhibited signs of active erosion along 20,063 ft. of total channel length in the unit (Fig. 4.3.1). The total surface area of active erosion totaled approximately 1,757 ft^2. Revetment has been installed on 3.6% (728 ft.) of the streambanks. No berms were identified in this management unit at the time of the stream feature inventory.

Stream Channel Current Conditions (2006)

The following description of stream channel conditions references insets in foldout, Figure 4.3.1. 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 #3 began at Bunny Lane. The drainage area ranged from 6.42 mi^2 at the top of the management unit to 11.68 mi^2 at the bottom of the unit. The valley slope was 0.62%.



1980 USGS topographic map – Kaaterskill & HunterQuadrangles contour interval 20ft

Valley morphology in this management unit was unconfined with a broad glacial and *alluvial* valley flat in the upstream half of the management unit allowing for a moderately *sinuous* channel. Approximately midway through the management unit the valley walls confined the channel (Station 143450 -139800). At the end of the unit the valley opened up once again.

Generally, stream conditions in this management unit were stable. The eroding streambanks documented were minor. Management efforts in this unit should focus on preservation of existing wetlands and forested areas and improving the *riparian* buffer by planting *herbaceous* areas with native trees and shrubs.

This management unit began as the stream passes under the Bunny Lane Bridge. This bridge may constrict the floodplain at very high flows, but passes most flows effectively. Rip-rap has been installed on both the downstream banks (Inset D). While rip-rap and other hard controls may provide temporary relief from erosion, they are expensive to install, degrade habitat, and require ongoing maintenance or may transfer erosion problems to upstream or downstream areas. Alternate stabilization techniques should be explored for streambanks whenever possible. Native shrub and sedge species should be interplanted through the rip-rap and along the toe of this streambank to help strengthen the revetment, while enhancing aquatic habitat.

A small Japanese knotweed (*Fallopia japonica*) plant was growing above the rip-rap. Japanese knotweed is an invasive non-native species which does not provide adequate erosion protection due to its very shallow rooting system, and also grows rapidly to crowd out more beneficial streamside vegetation. Removal of this Japanese Knotweed plant is recommended to prevent the spread if this invasive species (See Section 2.7 Riparian Vegetation).

The riparian buffer beyond the rip-rap was comprised of mown grass to the edge of the bank (Station 148641- 148300). The risk to bank stability can be minimized by maintaining mature trees along the critical 100 foot buffer zone. Buffer width should be increased by the greatest amount agreeable to the landowners, but increasing the forested buffer width by at least

Riparian planting site downstream from Bunny Lane (Station 148641- 148300)

100 feet will increase buffer functionality, such as filtering nutrients and pollutants, if any, from the adjacent lawn.

Bank erosion and clay exposure at Station 148200

As the rip-rap on the left streambank ended, erosion began (Station 148200). This erosion was 48 ft in length, exposing an area of 194 ft^2, including a 30ft^2 area of *lacustrine* clay. 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*. To prevent future erosion, riparian plantings including native willow and sedge species along the streambank toe are recommended. Reshaping these streambanks by grading may be necessary prior to planting. This work should be preceded by a more detailed site assessment.

Roaring Brook at Station 147040 - looking upstream

Downstream, Roaring Brook entered from the left streambank (Station 147040). This *tributary* was moderately sloped running along the valley between Sugarloaf and Spruce Top Mountains before entering the Schoharie Creek. The New York State Department of Environmental Conservation classifies streams and rivers based on their "best use" (NYSDEC, 1994). This tributary was classified as C(t), indicating that the best uses for this stream were the support of fisheries, including trout, and other non-contact activities.

Just downstream, on the right streambank was a piped outfall which flowed intermittently and conveyed excess water from a pond in the adjacent field (Station 146830). This outfall was presumably installed flush with the streambank which has since been eroded by the pipe's discharge. Rock outfall protection is usually recommended in these instances to prevent bank erosion.

Piped outfall at Station 146830

Riparian planting site at Station 146750

The adjacent riparian buffer has been mowed to the top of the streambank (Station 146750). Areas of *herbaceous* vegetation, such as this, 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. The deep and complex root systems of trees may also act to filter nutrients and pollutants found in stormwater runoff. Another solution is to simply stop mowing this area and allow for natural regrowth.

An unnamed tributary entered the stream at Station 146100. Originating on steep mountainous slopes, this stream drained parts of Roundtop Mountain before crossing under Platte Clove Road where the topography flattened before it entered the Schoharie Creek. As a result of this topography change, the tributary lost its ability to transport sediment gathered from the mountain slopes, and began to deposit

Tributary at Station 146100 - looking upstream

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. This tributary is classified by the NYSDEC as C(t).

At Station 145900, the right streambank buffer was dominated by small herbaceous plants. This riparian area would benefit from native tree plantings.

Riparian planting site at Station 145900

As the stream *meandered* downstream, the *thalweg*, or deepest part of the stream channel, flowed up against the left streambank causing the bank to erode (Station 145400, Inset C). The *shear stress*, or the force of the flowing water, has eroded the toe of this bank during high flow events, resulting in an erosion area of approximately 247 ft^2 and exposing a 30ft^2 area of clay. Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. Due to the erosion, many mature trees have fallen into the stream adding to in-stream woody debris. This erosion site is a good candidate for remediation using vegetative toe protection, but may self recover with time.

At the next meander bend there was another 120 ft^2 clay exposure on the right stream bank (Station 144700). This bank scour may have been exacerbated by upstream and downstream woody debris. While woody debris is valued for its many habitat features, it can also present problems when it diverts stream flows. Removal of some woody debris is recommended at this site to reduce potential clay inputs into the stream.

Clay exposure at Station 144700

There were two significant wetlands in this area (Station 146000 & 144950). 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. The wetland at Station 146000 was 0.8 acres in size, and was classified as Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Temporarily Flooded (PSS1A). The wetland at Station 144950 was 2.3 acres in size, and was classified as Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded (PFO1A) (see Section 2.6 for detailed wetland type descriptions).

Wetland (Station 146000-145700 and 144950-144000)
Approximate wetland boundary delineated by NWI

Downstream, the channel became confined by the valley walls (Station 143450 -139800). The streambanks in this confined reach were generally stable and heavily forested. The right streambank did begin to erode at Station 141220 (Inset B). Shear stress during high flow events eroded a 668 ft^2 area including at 15 ft long clay exposure. The streambank then began to restabilize through the creation of a bankfull bench and sedges along the toe.

Downstream, at Station 141200 there were two wetlands, which were differentiated by their physical and vegetative characteristics. The wetland along the right streambank was 0.7 acres in size, and was classified as Riverine, Upper Perennial, Unconsolidated Shore, Seasonally Flooded (R3USC). The wetland along the left streambank was also 0.7 acres is size and was

Wetland located at Station 141200-140600
Approximate wetland boundary delineated by NWI

classified as Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded (PFO1A).

At the end of the management unit there was a large 1.3 acre wetland, classified as Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Temporarily Flooded (PSS1A) on the left bank (Station 139150). Across the stream, bank stability was suffering from scour, and the riparian buffer was inadequate (Station 138900, Inset A). To improve the buffer native trees should be planted in the upland area, and willows and sedges planted along the toe to improve bank stability and combat continued scouring.

Wetland (Station 139150-138610) and planting site
Approximate wetland boundary delineated by NWI

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).

Sediment transport in this unit was strongly influenced by valley morphology. Evidenced by lack of significant aggradation or erosion, this unit appeared to be conveying its sediment load effectively. For the majority of this management unit, the stream channel was well connected to its floodplain and there were no major sediment sources in the unit.

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 floodplains, especially within the first 50 to 100 ft. 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. Three suitable riparian improvement planting sites were documented within this management unit.

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. In total, ten Japanese knotweed occurrences along an estimated length 243ft were documented in this management unit during the stream feature inventory conducted during the summer of 2006. Japanese knotweed locations were documented as part of the stream feature inventory conducted during the summer of 2006 (Riparian Vegetation Mapping, Appendix B).

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 (83 %) followed by herbaceous (12 %). *Impervious* area (0.15 %) within this unit's buffer was comprised primarily of the local roadways, along with 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 were 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. 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 along much of the right streambank, however, it could be improved at the very top and bottom of the unit. At these locations, the riparian buffer on the left streambank was lacking and should be enhanced with additional tree plantings. 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. There were several fairly deep pools noted in this management unit, including a large pool underneath the Bunny Lane bridge.

There were four fish habitat structures 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 increase the level 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 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.

Habitat structure

Water Quality

Clay/silt exposures and sediment from stream bank and channel erosion pose a potential threat to water quality in Schoharie Creek. Fine sediment inputs into a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. There were three 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 is another potential source of water pollution. Leaking septic systems can contaminate water 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.