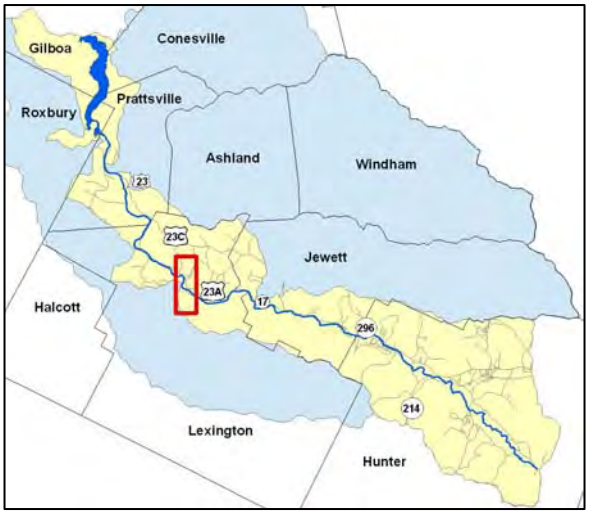
Schoharie Creek Management Unit 12

Town of Lexington – County Route 42 Bridge (Station 55350) to Station 48154

This management unit began at the County Route 42 Bridge (Station 55350), and continued approximately 7,196 ft to Station 48154 in the Town of Lexington.



Management Unit 12 location
see Figure 4.0.1 for more detailed map

Stream Feature Statistics

13.1% of streambanks experiencing erosion
22.3% of streambanks have been stabilized
0% of streambanks have been bermed
0 feet of clay exposures
43 acres of inadequate vegetation
7,203 feet of road within 300ft of stream
23 structures located in 100-year floodplain

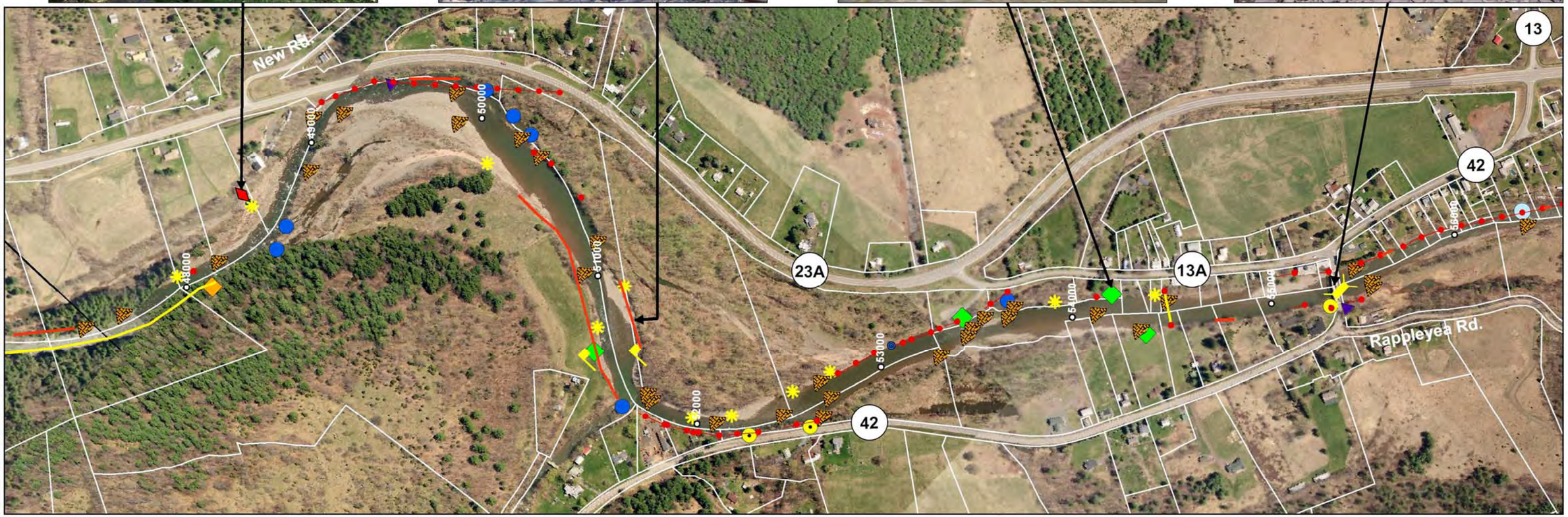
Summary of Recommendations Management Unit 12	
Intervention Level	Passive, Assisted Self-Recovery, Full Restoration
Stream Morphology	No recommendations at this time.
Riparian Vegetation	Plantings for assisted self-recovery of eroding banks at 51400 & 51600, enhancement of riparian buffer at Station 53500, 54350 & 54200, and interplanting of revetment at Stations 52600-51700.
Infrastructure	No recommendations at this time.
Aquatic Habitat	Watershed Aquatic Habitat Study.
Flood Related Threats	Replacement of County Rt. 13A culvert and installation of floodplain drainage to remediate flooding of roadway and residences.
Water Quality	Removal of dump site at Station 48500.
Further Assessment	Study effects of sill removal or creation of low flow channel in sill at Station 54480. Resurvey of bank erosion monitoring site at Station 51400 to assess erosion rate.

A

B

C

D



Legend

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

Schoharie Creek
Management Unit 12
Stream Feature Inventory

N E W S

Scale = 1:6000

0 250 500 1,000 Feet

Stream flow

Figure 4.12.1 Management Unit 12 - 2006 aerial photography with stream feature inventory

Historic Conditions

As seen from the historical stream alignments (below), the general *planform* of the channel has remained fairly stable since 1959. However, it was apparent the stream channel had widened significantly over the years. As of 2006, according to available NYS DEC records dating back to 1996, there had been no stream disturbance permit issued in this management unit.

Historic stream channel alignments overlayed with 2006 aerial photograph

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 13.1% (1,884 ft) of the streambanks exhibited signs of active erosion along the 14,391 ft of total channel length in the unit (Figure 4.12.1). The total surface area of active erosion totaled approximately 9,794 ft^2. *Revetment* has been installed on 22.3% (3,205 ft) of the streambanks. No *berms* were identified in this management unit at the time of the stream feature inventory.

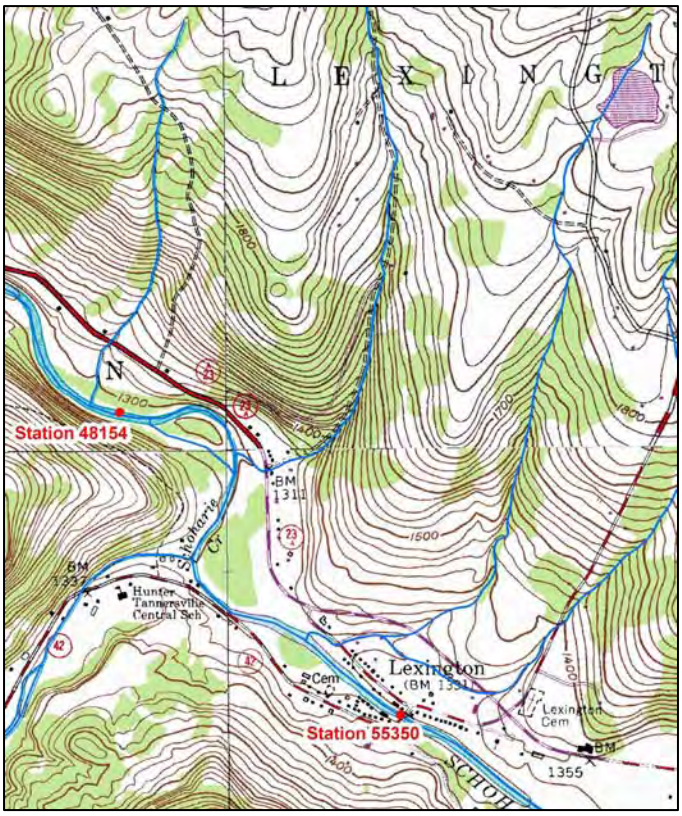
Stream Channel Conditions (2006)

The following description of stream channel conditions references insets in foldout, Figure 4.12.1. 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.

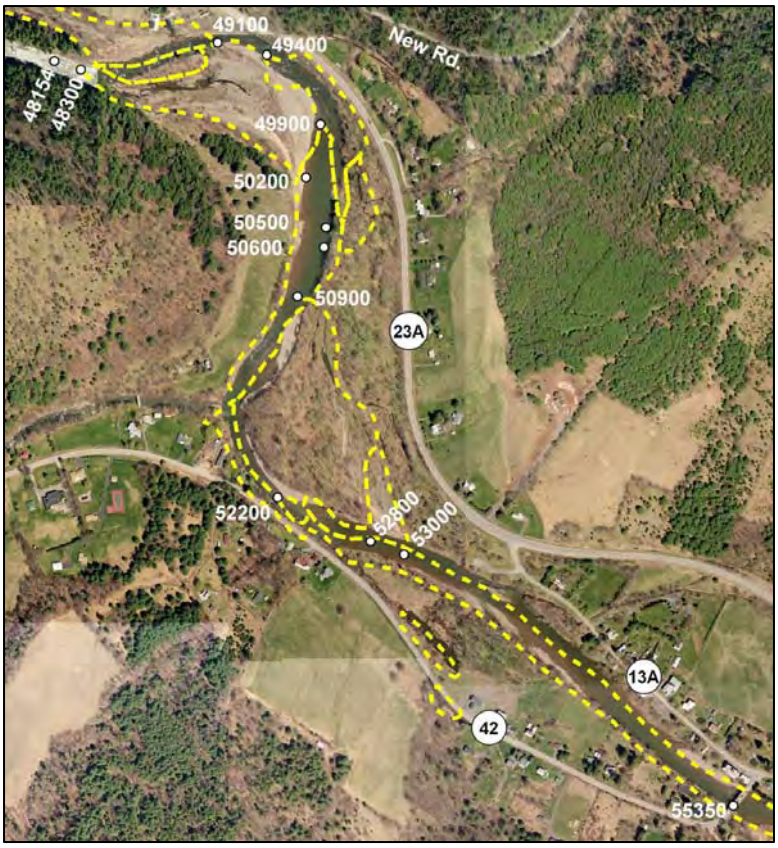
Management unit #12 began at the County Route 42 Bridge. The drainage area ranged from 99.75 mi^2 at the top of the management unit to 134.34 mi^2 at the bottom of the unit. The valley slope was 0.51%.

Valley *morphology* of this management unit was generally unconfined with a broad glacial and *alluvial* valley flat. However, infrastructure encroachment confined the stream channel at several locations. Drainage area increased significantly at the confluence of the West Kill, near the middle of the management unit. Residences along the right streambank and County Route 13A have suffered repetitive flooding due to their location within the 100-year floodplain. Management efforts in this unit should focus on addressing flooding issues along County Route 13A, prevention of future floodplain development, and enhancement of the riparian buffer. Generally, stream conditions in this management unit were unstable, although many of the erosion sites could be addressed with vegetative treatments and bioengineered bank stabilization.



1980 USGS topographic map – Lexington, West Kill & Prattsville Quadrangles - contour interval 20ft

The management unit was covered by eight wetlands. Three of these wetlands were classified as riverine lower perennial, signifying they were contained in the natural channel and characterized by a low gradient and slow water velocity (R2UBH, 15.8 Station 55350-49900) (R2USC, 2.7ac, Station 53000-52200) (R2USA, 8.9ac, Station 50200-48300). Five of the wetlands were classified as palustrine wetlands; three having shrub-scrub vegetation (PSS1A, 14ac, Station 52800-50900) (PSS1A, 3.6ac, Station 50500-49400) (PSS1E, 3.4ac, 49100-48154) and two with forested vegetation (PFO1A, 1.5ac, Station 50600-50200) (PFO1A, 1.4ac, Station 49100-48300). 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 (Stations 55350-48154) approximate wetland boundary delineated by NWI

Combined these wetlands were also designated for protection by New York State. The NYS Department of Environmental Conservation (DEC) classifies wetlands according to 6NYCRR Part 664, Wetlands Mapping and Classification Regulations from Class 1, wetlands which provide the most benefits, to Class IV, wetlands which provide the fewest benefits. Around every NYSDEC regulated wetland there is a regulated adjacent area of 100 ft., which serves as a buffer area for the wetland. This wetland was classified a Class 2 (NYS DEC, 2003).

This management unit started as the stream passed under the bridge at County Route 42 (BIN 1025220) (Station 55350). This bridge may constrict the floodplain at very high flows, as evidenced by aggradation upstream, but appeared to passes most flows effectively. 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 unobstructed water and sediment flow through the bridge opening.

The stream channel downstream from the bridge was over-wide and aggrading (Inset D). This condition was exacerbated by a 6 ft wide concrete sill across the stream channel. In the past, wooden barriers were placed into this sill to pond water for a swimming area. Although this has not occurred in many years the concrete sill remains. Conducting a study of the effect of removing this sill or cutting a low flow channel into the sill is recommended. Creation of a low flow channel may reduce deposition and create aquatic habitat through the development of stream features, which are currently lacking. In-depth survey and design would be necessary to study the upstream and downstream effects of a restoration project.

Concrete sill at Station 54480

Planting site at Station 54350 – left streambank

Downstream, residential properties lined both streambanks. On the left streambank, several properties with homes along County Route 42 had large lawn areas within the 100-year floodplain mown to the stream edge (Station 54350). A buffer of native trees and shrubs should be planted along the 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

slowing the flow of run-off from the floodplain and allowing sediment and its attached pollutants, if any, to settle out before reaching the stream. Along the right streambank the lawn was also mowed to the stream edges and the streambank toe showed signs of scour (Inset C, Station 54200). Native trees and shrubs should be planted on the face of stream bank. To provide protection against toe erosion, willow *fascines* and sedges should be planted along the toe of the stream bank. These planting can be spaced to retain views of the creek.

An unnamed tributary entered the Schoharie Creek from the right streambank (Station 53700). This tributary drained the steep slopes of Patterson Ridge, 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).

Tributary at Station 53700 – looking upstream

Culvert in need of replacement on County Rt. 13A

The tributary passed under County Route 13A through a culvert before entering the Schoharie Creek. During flood events this culvert is unable to pass flows and backwaters, leading to flooding of the roadway and adjacent residential properties. Repeated flooding in this area had resulted in expensive roadway repair work. To protect public and private infrastructure this culvert

should be replaced with a larger realigned culvert able to pass flood flows. The new culvert should also be ecologically friendly with an open bottom to provide passage for biota. Installation of flood plain drainage on the adjacent lawn could provide an outlet for any excess flood waters.

Downstream on the right streambank there was a NYSDEC public fishing access with a parking area at the top of the bank (Station 53500). These access points allow the public to wade and walk along the streambed and banks for the purpose of fishing. Rip-rap had been installed along 72 ft of this embankment.

Planting site at DEC Parking Area – Station 53500

To demonstrate creation of a high quality riparian buffer, native trees, shrubs, and sedges should be planted along this streambank and upland area. Buffer enhancement would not only increase bank stability but would also improve aquatic habitat by providing shade, resulting in cooler water temperatures. An educational kiosk at the DEC parking area could provide a description of the project and the importance of forested streamside buffers. Information explaining other restoration projects that may occur in the area, such as the proposed CR13A culvert replacement, could also be displayed.

Rip-rap had also been installed on the right streambank downstream (Stations 53300 & 53000). Located along this low bank was a flood chute (Station 53100). This flood chute was part of the *floodway*, or the land most severely affected by flooding, and must be able to carry and discharge floodwaters. If this chute were to be cut off, it would reduce the available floodplain and likely increase erosion during high flow events. This area, from the stream extending to County Route 23A, should not be developed due to its location within the 100-year floodplain.

As the stream flowed directly toward County Route 42, rip-rap had been installed on approximately 729 ft of the left streambank (Station 52600-51700). 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 shrub plantings into the soil between the rocks, would strengthen and increase its longevity. These plantings would also improve 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 streambank.

Rip-rap at Station 52120

Downstream, the West Kill entered the Schoharie Creek from the left streambank (Station 51650). The West Kill flows approximately 9.5 miles from its headwaters on West Kill and Hunter Mountains in Spruceton Valley, roughly following County Route 6 and NYS Route 42, to its confluence with the Schoharie Creek. A deep pool had been created at this confluence. The West Kill watershed drains approximately 31.2 mi^2 and is closely surrounded by the steep mountains of the Catskills. As evidenced by the large amount of deposition upstream and downstream of the confluence, the West Kill delivered a significant amount of sediment into the Schoharie Creek. The West Kill was classified as C(ts) by NYSDEC, indicating that the best uses for this stream were the support of fisheries, including trout spawning and other non-contact activities (NYSDEC, 1994).

West Kill confluence at Station 51650
looking upstream

Immediately downstream of this confluence both streambanks had eroded, likely due to the increased drainage area and sediment load from the West Kill. Erosion was documented along 1,171 ft of the left streambank, exposing an estimated area of 6,191 ft^2

(Station 51600). Restoration recommendations for this streambank include creation of a low bench at the toe of the eroding bank which may act to reduce flood water velocities near the bank and grading of the eroding bank to reduce its slope. The reshaped streambank should be planted with native trees, shrubs, and sedges. Installation of a 100 ft buffer along the adjacent stream corridor may also act to filter nutrients and pollutants, if any, from the adjacent fields.

Bank erosion on left streambank at Station 51600

A bank erosion monitoring site (BEMS) was installed along this bank to study this erosion (Station 51400). In 2006, 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.

The right streambank had also eroded along 356 ft of bank exposing an area of 1,782 ft^2 (Inset B, Station 51400). The stability of this streambank could be improved with plantings of willow *fascines* and sedges along the toe of the bank coupled with trees and shrubs along the bank.

At the next meander bend, an unnamed tributary entered the Schoharie Creek from the left streambank (Station 50100). This tributary drains the steep slopes of Patterson Ridge, before it reaches the flatter topography of the valley floor where it enters the Schoharie Creek. This tributary was classified C by the NYSDEC (NYSDEC, 1994).

T-wall at Staiton 49450

As the stream flowed against the County Route 23A embankment revetment had been installed, including 1,308 ft of rip-rap (Station 50100) and 285 ft of concrete T-wall (Station 49450). A large amount of

native vegetation was growing throughout this revetment.

At the downstream end of the management unit, an old dumpsite containing metal debris was observed on the right floodplain (Inset A, Station 48500). Removal of the debris is recommended to avoid its introduction into the stream.

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.

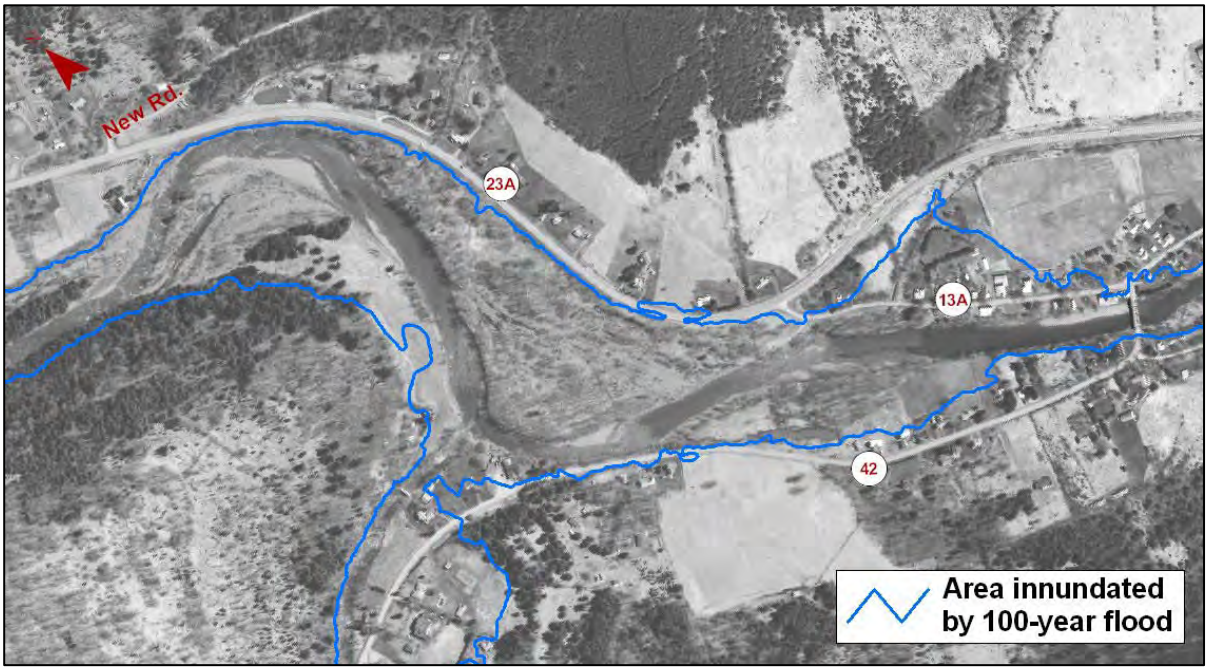
Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (*Fallopia japonica*), for example, has become a widespread problem in recent years. Knotweed shades out other species with its dense canopy structure (many large, 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, 36 Japanese knotweed occurrences along an estimated length of 1,554 ft 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 (35%) followed by herbaceous (35%). 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 (9%) 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 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.

According to the current floodplain maps (below), twenty-three existing structures in this unit appeared to be situated within 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



100-year floodplain boundary map

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. Woody debris observed within the stream channel was observed throughout the unit. Woody debris provides critical habitat for fish and insects, and adds essential organic matter that will benefit organisms downstream. However, over wide, aggradational conditions could lead to potential thermal impairment and filling of pools in some sections.

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 Schoharie Creek. Fine sediment inputs into a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. There were no 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 four 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, sixteen homeowners within the drainage area of this management unit had made use of these programs to replace or repair a septic system.

References

NYSDEC. 2003. Programs to Conserve Wetlands. Available on web: http://www.dec.state.ny.us/website/dfwmr/habitat/fwwprog4.htm.

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.