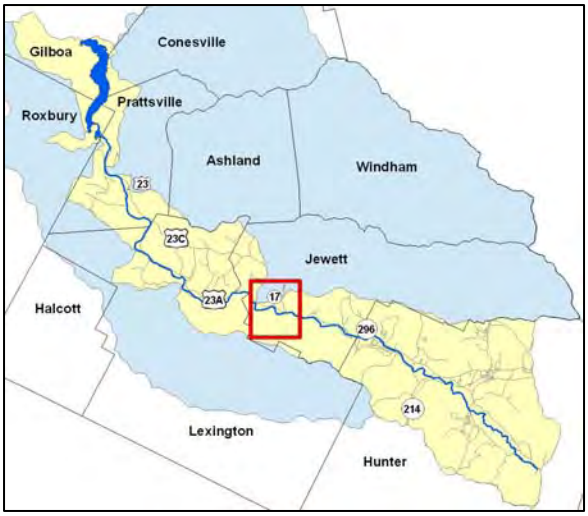
Schoharie Creek Management Unit 9

Town of Jewett – Carr Road Bridge (Station 83957) to County Route 17 (Station 70652)

This management unit begins at Carr Road bridge (Station 83957), continuing approximately 13,305 ft to County Route 17 (Station 70652) in the Town of Jewett.

Stream Feature Statistics

7% of streambanks experiencing erosion
10% of streambanks have been stabilized
0% of streambanks have been bermed
33 feet of clay exposures
76 acres of inadequate vegetation
9,266 feet of road within 300ft of stream
14 structures located in 100-year floodplain



Management Unit 9 location
see Figure 4.0.1 for more detailed map

Summary of Recommendations Management Unit 9	
Intervention Level	Assisted Self-Recovery
Stream Morphology	No recommendations at this time
Riparian Vegetation	Plantings for assisted self-recovery of eroding banks at Stations 83400 & 82830, interplanting of rip-rap at Stations 83900 & 82300, and enhancement of riparian buffer at Station 83700.
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 sites at Stations 78300 & 73750.
Further Assessment	Resurvey of bank erosion monitoring site at Station 88700 to assess erosion rate.

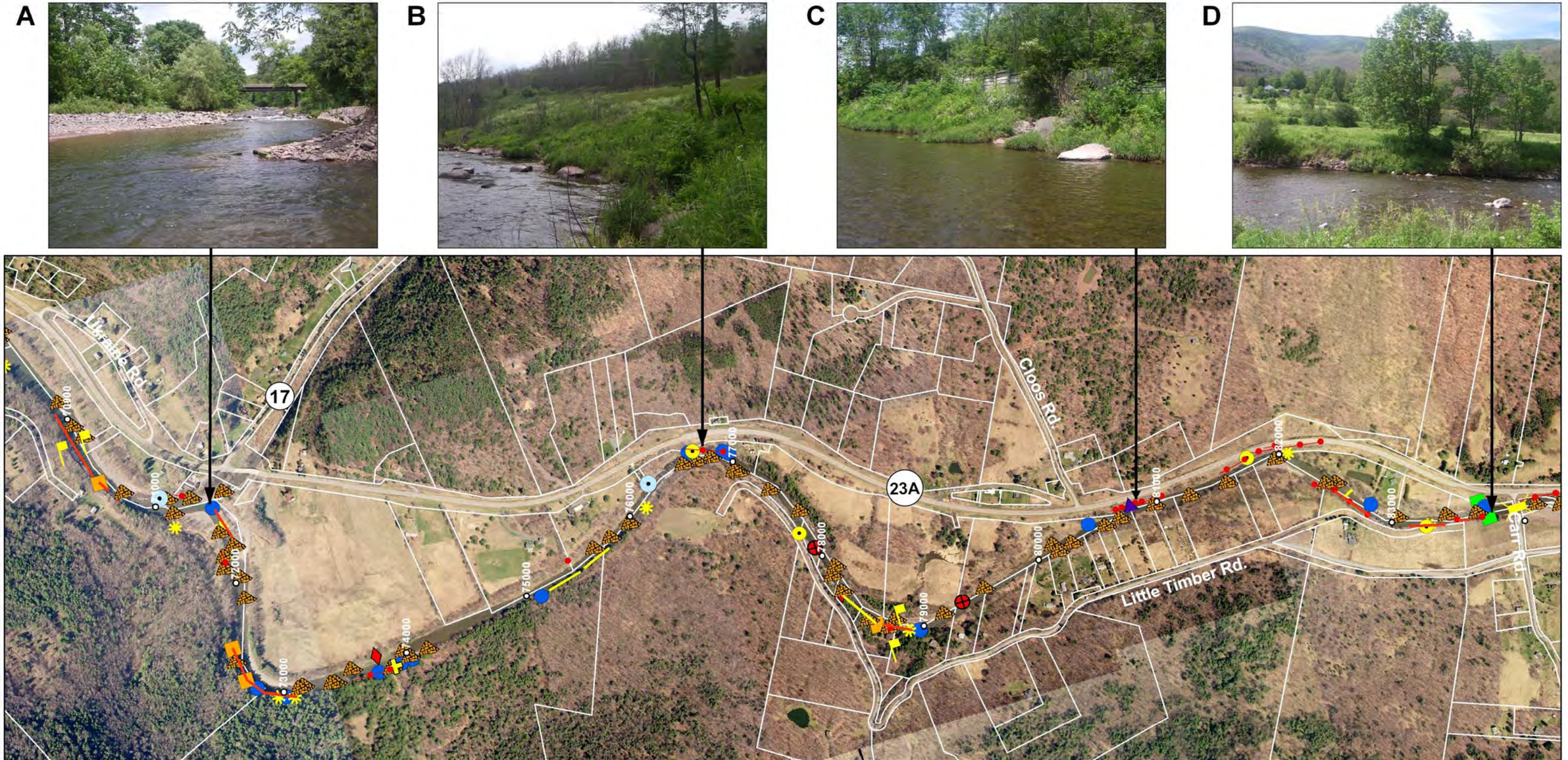


Figure 4.9.1 Management Unit 9 - 2006 aerial photography with stream feature inventory

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 had been two stream disturbance permits issued in this management unit. Following the 1996 flood, two permits were issued to a private landowner but more specific information was unavailable.

Stream Channel and Floodplain Current Conditions (2006)

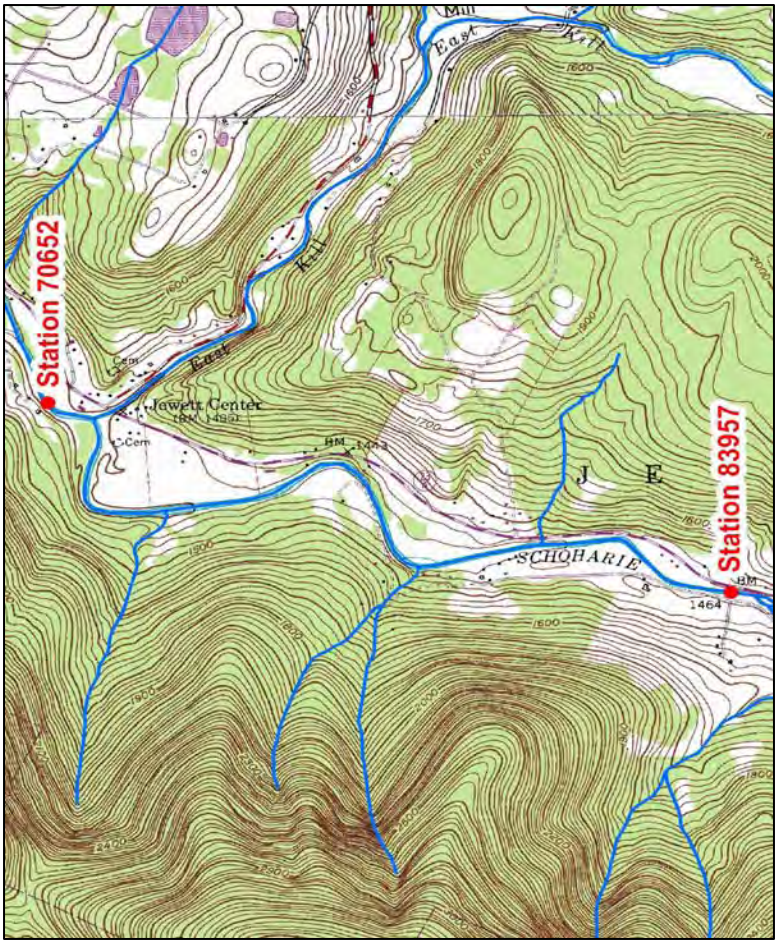
Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 7% (1,861 ft) of the streambanks exhibited signs of active erosion along the 26,610 ft of total channel length in the unit (Fig. 4.9.1). The total surface area of active erosion totaled approximately 70,973 ft^2. *Revetment* had been installed on 10% (2,691 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 4.9.1. 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 #9 began at Carr Road bridge. The drainage area ranged from 50.9 mi^2 at the top of the management unit to 91.37 mi^2 at the bottom of the unit. The valley slope was 0.61%.



1980 USGS topographic map - Lexington Quadrangle
contour interval 20ft

Valley *morphology* at the upstream end of this management unit was generally unconfined with a broad glacial and *alluvial* valley flat. The valley became very confined for approximately 4,500 feet in the middle of the unit (Station 78500-74000) at which point the stream regained its floodplain access. The management unit was moderately *sinuous* or winding. The more sinuous a stream, the more gentle the slope. Generally, stream conditions in this management unit were stable. Management efforts in this unit should focus on enhancing the *riparian* buffer in recommended locations and enhancing existing revetment with plantings.

This management unit began as the stream passed under the Carr Road bridge. While *bankfull* flows appeared to flow freely through this bridge, higher flows overtop the bridge and flow over Carr Road rendering the bridge impassable. This bridge is the sole access residents have to cross the Schoharie Creek and during floods residents are cut off from emergency services. Repeated repair of Carr Road after flood events has also been very costly. Installation of *floodplain drainage*, using culverts set at the floodplain elevation under the bridge approach, would increase hydraulic capacity of the bridge and help mitigate this problem. A hydraulic analysis of Carr Road bridge and upstream floodplain is the first step necessary to begin planning for remediation of flood concerns in this area (see Section 4.8 for recommendations).

Bridge at Carr Road (Station 83957)

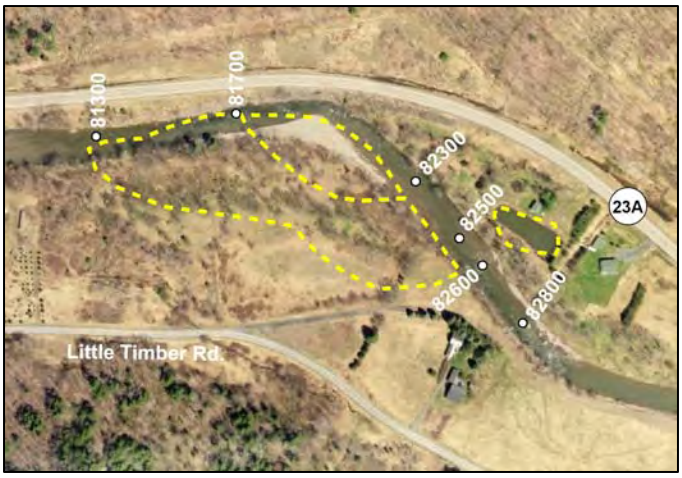
On the left streambank there was a NYS DEC public fishing access with a dirt parking area at the top of the bank. These access points allow the public to wade and walk along the streambed and banks for the purpose of fishing. The adjacent land on both streambanks had only *herbaceous* vegetation in the riparian zone (Inset D, Station 83700). To promote a more mature vegetative community a buffer of native trees and shrubs should be planted. Buffer width should be increased 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.

Rip-rap had been installed along 77ft of the left streambank (Station 83900). 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 tree, shrub and sedge species should be interplanted along this streambank to help strengthen the revetment, while enhancing aquatic habitat by providing shading.

Downstream, approximately 276ft of the left streambank had suffered minor erosion during high flow events (Station 83400). A piped outfall, which discharged stormwater from Little Timber Road onto this streambank, may exacerbate erosion at this site. 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. These plantings would also improve the aquatic habitat within this reach. Erosion continued downstream for 331ft of the left streambank (Station 82830). This site was also a good candidate for *bioengineering* stabilization techniques.

Bank erosion at Station 83400

Just downstream, a 174ft long stacked rock wall had been built along the left streambank perhaps intended to protect the adjacent land from flooding (Station 82830). The building of walls or berms within the floodplain is not recommended at it may act to raise flood elevations and increase the erosive power of the stream. They should be evaluated for their influence on floodplain connectivity and stream entrenchment, and removal should be considered where a significant negative impact is found.



Wetlands (Station 82800-82500 & 82600-81300 & 82300-81700) Approximate wetland boundary delineated by NWI

There were three wetlands in this vicinity. On the right streambank was a 0.4 acre impounded palustrine wetland (PUBFh, Station 82800-82500). On the left streambank was a large 4.7 acres palustrine forested wetland (PFO1A, Station 82600-81300) along with a 1.4 acre riverine lower perennial wetland (R2USA, Station 82300-81700) (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.

As the stream flowed directly towards the County Route 23A embankment, revetment including 767ft of rip-rap and 90ft of T-wall had been installed along the right streambank (Station 82300). 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.

Revetment at Station 82300

The downstream County Route 23A embankment had again been stabilized with 414ft of rip-rap and 175ft of T-wall along the right streambank (Inset C, Station 81050). Native vegetation including mature trees and shrubs had grown along this revetment, providing a good example of interplanted revetment. At the middle of this rip-rap, an unnamed tr*ibutary* entered the Schoharie Creek (Station 80800). This tributary drained the mountain on the opposite side of County Route 23A, before passing under the road and joining the Schoharie Creek through a large concrete 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.

Culvert and Tributary at Station 80800

As the stream *meandered* downstream a 0.5 acre riverine, upper perennial, seasonally flooded wetland was located within the stream channel (R2USC, Station 79000-78700). Near the upstream end of this wetland an unnamed tributary entered the Schoharie Creek from the left streambank (Station 78965). This tributary drained the steep slopes of Evergreen 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).

Wetland (Station 79000-78700)
Approximate wetland boundary delineated by NWI

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 78900). Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. A 19,823ft^2 area of streambank had been left unvegetated, exposing a glacial lake silt/clay deposit. Fine sediment inputs from eroding bank can be a water quality concern because they increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. Sheet piling had

Bank erosion at 78900

been installed along 30ft of this bank in efforts to protect a home on the streambank (Station 78760). This home could be threatened in the future if this bank continues to erode.

A bank erosion monitoring site (BEMS) was installed along this bank to study this erosion (Station 78870). 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 and water quality threats should be considered for this site. 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 left streambank changed to bedrock the erosion ended and the stream became confined (Station 78650). At the downstream end of this bedrock, a small dumpsite was observed on the hillslope, containing old metal debris. Removal of the trash is recommended to avoid its introduction into the stream.

Detention basin at Station 76700

At the next downstream meander bend, the stream was once again pushed against the County Route 23A embankment. Rip-rap had been installed along 312ft of this embankment and was in good structural condition with shrub and herbaceous vegetation growing throughout (Inset B, Station 76900). Several hillside seeps, along with road drainage, entered Schoharie Creek along this bank. A small detention pond designed to retain stormwater runoff, and remove sediment within the stormwater by settling, had been installed on the streambank terrace (Station 76700).

There was a 0.9 acre riverine, upper perennial, seasonally flooded wetland located along the left streambank (R2USC, Station 77000-76300). A larger 5.4 acre riverine, upper perennial, permanently flood wetland was located within the stream channel downstream (R2UBH, Station 76000-73400).

Wetland (Station 7700-76300 & 76000-73400)
Approximate wetland boundary delineated by NWI

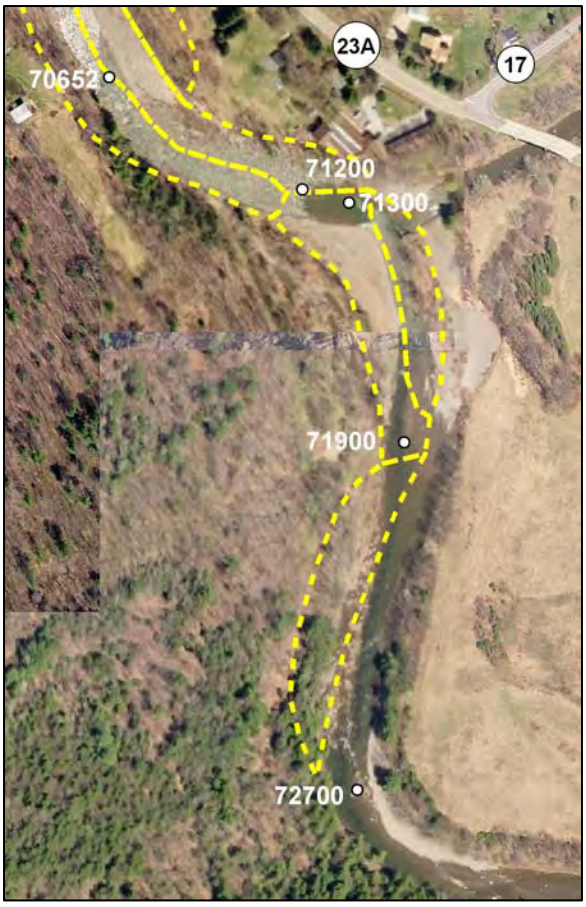
Downstream, the valley became unconfined and the stream channel reconnected with its floodplain. An unnamed tributary entered the Schoharie Creek from the left streambank (Station 74000). This tributary was classified C by the NYSDEC from its headwaters downstream to the last 75ft where its classification change to C(t), indicating that the best uses for this stream were the support of fisheries, including trout, and other non-contact activities (NYSDEC, 1994). Sediment deposits near this confluence indicated an influx of sediment from this tributary during high flow events.

Another small dump site containing old cars and metal debris was documented on the right streambank (Station 73750). Removal of this dump is recommended in order to protect the stream.

Bank erosion at Station 73100

At the next meander bend downstream, the channel flowed up against the valley wall on the left bank causing a 40,613ft^2 mass failure (Station 73100). The *thalweg* pushed up against the high hillslope which caused toe erosion that resulted in the loss of the mature forested vegetation, leaving much of the streambank unvegetated. The exposed *mixed till* soils had a high silt and clay content, which likely contributed a significant sediment load during high flows.

The downstream end of this management unit was dominated by wetlands including four riverine, upper perennial wetlands, totaling 5 acres (R2USC, Station 72700-71900) (R2USC, Station 71900-71300) (R2USC, R2UBH, Station 71200-70652). A 1.7 acre palustrine, forested wetland was located along the left streambank (PFO1A, Station 71900-71200).



Wetlands at downstream end of management unit
Approximate wetland boundary delineated by NWI

Downstream, the right streambank had eroded exposing a 1,799ft^2 area of bank (Station 71665). This area was heavily influenced by the major tributary confluence downstream. Large flood flows appear to have backed up in this area, causing flows to slow and deposit its sediment load. Considerable sediment deposits were also documented in the flood chute adjacent to this erosion.

At the downstream end of this management unit the East Kill entered the Schoharie Creek from the right streambank (Inset A, Station 71400). The East Kill flows from its headwaters upstream of Lake Capra (upstream of Colgate Lake) through the town of Jewett, roughly following County Route 23C, to its confluence with the Schoharie Creek. Its watershed drains approximately 37 mi^2 and is closely surrounded by the steep mountains of the Catskills, specifically the Blackheads. As evidenced by the large amount of deposition upstream and downstream of the confluence, the East Kill delivers a significant amount of sediment into the Schoharie Creek. The East Kill is classified as C(t) by NYSDEC (NYSDEC, 1994).

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 add a significant amount of sediment. The sediment storage evident in this unit encouraged lateral adjustments which led to either revetment or bank erosion at almost every meander bend.

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

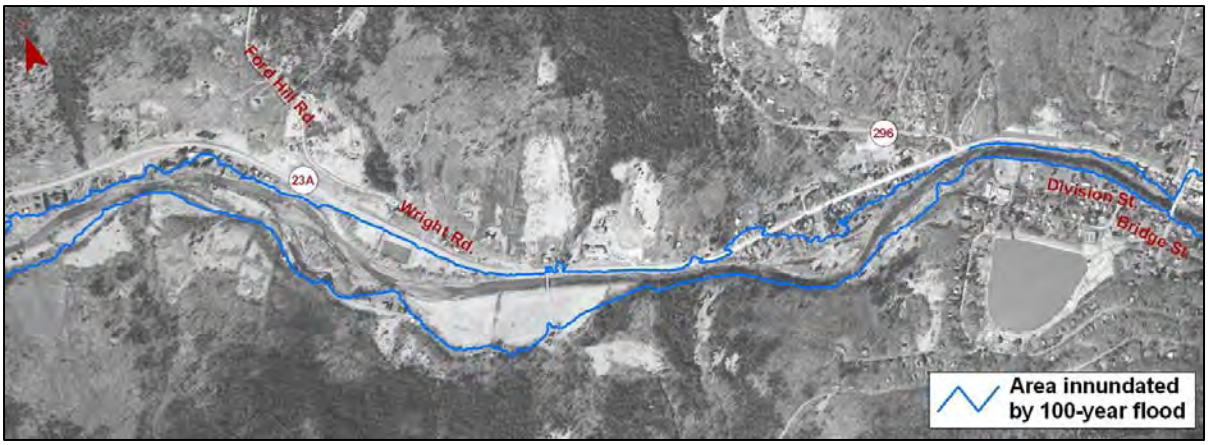
dense canopy structure (many large, overlapping leaves), but stands are sparse at ground level, with much bare space between narrow stems, and without adequate root structure to hold the soil of streambanks. The result can include rapid streambank erosion and increased surface runoff leading to a loss of valuable topsoil. In total, 73 Japanese knotweed occurrences along an estimated length of 1,890ft 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 (47%), followed by herbaceous (36%). 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 (4%) 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), fourteen 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.



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 observed within the stream channel was minimal throughout the unit. Woody debris provides critical habitat for fish and insects, and adds 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 the 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, two 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.