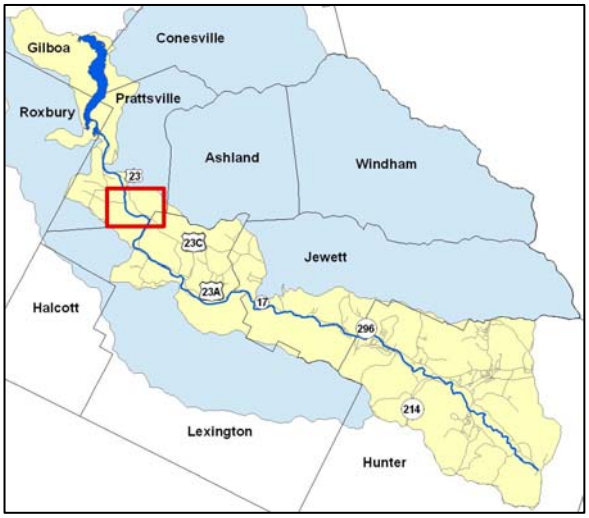
Schoharie Creek Management Unit 16

Town of Prattsville – Station 31388 to County Route 23 (Station 19376)

This management unit began at Station 31388 and continued approximately 12,013 ft to the Batavia Kill confluence (Station 19376) in the Town of Prattsville.

Stream Feature Statistics

16.5% of streambanks experiencing erosion
16.9% of streambanks have been stabilized
0% of streambanks have been bermed
1,669 feet of clay exposures
72 acres of inadequate vegetation
2,961 feet of road within 300ft of stream
14 structures located in 100-year floodplain



Management Unit 16 location
see Figure 4.0.1 for more detailed map

Summary of Recommendations Management Unit 16	
Intervention Level	Passive, Assisted Self-Recovery
Stream Morphology	No recommendations at this time
Riparian Vegetation	Plantings for assisted self-recovery of eroding banks at Stations 30600 & 20750, enhancement of riparian buffer at Station 22900, 20750, & 20300, and interplanting of rip-rap at Stations 29750, 29500 & 27700.
Infrastructure	No recommendations at this time
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	No recommendations at this time
Water Quality	Removal of dump site at Station 21850.
Further Assessment	Resurvey of bank erosion monitoring site at Stations 27840, 25340, 22350 & 19770 to assess erosion rate.

Legend

- Bank Erosion
- h Bank Erosion Monitoring Site (BEMS)
- Berm
- à Bridge
- Bedrock
- F Crossing
- # Culvert
-) Dam
- 3 Deposition
- W Dump Site
-) Clay Exposure
- Clay Exposure
- $ Gage
- k Obstruction
-) Planting Site
- ! Piped Outfall
- Revetment
- 1000ft Stream Stationing
- Tax Parcel
- (Tributary
- Utility
- ! Water Intake

Schoharie Creek
Management Unit 16
Stream Feature Inventory

Scale = 1:8000

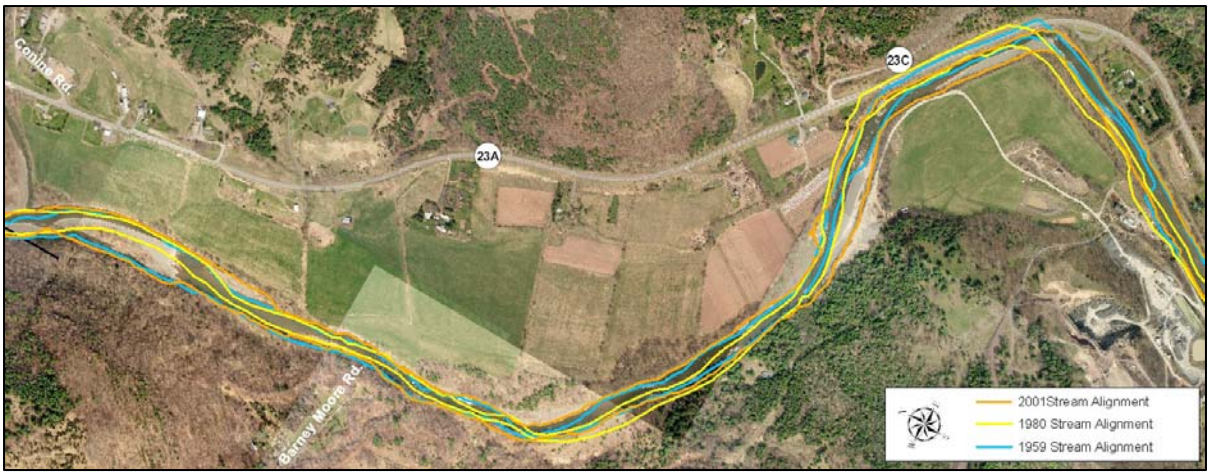
0 500 1,000 1,500 Feet

Stream flow

Figure 4.16.1 Management Unit 16 - 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.



Historic stream channel alignments overlayed with 2006 aerial photograph

As of 2006, according to available NYSDEC records dating back to 1996, there had been two stream disturbance permits issued in this management unit. Following the 1996 flood, two permits were issued to private landowners; one for excavation of sand and gravel along 500 ft of stream to restore stream flows to pre-flood channels, and the other for installation or repair of rock rip-rap and excavation of 10,000 yd^3 of rock and gravel from the stream channel to be used on the toe of an eroding bank.

Stream Channel and Floodplain Current Conditions (2006)

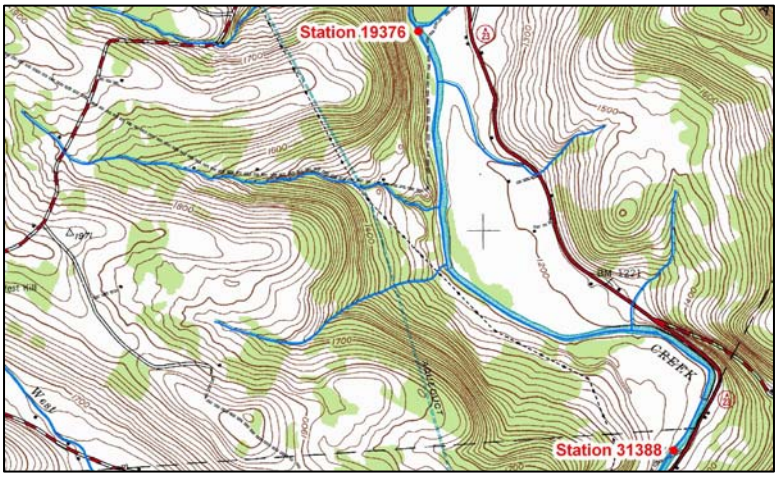
Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 16.5% (3,962 ft) of the streambanks exhibited signs of active erosion along the 24,025 ft of total channel length in the unit (Figure 4.16.1). The total surface area of active erosion totaled approximately 76,453 ft^2. *Revetment* had been installed on 16.9% (4,064 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 4.16.1. 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 #16 began at Station 31388. The drainage area ranged from 147.86 mi^2 at the top of the management unit to 153.52 mi^2 at the bottom of the unit. The valley slope was 0.51%.

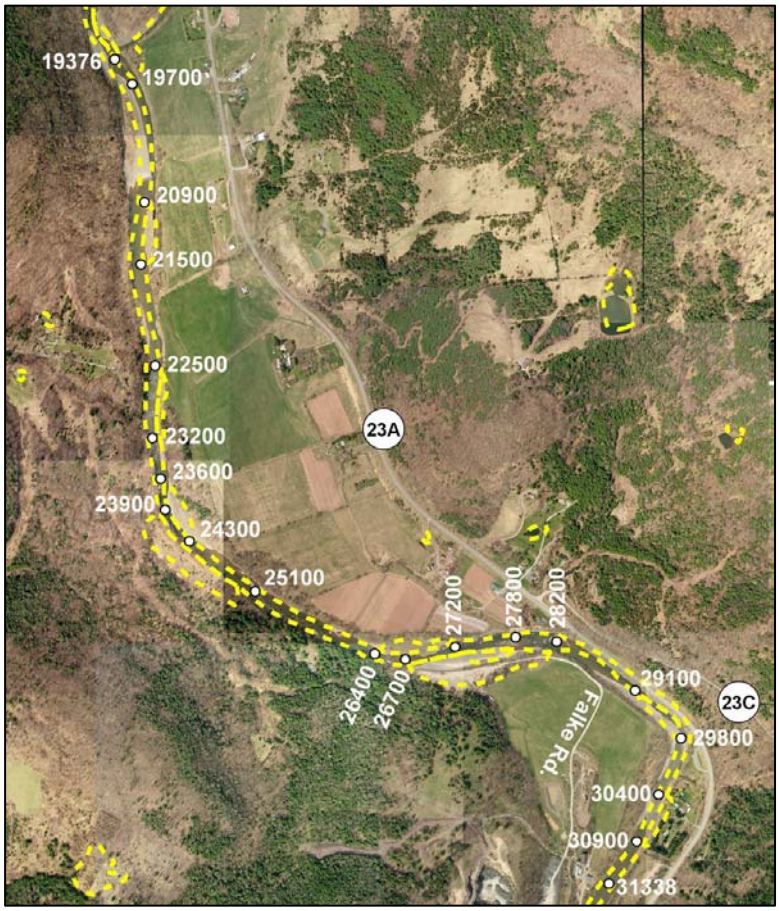


1980 USGS topographic map - Prattsville Quadrangle contour interval 20ft

Valley *morphology* of this management unit was unconfined with a broad glacial and *alluvial* valley flat along the right streambank, and confined by the valley wall on the left streambank. Generally, stream conditions in this management unit were unstable, with a high percentage of streambank either eroded or hardened with revetment. Many erosion sites may be addressed with vegetative treatments and bioengineered bank stabilization. Management efforts in this unit should focus on addressing bank erosion at recommended sites and enhancement of the riparian buffer.

Eleven wetlands were located within this management unit. Three wetlands, including the entire stream channel within this unit, were classified as riverine lower perennial wetlands signifying they were contained in the natural channel and characterized by a low gradient and slow water velocity (R2UBH, 30.1 ac Station 31388-19376) (R2USC, 0.9 ac, Station 30900-30400) (R2USC, 1.1 ac, Station 29800-29100). The remaining wetlands were all classified as palustrine wetlands; two were forested (PFO1C, 5.9 ac,

Station 28200-26700) (PFO1A, 0.9 ac, Station 19700-19400), four had shrub-scrub vegetation (PSS1E, 1.4 ac, Station 27200-26400) (PSS1C, 1.5 ac, Station 24300-23600) (PSS1C, 0.9 ac, Station 23200-22500) (PSS1C, 1.3 ac, Station 21500-20900), and two were dominated by emergent vegetation (PEM1E, 0.9 ac, Station 27800-27200) (PEM1E, 5.0 ac, Station 25100-23900). 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 (see Section 2.6 for detailed wetland type descriptions).



Wetlands (Station 31388-19376)
approximate wetland boundary delineated by NWI

Bank erosion at Station 30600

At the upstream end of this management unit 200 ft of the right streambank had eroded a residential property (Station 30600). To increase bank stability, native shrubs and sedges should be planted along the streambank and toe. On the opposite bank 245 ft (Station 30260) had scoured during high flow events. 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.

Rip-rap at Station 29750

As the stream flowed directly into the County Route 23A embankment, rip-rap had been installed along 2,498 ft of the right streambank (Station 29750) and 1,339 ft along the left streambank (Station 29500). 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. Interplanting of this rip-rap, by inserting native tree and shrub plantings into the soil between the rocks, would increase its strength and increase its longevity. These plantings would also improve the aquatic habitat by providing shade, resulting in cooler water temperatures.

Downstream along this meander bend the *thalweg*, or deepest part of the stream channel, flowed up against the right streambank causing significant bank erosion (Station 28100). Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. The home at the top of this bank could be threatened in the future if this bank continues to erode. Rip-rap had been installed along the toe of the bank.

Bank erosion at Station 28100

At the downstream end of this erosion, an unnamed tributary entered the Schoharie Creek from the right streambank (Inset D, Station 27950). The tributary was entrenched into the streambank and is likely exacerbating the erosion. This tributary drained Bald Mountain on the opposite side County Route 23A, before passing under the road and joining 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, indicating that the best uses for this stream were the support of fisheries and other non-contact activities.

Bank erosion at Station 27950

Downstream of the tributary, the erosion continued for an additional 477 ft, leaving a 8,265 ft^2 area of streambank unvegetated and exposing a large amount of bare soil (Station 27950). A bank erosion monitoring site (BEMS) was installed along this bank to study this erosion (Station 27840). A cross-section and long profile survey were conducted to collect baseline *morphology* data. In the future this cross-section can be resurveyed to calculate the bank's erosion rate. If the erosion rate accelerates significantly, full restoration to address property loss of the adjacent agricultural fields should be considered for this site. This would possibly involve establishment of a well-vegetated bench at the bank toe with rock vanes to direct stream flows away from the bank, regrading and then revegetation of the bank face, and establishment of channel geometry throughout the unit to more effectively convey the *sediment load*.

As the stream meandered downstream, the shear stress, or force of flowing water was transferred to the left streambank. Rip-rap had been installed along 1,081 ft of the top the streambank (Inset C, Station 27700). Interplanting of this rip-rap with native tree and shrub plantings is recommended.

Just downstream, a 37,263 ft^2 area of eroding streambank had exposed a significant glacial lake silt/clay deposit throughout the entire bank (Station 26260). Fine sediment inputs from eroding banks can be a water quality concern because they increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. Another bank erosion monitoring site (BEMS) was installed near the downstream end of this erosion (Station 25340). If the erosion rate accelerates significantly, full restoration to address water quality threats from clay exposures should be considered.

Bank erosion at Station 26260

On the left streambank an unnamed tributary entered the Schoharie Creek (Station 23930). This tributary drained Roundtop Mountain, before it reached the flatter topography of the valley floor where it entered the Schoharie Creek. As a result of this stream slope change, the tributary lost 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. This tributary was classified C by the NYSDEC (NYSDEC, 1994). Possibly due to the increase in runoff and sediment load from the tributary, a 178 ft long *lacustrine* clay deposit had been exposed along the left bank immediately downstream (Station 23800).

Tributary at Station 23930 - looking upstream

Downstream another unnamed tributary, which also drained Roundtop Mountain, entered the Schoharie Creek from the left streambank (Station 23000). A large amount of sediment was noted at the confluence. This tributary was classified C by the NYSDEC

(NYSDEC, 1994). On the opposite streambank toe scour, likely exacerbated by the increased runoff and sediment load from the tributary, had exposed a 21 ft long *lacustrine* clay deposit (Station 23000).

Proceeding downstream, the land use on the right streambank changed from forested to agricultural with fields to the edge of the stream (Station 22900). A riparian buffer of native trees and shrubs should be planted along this streambank and corridor. Buffer width should be increased by the greatest amount agreeable to the landowner, but increasing the buffer width by at least 100 feet will increase the buffer functionality, such as filtering nutrients and pollutants, if any, from the agricultural fields. Buffer enhancement would also increase bank stability and improve aquatic habitat by providing shade, resulting in cooler water temperatures.

Planting site at Station 22900

Bank erosion at Station 22800

The hillslope along left streambank had been undermined by toe erosion, resulting in 8,207 ft^2 bank failure along 205 ft of the bank (Station 22800). Many mature trees had been lost from the bank. However, this site may stabilize on its own over time. It appeared a low bench may have begun to develop at the toe of the eroding bank which may act to reduce flood water velocities near the bank.

Downstream, 386 ft along agricultural fields on the right streambank had eroded. This resulted in a nearly vertical unvegetated streambank and exposed clay deposits at the bank toe (Inset B, Station 22450). A bank erosion monitoring site (BEMS) was installed near middle of this erosion (Station 22350). If the erosion rate accelerates significantly, full

restoration to address water quality threats from clay exposures and property loss should be considered for this site. Following bank stabilization, planting of a high quality riparian buffer would be essential to achieving long-term bank stability.

A dump site including some old farm machinery and metal debris was documented along the right streambank (Station 21850). The dump should be removed to prevent introduction of this material, and any possible pollutants, into the stream.

As the stream channel began to widen, aggradation in the stream channel increased. Once again the agricultural field along the right streambank had eroded (Station 20750). The stability of this streambank might be improved with plantings of willow *fascines* and sedges along the toe of the bank coupled with trees and shrubs along the bank and upland area.

On the right streambank, erosion continued for an additional 741 ft, exposing clay deposits along 75 ft of the bed and bank (Station 20300). A bank erosion monitoring site (BEMS) was installed near the downstream end of this erosion (Station 19770). If the erosion rate accelerates significantly, full restoration to address water quality threats from clay exposures and property loss should be considered for this site. Streambank and buffer plantings are also recommended to slow erosion at this site. This management unit came to an end just upstream of the confluence with Batavia Kill.

Bank erosion at Station 20300

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).

This management unit was characterized by an overwide and shallow stream channel with generally aggrading conditions. Tributaries and eroding banks within the unit appeared to contribute a significant amount of sediment.

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 while 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.

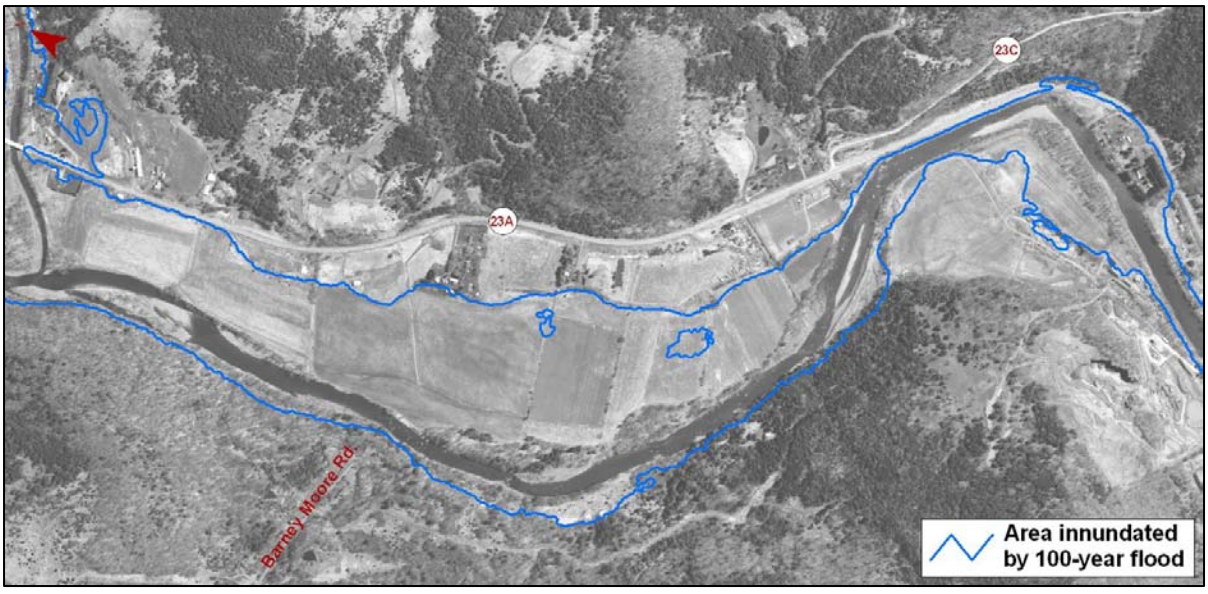
Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (*Fallopia japonica*), for example, has become a widespread problem in recent years. Knotweed shades out other species with its dense canopy structure (many large, 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 results can include rapid streambank erosion and increased surface runoff leading to a loss of valuable topsoil. In total, 37 Japanese knotweed occurrences along an estimated length of 930 ft were documented in this management unit. 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 (50%), followed by herbaceous (34%). 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. *Impervious* area (3%) within this unit's buffer was primarily the local roadways, private residences and associated driveways.

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 NYSDEC 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 are currently under review. Finalization and adoption is expected by the end of 2007.

According to the current floodplain maps (below), fourteen existing structures in this management unit appeared to be situated within the estimated 100-year floodplain. The 100-



100-year floodplain boundary map

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 fair throughout this management unit. Canopy cover was inadequate along some streambanks and could be enhanced with plantings in the riparian zone. There were minimal amounts of woody debris within the stream channel. Woody debris provides critical habitat for fish and insects, and adds essential organic matter that benefits organisms downstream. Within this management unit, over wide, aggradational conditions could lead to potential thermal impairment and filling of pools.

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.

Water Quality

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 to a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. There were eight 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. There were three 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. Homeowners with septic systems

should inspect their 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, four 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.