Schoharie Creek Management Unit 2

Town of Hunter – Dale Lane (Station 151439) to Bunny Lane (Station 148641)

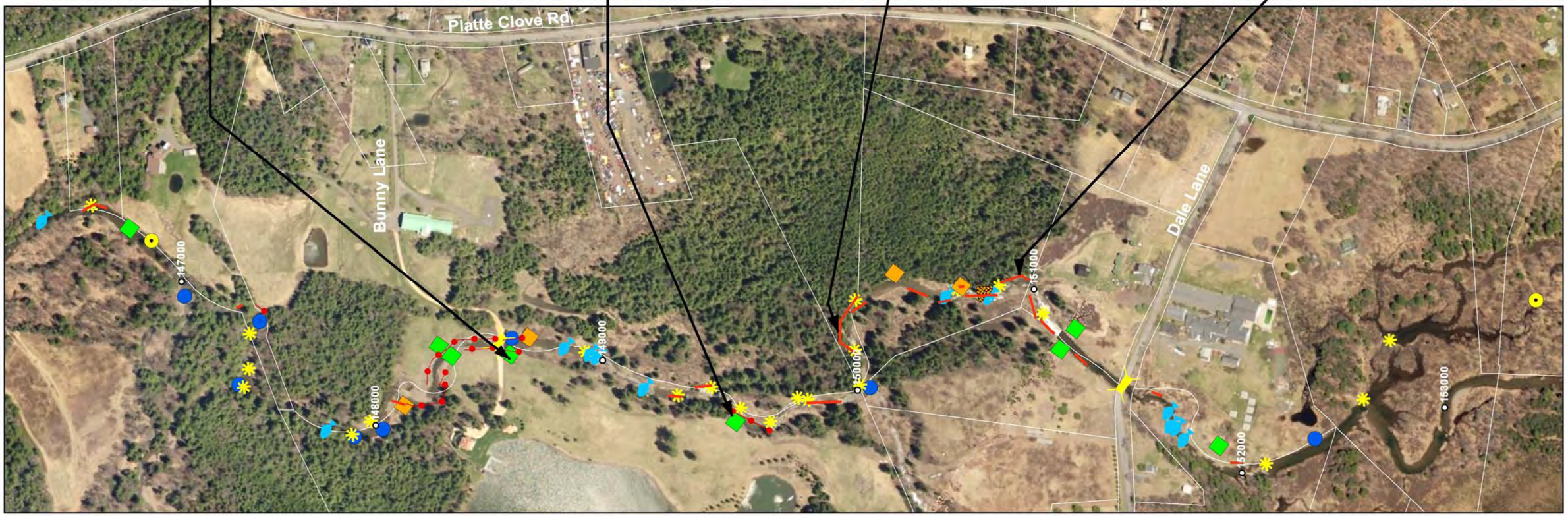
This management unit begins at Dale Lane, continuing approximately 2,798 ft. to Bunny Lane in the Town of Hunter.

Stream Feature Statistics

19.5% of streambanks experiencing erosion
5.6% of streambanks have been stabilized
0% of streambanks have been bermed
60 feet of clay exposures
11 acres of inadequate vegetation
270 feet of road within 300ft. of stream

Management Unit 2 location
see Figure 4.0.1 for more detailed map

Summary of Recommendations Management Unit 2	
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	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



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 2
Stream Feature Inventory

N E S W

Scale = 1:4000

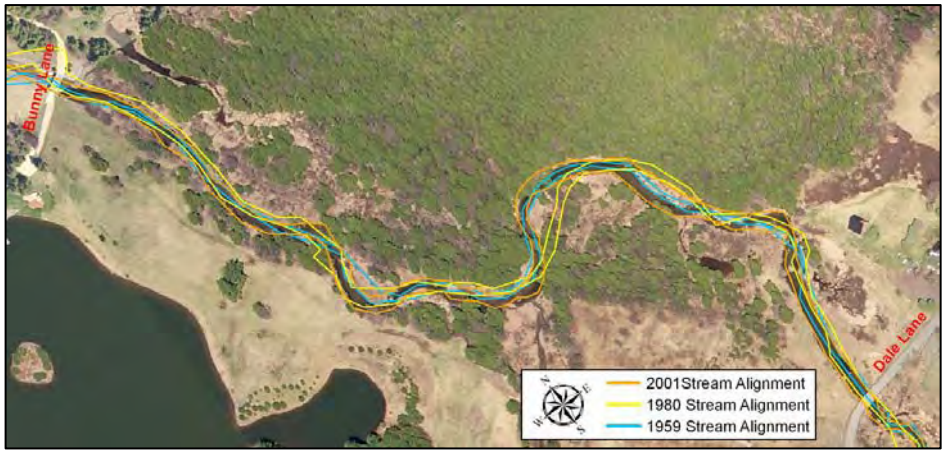
0 250 500 1,000 Feet

Stream flow

Figure 4.2.1 Management Unit 2 - 2006 aerial photography with stream feature inventory

Historic Conditions

As seen from the historical stream alignments (below), the *planform* of the channel has remained fairly stable since 1959. 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 has been one stream disturbance permit issued in this management unit. In 2004 a permit was issued to place heavy stone rip-rap on both streambanks of the Schoharie Creek, upstream of the Bunny Lane bridge, to control streambank erosion.

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

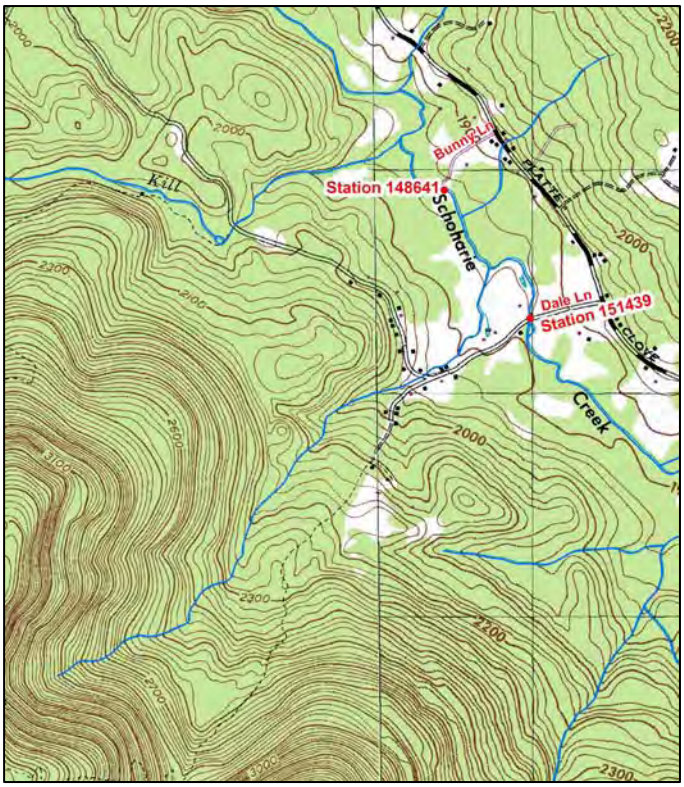
The 2006 stream feature inventory revealed that 19.5% (1093 ft.) of the streambanks exhibited signs of active erosion along the 5,597 ft. of total channel length in the unit (Fig. 4.2.1). The total surface area of active erosion totaled approximately 6,456 ft^2. *Revetment*

has been installed on 5.6% (315 ft.) of the streambanks. No berms were identified in this management unit at the time of the stream feature inventory.

Stream Channel Conditions (2006)

The following description of stream channel conditions references insets in foldout, Figure 4.2.1. 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 #2 begins at Dale Lane. The drainage area ranges from 4.84 mi^2 at the top of the management unit to 6.42 mi^2 at the bottom of the unit. The valley slope is 0.62%.



1980 USGS topographic map – Kaaterskill Quadrangle contour interval 20ft

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. There were two significant erosional areas but the majority of the documented eroding streambanks were small and less severe. Management efforts in this unit should focus on preservation of existing wetlands and forested areas and improvements to the riparian buffer by planting *herbaceous* areas with native trees and shrubs.

This management unit begins as the stream passes 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.

The upstream half of this management unit was dominated by a large wetland (Station 151439-149400). 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 wetland is approximately 17 acres in size, including some areas of open water (see Section 2.6 for detailed wetland type descriptions). There were four beaver dams within this wetland area.

Wetland located at beginning of MU (Station 151439-149400)
Approximate wetland boundary delineated by NYSDEC

Bank erosion and beaver dam at Station 151100 looking upstream

The stream channel was well defined throughout this wetland. The first 400ft of stream in this management unit was fairly straight with three minor erosion occurrences located on the left streambank totaling 1,045 ft^2 in eroded area (Station 151100). To prevent future erosion, vegetation plantings are recommended for these streambanks, including vegetative protection of the toe. Reshaping these streambanks by grading may be necessary prior to planting.

As the stream *meandered* downstream, 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 (Station 150970, Inset D). The streambank was being undermined by toe erosion, resulting in an erosion area of approximately 884 ft^2. Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. 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 erosion site is a good candidate for remediation using vegetative toe and bank protection, but may self recover with time.

Further downstream, along the right bank, the stream undercut the bank exposing a 90ft^2 area of glacial lake silt/clay (Station 150740). 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*. Immediately downstream was a second 20ft^2 glacial lake silt/clay exposure (Station 150500).

Clay exposure at Station 150740

On the right streambank of the next meander bend was the largest erosion area in this management unit (Station 150365, Inset C). The *shear stress*, or the force of the flowing water, has eroded the toe of this bank during high flow events. Erosion of the streambank has led to overhanging and leaning trees, which may now provide some toe protection. The left floodplain showed evidence of inundation during flood events and historical channel *avulsions*.

Downstream a sizable unnamed *tributary* enters from the left streambank (Station 150035). This tributary drains the slopes of Sugarloaf and Twin Mountains before it reaches the flatter topography of the valley floor where it enters the Schoharie Creek. As a result of this stream slope change, the tributary loses its ability to transport sediment gathered from the mountain slopes, and began 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(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.

Tributary at Station 150035 - looking upstream

Japanese knotweed on rip-rap at Station 149530

As the land use on the left streambank changed from forested to residential, the buffer thinned and rip-rap was installed to protect the bank (Station 149530, Inset B). This old rip-rap was approximately 184ft in length, and while only in fair condition still provided some protection of the streambank toe. Japanese knotweed (*Fallopia japonica*) has colonized the disturbed area above the rip-rap. This was the first occurrence of Japanese knotweed on the Schoharie Creek mainstem. Knotweed is an invasive non-native species.

Removal of Japanese knotweed is recommended at this site because it does not provide adequate erosion protection due to its very shallow rooting system, and it grows rapidly to crowd out more beneficial streamside vegetation (See Section 2.7 Riparian Vegetation). It is also recommended to interplant native shrub and sedge species through the rip-rap and along the toe of this streambank. This planting will help to strengthen the revetment, while enhancing aquatic habitat.

The riparian buffer beyond the rip-rap installation was sparse, with some mature trees and mown grass to the edge of the bank. The risk to bank stability can be minimized by maintaining mature trees along the critical 100 foot buffer zone. The 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 buffer functionality, such as filtering nutrients and pollutants, if present, from the adjacent lawn. This restored forested buffer should be extended downstream to Bunny Lane.

The next stream reach meandered gently with two minor eroding stream banks and several areas at which woody debris has accumulated. Woody debris is critical to in-stream aquatic habitat, but in some instances such as this, may exacerbate erosion. These banks are likely to revegetate and stabilize over time. 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. There were also remnants of four fish habitat structures, of which two were fairly functional.

The stream channel widened as it approached the bridge at Bunny Lane. On the right streambank and bed there was a 100 ft^2 area of exposed clay (Station 148740). This clay exposure was composed of a mixture of both *lacustrine* clay beds and glacial till deposits with a high clay component.

Clay exposure at Station 148740

Downstream from this exposure, rip-rap covered both streambanks to the bridge (Inset A). This rip-rap, installed in 2004, was in good structural and functional condition. Interplanting of the rip-rap, by inserting native shrub plantings into the soil between the rocks, would strengthen and increase its longevity. These plantings would also improve the aquatic habitat by providing shade, resulting in cooler water temperatures. To provide protection against toe erosion, sedges or willows could be planted along the toe of the stream bank. The riparian areas at the top of both banks were mowed. Native trees and shrubs should be planted in this upland area. Increasing the stream buffer width will improve streambank stability and buffer functionality.

Through the middle of the right bank rip-rap, a small unnamed tributary entered the Schoharie Creek (Station 148690). Originating across Platte Clove Road, this stream drains the lower slopes of Roundtop Mountain. As the stream crossed under the road, the slope flattened and the stream passed through a large forested wetland before entering the Schoharie Creek in a small, slightly entrenched channel. This tributary is classified as C by the NYS DEC, indicating that the best uses for this stream are supporting fisheries and other non-contact activities (NYSDEC, 1994).

Tributary at Station 148690 - looking upstream

Bridge at Bunny Lane

At the downstream end of this management unit the stream passed under the private bridge at Bunny Lane. This bridge may constrict the floodplain at very high flows, but passes most flows effectively. The bridge had concrete wing walls and rip-rap to protect the abutments from scour.

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 is strongly influenced by valley morphology. Evidenced by lack of significant aggradation or erosion, this unit appeared to be conveying its sediment load effectively. 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 binds 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. The first appearance of Japanese knotweed on the Schoharie Creek mainstem occurred in the middle of this management unit. In total, three Japanese knotweed occurrences along an estimated length of 46ft were documented in this management unit during the stream feature inventory. 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 (51%) followed by herbaceous (30%). *Impervious* area (1%) 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. In 2006, existing structures in this unit appeared to be situated out of the estimated 100-year floodplain. The 100-year floodplain is the 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 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. 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 six 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 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 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 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, nine 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.