Schoharie Creek Management Unit 10

Towns of Jewett and Lexington – County Route 17 (Station 70652) to Bush Road Bridge (Station 63446)

This management unit began at County Route 17 (Station 70652), and continued approximately 7,207 ft to the Bush Road Bridge (Station 63446) in the Town of Jewett.

Management Unit 10 location
see Figure 4.0.1 for more detailed map

Stream Feature Statistics

26.5% of streambanks experienced erosion
25% of streambanks have been stabilized
0% of streambanks have been bermed
439 feet of clay exposures
52 acres of inadequate vegetation
9,395 feet of road within 300ft of stream
1 structure located in 100-year floodplain

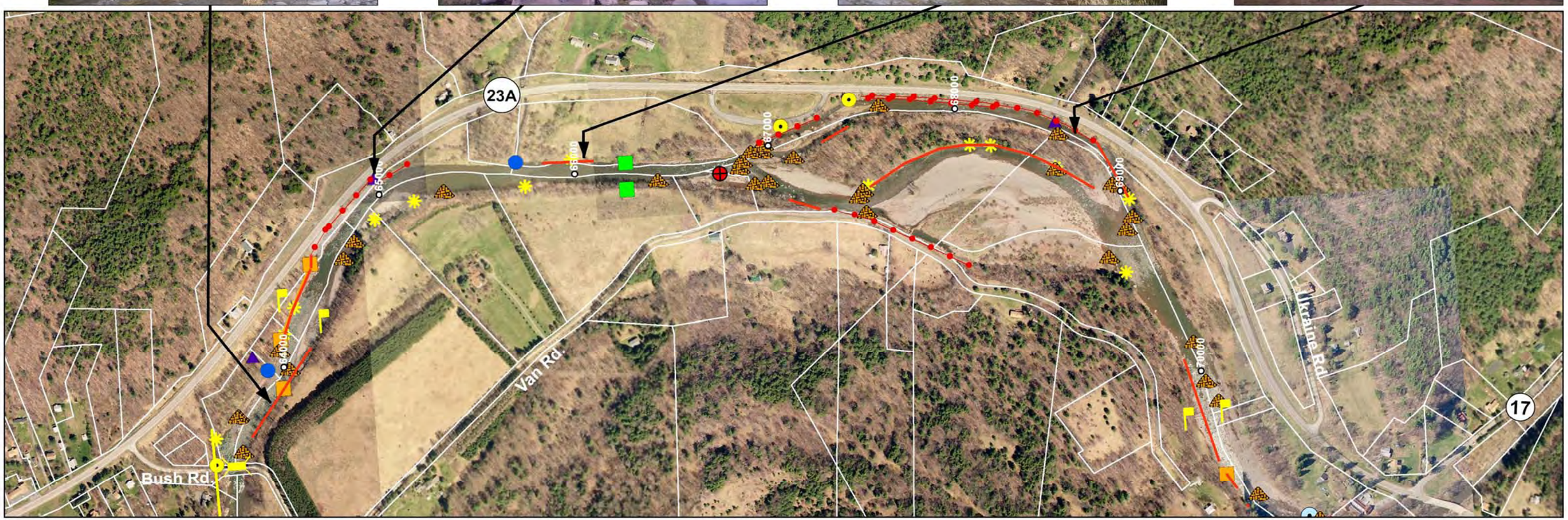
Summary of Recommendations Management Unit 10	
Intervention Level	Passive, Assisted Self-Recovery
Stream Morphology	No recommendations at this time
Riparian Vegetation	Plantings for assisted self-recovery of eroding bank at Station 68700, enhancement of riparian buffer at Station 66250, and interplanting of revetment at Station 68300 & 65200.
Infrastructure	No recommendations at this time
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	No recommendations at this time
Water Quality	No recommendations at this time
Further Assessment	Resurvey of bank erosion monitoring site at Station 70230 and 64315 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 10
Stream Feature Inventory

N W E S

Scale = 1:6000

Feet
0 250 500 1,000

Stream flow

Figure 4.10.1 Management Unit 10 - 2006 aerial photography with stream feature inventory

Historic Conditions

As seen from the historical stream alignments (below), the *planform* of the stream channel at the upstream half of the management unit has changed over the years (Station 69400-66700), but the downstream half has remained fairly stable since 1959.

Historic stream channel alignments overlayed with 2006 aerial photograph

1959 aerial photograph (Station 69400-66700)

The 1959 aerial photograph (above) shows the upstream half of the management unit was historically affected by floods. The mainstem flowed against County Route 23A, however one large flood chute along the agricultural fields can be seen, as well as several smaller flood chutes across the forested area in between. Sometime between 1980 and 2001

another large flood chute was cut directly across the forested area most likely during a large flood event. The mainstem has remained split in two channels as shown on the 2006 aerial photograph. A general widening of the stream channel was also noted. As of 2006, according to available NYS DEC records dating back to 1996, no stream disturbance permits were issued in this management unit.

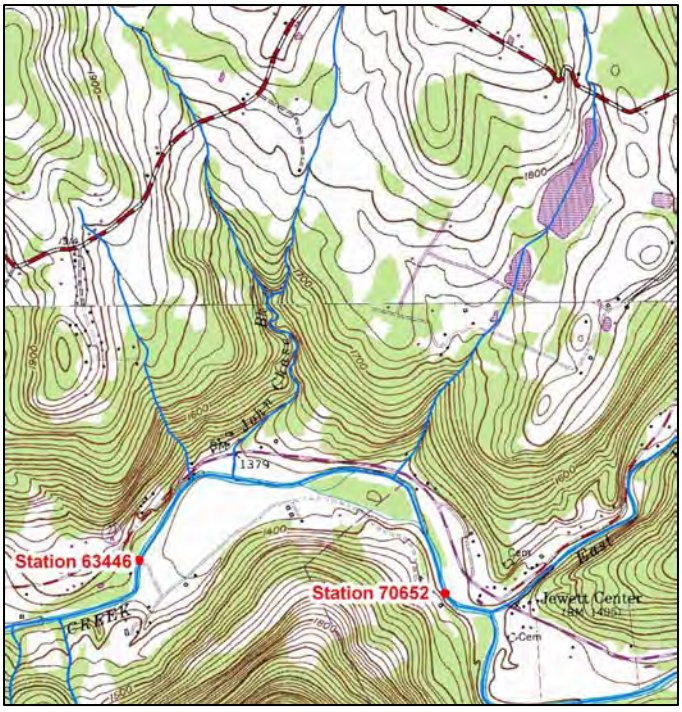
Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 26.5% (3,820 ft) of the streambanks exhibited signs of active erosion along the 14,413 ft of total channel length in the unit (Figure 4.10.1). The total surface area of active erosion totaled approximately 30,731 ft^2. *Revetment* has been installed on 25% (3,602 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 4.10.1. 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.

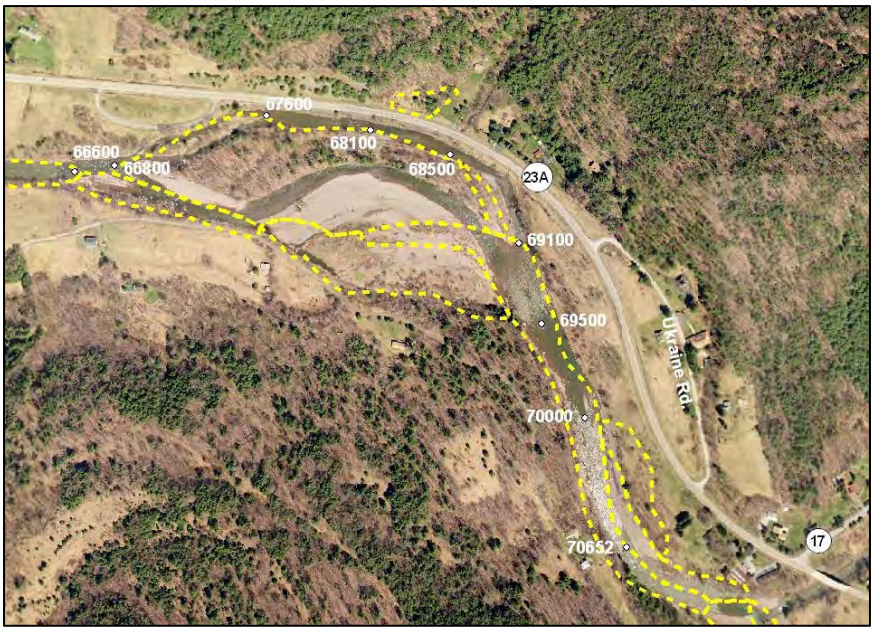


1980 USGS topographic map - Lexington Quadrangle contour interval 20ft

Management unit #10 began at County Route 17. The drainage area ranged from 91.37 mi^2 at the top of the management unit to 96.14 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 the stream channel was confined for much of the stretch by County Route 23A along the right streambank. Generally, stream conditions in this management unit were unstable, although several of the erosion sites could be addressed with vegetative treatments and bioengineered bank stabilization. Management efforts in this unit should focus on enhancement of the riparian buffer and interplanting of rip-rap at recommended locations.

Most of the stream channel within this management unit was designated as a wetland. Five 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, 7.1 ac, Station 70652-68500) (R2USC, 0.9ac, Station 70652-70150) (R2USC, 5.9ac, Station 69500-67600), (R2USC, 0.5ac, Station 69100-68500) (R2USC, 1.9ac, 67600-666000). A 1.9 acre palustrine wetland with a mixture of shrub-scrub and emergent vegetation was located along the right streambank near the upstream end of the management unit (PSS1/EM1A, Station 70652-70000). A 15 acre palustrine wetland with forested vegetation was located on the island between the stream channel divergence (PFO1A, Station 69000-66880). 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 in upstream half of management unit (Stations 70652-66600) approximate wetland boundary delineated by NWI

This management unit began just downstream from the East Kill confluence with the Schoharie Creek. The stream had scoured the toe of the left streambank exposing a 45ft^2 area of clay/silt (Station 70500). Fine sediment inputs can be a water quality concern because they increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens.

Bank erosion at Station 70450

Just downstream, along the outside meander of this bend the *thalweg*, or deepest part of the stream channel, flowed up against the left streambank causing significant bank erosion (Station 70450). Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. Many mature trees had fallen from the top of the bank and a 10,876ft^2 area of streambank had been left unvegetated. This site may stabilize on its own over time. It appeared that a low bench had begun to develop at the toe of the eroding bank which may act to reduce flood water velocities near the bank. As the bank stabilizes native vegetation will reestablish. A bank erosion monitoring site (BEMS) was installed along this bank to study this erosion (Station 70230). 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 and document its potential recovery.

Downstream the valley broadens and the stream channel widens significantly causing widespread *aggradation* (Station 69400). Historically this reach has been unstable with flood chutes cutting through the adjacent lands during floods. Multiple stream threads have developed with erosion or revetment on most streambanks.

The right streambank on the side channel along the Route 23A embankment had suffered erosion along a 2,258ft^2 area. Revetment including 1,209ft of rip-rap and 641ft of T-wall had been installed along the right streambank downstream (Inset A, Station 68700). Although some vegetation had established along this revetment, additional plantings of native trees and shrubs along both the eroding and revetted bank would increase bank stability and improve the aquatic habitat by providing shade, resulting in cooler water temperatures.

Bank erosion at Station 69050

Along this rip-rap, an unnamed tr*ibutary* entered the Schoharie Creek (Station 68500). This tributary drains lands on the opposite side County Route 23A, before passing under the road and joining the Schoharie Creek through a large metal culvert. 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.

Downstream at the right streambank was a NYS DEC public fishing access with a parking area at the top of the bank. 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 335ft of this embankment. Native vegetation had established on this revetment.

Bank erosion at Station 68900

What is currently (2006) the mainstem stream channel was formed sometime between 1980 and 2001, most likely during a large flood event. Approximately 1,229ft of the right streambank of this channel had scoured exposing the roots of the streamside forest. On the opposite streambank there was a large

gravel deposit indicating ineffective sediment transport.

Beginning at Station 90100 there was an active flood chute on the right streambank along Van Road. According to historic aerial photos this flood chute dates back to at least 1959. The 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. Although the upstream half of this chute was dry, the downstream end did contain base flow. At the downstream end of this chute rip-rap had been installed along 763ft of the left streambank protecting the Van Road embankment (Station 68300). 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 and enhance aquatic habitat.

Rip-rap at Station 68300

Bank erosion at Station 67300 - looking upstream

As the flood chute and mainstem stream channel converged, the left streambank had been scoured along the streambank toe. 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. Excessive sediment deposition was observed as the two stream channels reunited into one (Station 66800).

The downstream half of the management unit also contained many wetland areas. Four of these wetlands were classified as riverine lower perennial (R2UBH, 9.3ac, Station 66600-63446) (R2USA, 0.2ac, Station 65250-65000) (R2USC, 0.8ac, Station 64450-64050). A 1.2 acre palustrine wetland with forested vegetation was located on the right streambank (PFO1A, Station 65700-65400).

Wetlands in downstream half of management unit (Stations 66600-63446) approximate wetland boundary delineated by NWI

Downstream the riparian buffer beyond both the streambanks was comprised of a few mature trees with herbaceous fields to the edge of the bank (Station 66250). Buffer width should be increased along these banks by the greatest amount agreeable to the landowners, but increasing the forested buffer width by at least 100 feet would increase buffer functionality, such as filtering nutrients and pollutants, if any, from the adjacent fields. Along the right streambank there was a NYS DEC public fishing access with a parking area at the top of the bank. Approximately 260ft of the right streambank had been undercut by high stream flows (Inset C, Station 66100). Undercut banks have long been appreciated by fisheries managers for their value as cover for fish and aquatic insects.

Planting site at Station 66250 – right streambank

John Chase Brook entered from the right streambank (Station 65700). This tributary drained the slopes of Tower Mountain before it reached the flatter topography of the valley floor where it entered the Schoharie Creek. As a result of this change in stream slope, 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 as C(t) by the NYS DEC, indicating that the best uses for this stream were the support of fisheries, including trout, and other non-contact activities (NYSDEC, 1994).

John Chase Brook confluence at Station 65700

As the stream flowed directly towards the County Route 23A embankment, 500ft of rip-rap had been installed along the right streambank (Station 65200). Interplanting of the existing rip-rap, by inserting plantings into the soil between the rocks may help to strengthen and increase the longevity of this rip-rap. These plantings will also improve the aquatic habitat by providing shade, resulting in cooler water temperatures. Along this rip-rap an unnamed tributary entered the Schoharie Creek through a concrete culvert (Inset B, Station 65000). This tributary's best use classification was rated C by the NYS DEC (NYSDEC, 1994).

Rip-rap at Station 65200

As this rip-rap ended, erosion began (Station 64580). The hillslope was being undermined by toe erosion, resulting in the mass wasting of a 3,479 ft^2 area of the right streambank. This erosion left the face of the stream bank unvegetated. The exposed lodgement till soil had a high silt and clay content, contributing a significant suspended sediment load during rainfall events. In addition to the water quality threat associated with the clay exposed at this erosion site, conditions here also present a future hazard to the County Route 23A embankment which could be threatened if this bank continues to erode.

Bank erosion at Station 64580

A bank erosion monitoring site (BEMS) was installed along this bank to study this erosion (Station 64315). If study of this streambank shows erosion rates accelerating significantly, full restoration to address property loss and water quality threats should be considered. This would likely involve establishment of a well-vegetated bench on the right bank 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 approached the bridge at Bush Road there was significant deposition within the stream channel. The left streambank had suffered some scour during high flow events exposing a 2,723ft^2 area, including some glacial till (Inset A, Station 64100).

Bridge at Bush Road Station 63446

At the downstream end of this management unit the stream passed under the bridge at Bush Road (BIN 32012110). This bridge may constrict the floodplain at very high flows, as evidenced by aggradation at the left bridge abutment, but appeared to pass 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.

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. The sediment storage evident in this unit encouraged lateral adjustments which led to either revetment or bank erosion along a high percentage of the streambanks.

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.

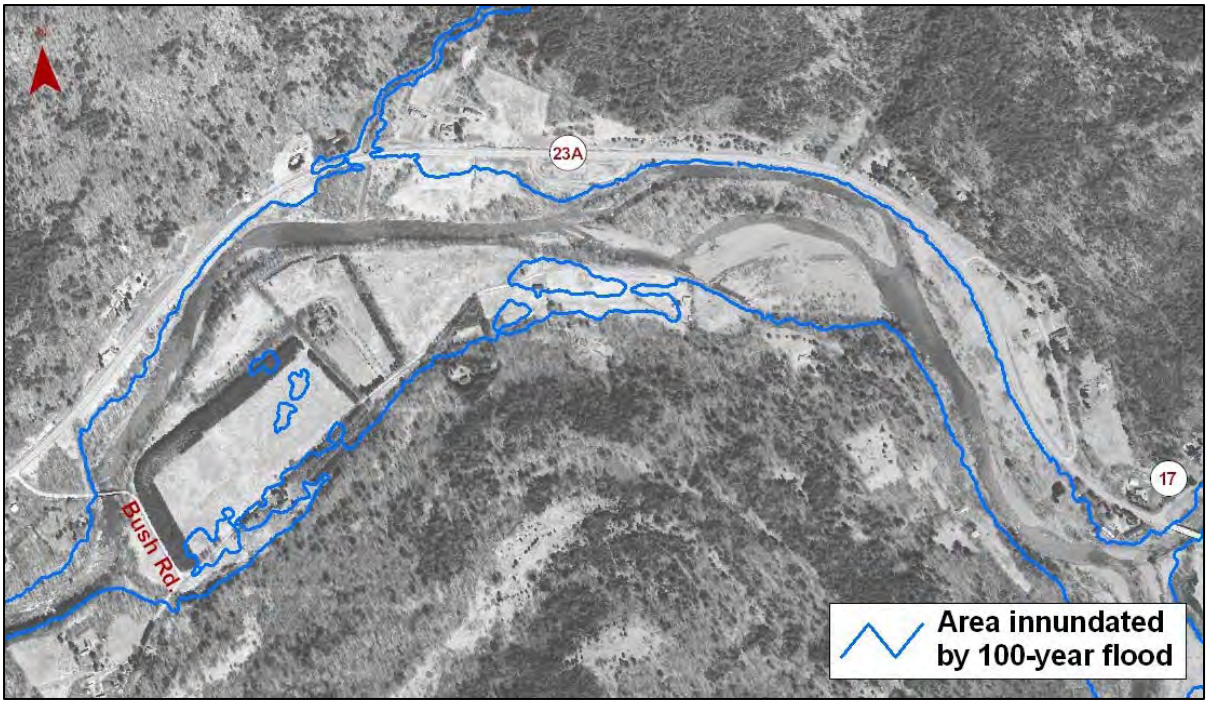
Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (*Fallopia japonica*), for example, has become a widespread problem in recent years. Knotweed shades out other species with its dense canopy structure (many large, 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 result can include rapid streambank erosion and increased surface runoff leading to a loss of valuable topsoil. In total, 38 Japanese knotweed occurrences along an estimated length of 1,127ft 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 (39%) followed by herbaceous (38%). 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 (7%) 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), one existing structure 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 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.



100-year floodplain boundary map

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

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 three 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, eight 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.