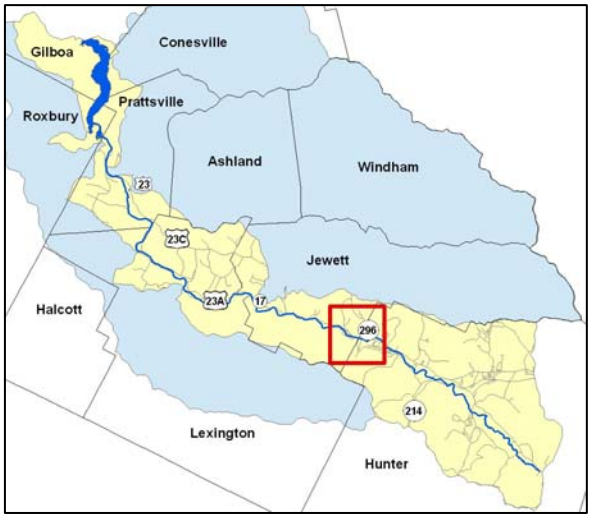
Schoharie Creek Management Unit 7

Towns of Hunter and Jewett – Bridge St.(Station 104521) to Station 91473

This management unit began at Bridge St, in the Town of Hunter, and continued approximately 13,048 ft to a private bride (Station 91473) in the Town of Jewett.

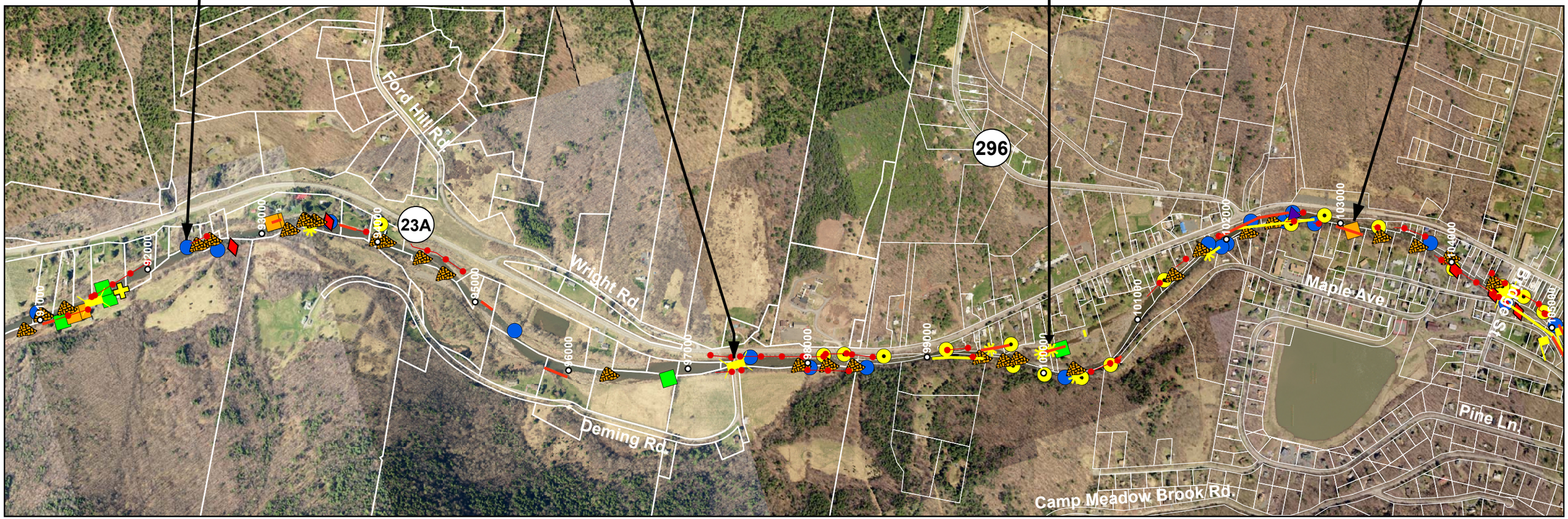
Stream Feature Statistics

7.5% of streambanks experiencing erosion
20.1% of streambanks have been stabilized
0% of streambanks have been bermed
44 feet of clay exposures
82 acres of inadequate vegetation
16,230 feet of road within 300ft of stream
25 structures located in 100-year floodplain



Management Unit 7 location
see Figure 4.0.1 for more detailed map

Summary of Recommendations Management Unit 7	
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 101130 & 99700, and enhancement of riparian buffer at Station 97370.
Infrastructure	No recommendations at this time
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	Installation of flood plain drainage, and/or regrading of the right streambank floodplain area to floodplain elevation, and installation of riparian plantings to address flooding issues at private bridge (Station 91473).
Water Quality	Removal of dump sites at Stations 104440 & 104050.
Further Assessment	Community-Wide Stormwater Infrastructure Assessment & Planning



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 7
Stream Feature Inventory

N W E S

Scale = 1:10000

0 500 1,000 2,000 Feet

Stream flow

Figure 4.7.1 Management Unit 7 - 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 NYS DEC records dating back to 1996, there has been two stream disturbance permits issued in this management unit. Following the 1996 flood, a permit was issued to the Town of Hunter to excavate 800yd^3 of sand and gravel to restore stream flows to the pre-flood channel and installation or repair of 500ft of rock rip-rap or other permanent streambank stabilization measures. The second permit, also issued after the 1996 flood, was to a private landowner for installation or repair of 100ft of rock rip-rap, or other permanent streambank stabilization measures.

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 7.5% (1,958 ft) of the streambanks exhibited signs of active erosion along the 26,096 ft of total channel length in the unit (Figure 4.7.1). The total surface area of active erosion totaled approximately 29,691 ft^2. *Revetment* has been installed on 20.1% (5,247 ft) of the streambanks. No *berms* were identified in this management unit at the time of the stream feature inventory.

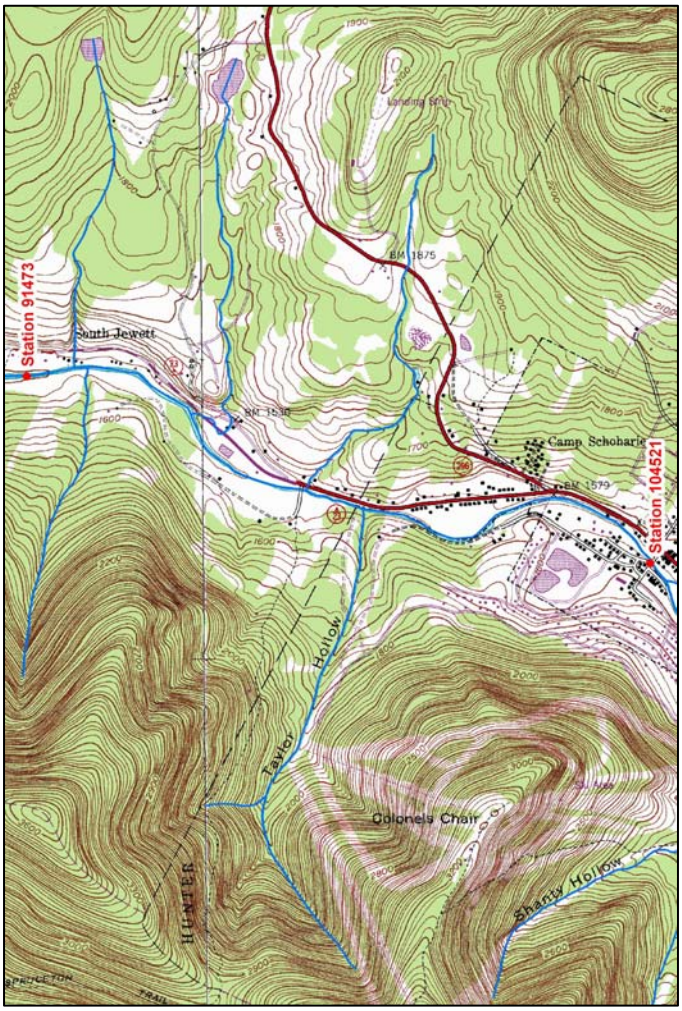
Stream Channel Conditions (2006)

The following description of stream channel conditions references insets in foldout, Figure 4.7.1. 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 #7 began at Bridge Street. The drainage area ranged from 40.22 mi^2 at the top of the management unit to 47.21 mi^2 at the bottom of the unit. The valley slope was 0.61%.

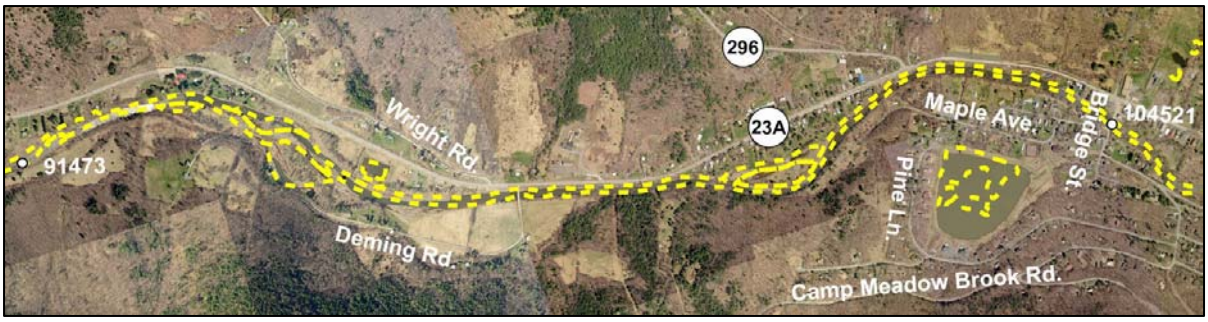
Valley *morphology* of the first 2,700ft of this management unit was confined by infrastructure and residential encroachment, but the majority of the unit, was unconfined with a broad glacial and *alluvial* valley flat. Generally, stream conditions in this management unit were fairly stable, although this unit had a high percentage of armored and eroding banks. Many of the erosion sites could be addressed with vegetative treatments and bioengineered bank stabilization and much of the revetment had been colonized with native vegetation. Management efforts in this unit should focus on enhancing the *riparian* buffer in recommended locations and prevention of further floodplain development.



1980 USGS topographic map - Hunter and Lexington Quadrangles - contour interval 20ft

The entire stream channel within this management unit was designated as a wetland. This wetland was approximately 26 acres in size and classified as riverine lower perennial, signifying it is contained in the natural channel and characterized by a low gradient and slow

water velocity (R2UBH, Station 104521-104521) (see Section 2.6 for detailed wetland type descriptions). 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.



Wetland boundary approximately delineated by NWI (Station 104521-91473)

This management unit began as the stream passed under the county bridge at Bridge Street in the Village of Hunter (BIN# 3201430). This bridge may constrict the floodplain at very high flows, as evidenced by minor deposition upstream, 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.

A large deep pool downstream of the bridge serves as a popular local swimming area. Rip-rap had been installed on 99 feet of the right streambank (Station 104440) and 599 feet of the left streambank (Station 104422). Mature trees and shrubs had grown throughout the rip-rap, increasing its stability and enhancing aquatic habitat. Two dump sites including some old farm machinery were documented along the left streambank (Stations 104440 & 104050). To prevent introduction of his material and any other possible pollutants into the stream, the dumped materials should be removed.

Downstream, the left streambank had suffered some erosion during high flow events but vegetation along this bank had worked to lessen the severity (Inset D, Station 103200).

Scour along the toe had exposed a 24ft^2 area of clay/silt. Fine sediment inputs into a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens.

At Station 102580, there was an NYS permitted discharge point, permitted to Colonel Chair Estates Block 8 (SPDES permit# NY0101001). This permit allowed for the discharge of 0.0300 million gallons per day of treated sanitary wastewater to Schoharie Creek. The State Pollutant Discharge Elimination System (SPDES) program, administered by NYS Department of Environmental Conservation (DEC), governs discharges to surface and ground waters through the issuance of wastewater and stormwater discharge permits. This discharge was eliminated in 2006 and is now treated at the Village of Hunter sewage treatment facility.

As the stream *meandered* downstream, the first significant bank erosion in the management unit was located on the right streambank (Station 102570). Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. The shale bedrock along the bank appeared to have eroded during high flow events while the upper streambank had eroded due to stormwater runoff, threatening County Route 23A at the top of the bank. At the time of the 2006 stream feature inventory, the Village of Hunter was preparing to stabilize this bank and remove the stormwater threats.

Wetland (Station 101100-99600 & 100800-99800) Approximate wetland boundary delineated by NWI

At the next meander bend, stream confinement was reduced allowing some floodplain access. There were two wetlands mapped in this area. Along the right streambank there was a 2.5 acre palustrine wetland with emergent vegetation (PEM1E, Station 101100-99600) and a 3 acre upland wetland on the center bar (U, Station 100800-99800).

At Station 101130 there was a stream divergence on the right streambank which served as a flood chute. 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 was cut off, it would reduce the available floodplain and likely increase erosion of the main channel during high flow events. The main stream channel appeared fairly stable with only a short section of rip-rap along the outside of the meander bend where *shear stress* was greatest (Station 100575).

A road crossing had been built across the flood chute to allow the landowner access to their land. This crossing had a low flow channel cut into it but still obstructed higher stream flows. Immediately downstream the left streambank had eroded exposing an area of 950ft^2. To prevent future loss of land, planting of native trees and shrubs is recommended along the streambank and riparian buffer along with installation of willow *fascines* and sedges along the toe of the bank to provide protection against toe erosion.

Eroding bank and planting site at Station 101130

Bank erosion at Station 99700 - looking upstream

Near the downstream end of the flood chute, a piped outfall which drained stormwater from County Route 23A, was located on the right streambank (Station 99700). Stormwater inputs combined with flood chute flows had eroded a large 4561ft^2 area on the right streambank leaving it unvegetated (Station 99700). This erosion site is also a good candidate for *bioengineering* stabilization techniques, which use plantings to bind stream banks.

Downstream the stream channel straightens and becomes confined by the County Route 23A embankment on the right streambank and the streambank on the left. Rip-rap had been installed on much of the road embankment (Station 98500-97400). Along this rip-rap was an NYS permitted discharge point, permitted to the Village of Hunter (SPDES permit# NY0241075). This permit allows for the discharge of 0.3259 million gallons per day of treated sanitary wastewater from the Village treatment plant to the Schoharie Creek. The State Pollutant Discharge Elimination System (SPDES) program, administered by NYS Department of Environmental Conservation (DEC), governs discharges to surface and ground waters through the issuance of wastewater and stormwater discharge permits.

SPDES outfall at Station 98300

On the left streambank, an unnamed *tributary* entered the Schoharie Creek (Station 98500). This tributary drains the slopes of Hunter Mountain, through Taylor Hollow, 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 was classified as C, indicating

Tributary at Station 98500

that the best uses for this stream were the support of fisheries and other non-contact activities.

A 355ft long old stacked rock wall had been built along the left streambank, perhaps intended to protect the adjacent field (Station 98350). Walls such as this located within the floodway tend to raise flood elevations and increase the erosive power of the stream. It is recommended that the stacked rock wall be evaluated for its influence on floodplain connectivity and stream entrenchment, and that removal should be considered where there is significant negative impact.

Just upstream from the Deming Rd. bridge another tributary entered the Schoharie Creek from the right streambank (Station 97500). This tributary begins on the East Jewett Mountain Range before flowing under County Route 23A through a large box culvert and joining the Schoharie Creek. As shown in the photo, this tributary also appeared to be a sediment source. This tributary was classified as C by the NYSDEC.

Tributary at Station 97500 - looking upstream

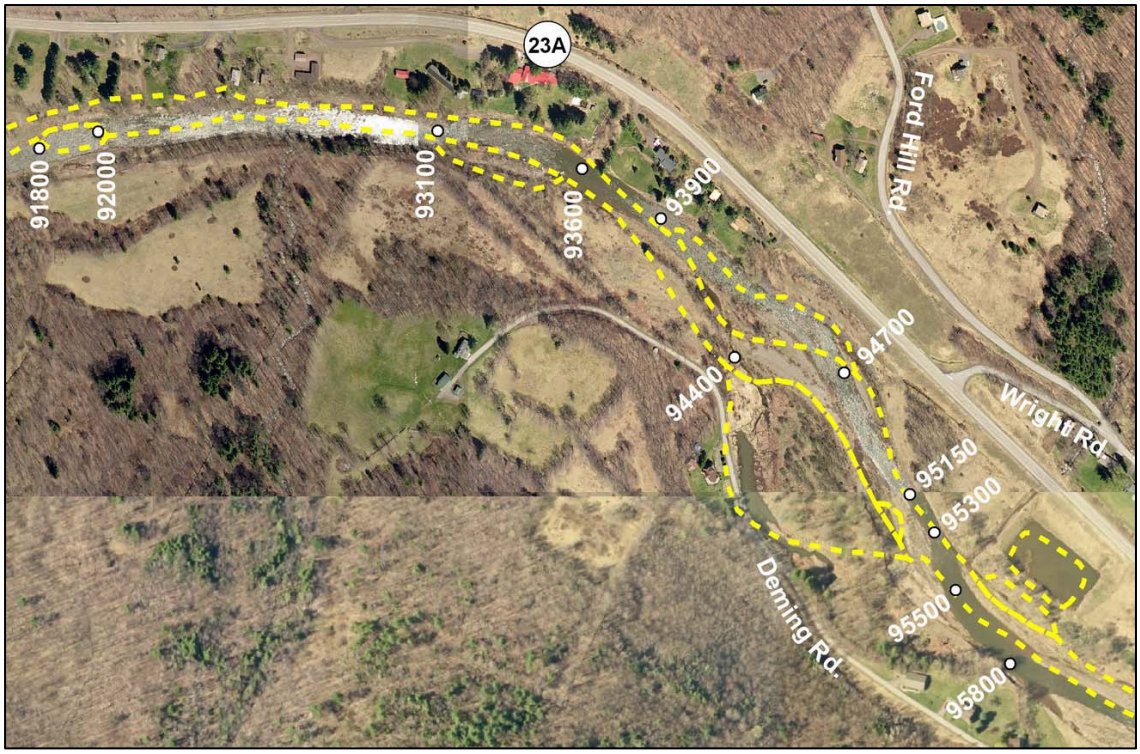
Continuing downstream, the stream passed under the county bridge at Deming Road (BIN# 3201180, Inset B). This bridge may constrict the floodplain at very high flows, as evidenced by minor deposition upstream and downstream, but appeared to pass most flows effectively. Both bridge abutments had been reinforced with sheet piling and had rip-rap installed on both downstream streambanks. There were agricultural fields on the left streambank (Station 97370-95800). 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

Planting site at Station 97370-95800

landowner. 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. At the downstream end of the agricultural field was a 4175ft^2 area of eroding bank (Station 96000). Streambank stability could be improved at this site with the planting of willow *fascines* and sedges along the toe of the bank, along with native trees and shrubs on the face of stream bank.

Downstream a tributary entered the Schoharie Creek from the right streambank (Station 95400). This tributary begins at an impounded lake in a mountain valley before flowing under County Route 23A and joining the Schoharie Creek. This tributary was classified as C by the NYSDEC.

There were six wetlands located along the stream corridor from here to the end of the management unit. Four of these were classified as riverine lower perennial wetlands, located at Station 95800-95500 (R2USC, 0.4ac), Station 95300-95150 (R2USC, 0.09ac), Station 94700-93900 (R2USC, 1.7ac), Station 92000-91800 (R2USA 0.3ac). Two palustrine forested wetlands were located along the left streambank at Station 95300-94400 (PFO1A, 4.8ac) and Station 93600-93100 (PFO1A, 0.7ac).



Wetland boundaries approximately delineated by NWI from Station 95800 to 91800

The right streambank of the next meander bend had suffered minor erosion during high flow events (Station 93150). This erosion exposed an 96ft^2 area of clay/silt.

Clay exposure at Station 93150

Downstream, two tributaries entered the Schoharie Creek. On the left streambank, a creek draining Rusk Mountain appeared to introduce sediment into the Schoharie Creek (Station 92600). On the right streambank, there was a tributary which began at an impounded lake before flowing under County Route 23A and joining the Schoharie Creek (Station 92400). Both tributaries were classified as C by the NYSDEC.

Rip-rap at Station 92040

Along the right streambank rip-rap had been installed (Station 92040). Native vegetation had grown through this rip-rap and will serve to strengthen and increase its longevity while also improving the aquatic habitat of the reach. While this growth occurred naturally, inserting plant material into the soil between rip-rap during or after installation can have the same desired effect.

At the end of the management unit the stream passed under a private bridge on an unpaved road (Station 91473). This bridge, built in the mid 1990's, was in good structural condition and appeared to pass most flows effectively. However, during large flood events floodwaters have spread over the right abutment, causing erosion and deposition, then back into the stream channel downstream of the bridge. According to landowner accounts, maintenance of the road and bridge due to stream related problems has cost thousands of dollars. Installation of flood plain drainage, and/or regrading of the right streambank floodplain area to floodplain elevation, at or just above the bankfull stage, could reduce flooding. Leveling this area would decrease the local flow concentration that is currently

causing erosion while still providing over bank access during flood flows. The riparian area throughout the reach, including the immediate terrace area should be vegetated with native trees and shrubs. An established riparian community could reduce erosion and flood velocities in the bridge and road access area and discourage further widening of the stream channel. With the exception of planting, in-depth survey and design would be required to implement these recommendations.

Bridge at Station 91473

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).

Evidenced by lack of significant aggradation or mass failure of streambanks, this unit appeared to be conveying its sediment load effectively. Some aggradation was noted upstream from the private bridge at the end of the management unit (station 91473). Three tributaries within the unit appeared to input 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 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.

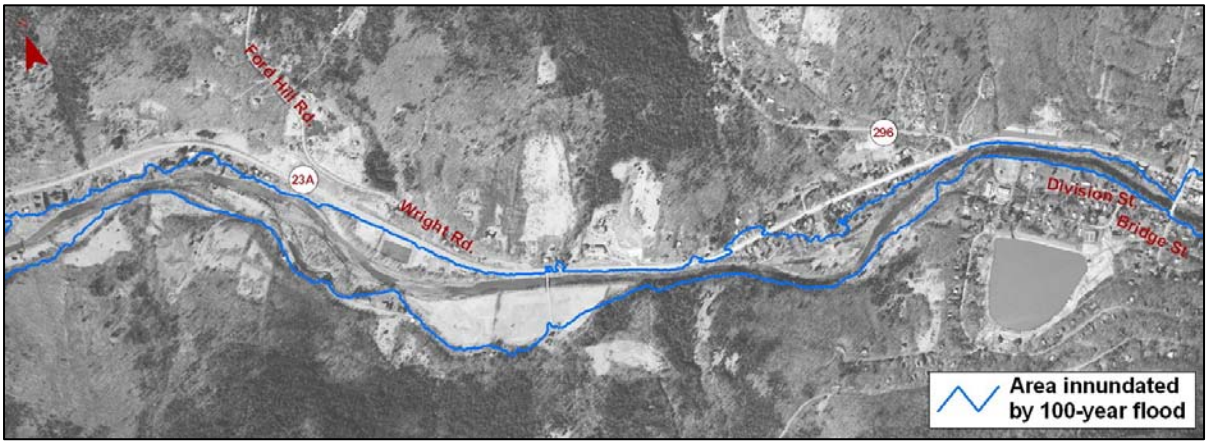
Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (*Fallopia japonica*), for example, has become a widespread problem in recent years. Knotweed shades out other species with its dense canopy structure (many large, 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 results can include rapid streambank erosion and increased surface runoff leading to a loss of valuable topsoil. In total, 107 Japanese knotweed occurrences 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 A).

An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (Riparian Vegetation Mapping, Appendix A). In this management unit, the predominant vegetation type within the 300 ft riparian buffer was herbaceous (40%) followed by forested (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 (11%) 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.



100-year floodplain boundary map

According to the current floodplain map (above), twenty-five 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 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 minimal throughout the unit. Woody debris provides critical habitat for fish and insects, and added essential organic matter that will benefit organisms downstream.

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 two 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. In 2006, there were eight stormwater culverts in this management unit.

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, five homeowners within the drainage area of this management unit had made use of these programs to replace or repair a septic system.

Some homes along the Schoharie Creek within this management have public sewer. In 2006, the Village of Hunter completed work on a new sewage treatment infrastructure project. The project constructed approximately 11 miles of sewer collection lines and associated appurtenant structures within the Village of Hunter which will convey water to a wastewater treatment plant designed to treat 326,000 gallons of domestic wastewater per day. In addition to wastewater collected from the new sewer lines, a number of existing wastewater collection systems were consolidated into the Village wastewater collection and treatment system (NYSDEC, 2002).

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.

NYSDEC, 2002. ENM – Region 4 Notices. Available on web: http://www.dec.state.ny.us/website/enb2002/20021218/not4.html (Accessed 02/07/07).