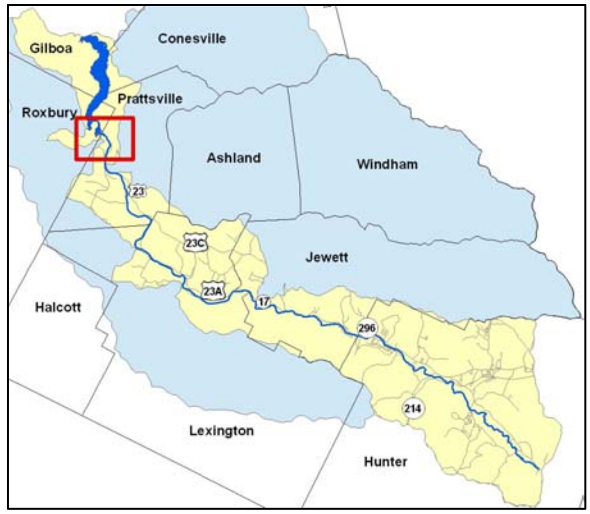
Schoharie Creek Management Unit 18

Town of Prattsville – County Route 23 Bridge (Station 10486) to Station 0

This management unit began at the County Route 23 Bridge (Station 10486), and continued approximately 10,486 ft to Station 0 in the Town of Prattsville.

Stream Feature Statistics

9.7% of streambanks experiencing erosion
5% of streambanks have been stabilized
0% of streambanks have been bermed
1,962 feet of clay exposures
19 acres of inadequate vegetation
4,356 feet of road within 300 ft of stream
17 structures located in 100-year floodplain



Management Unit 18 location
see Figure 4.0.1 for more detailed map

Summary of Recommendations Management Unit 18	
Intervention Level	Preservation, Passive, Assisted Self-Recovery
Stream Morphology	No recommendations at this time
Riparian Vegetation	Interplanting of rip-rap at Station 9200
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	No recommendations at this time

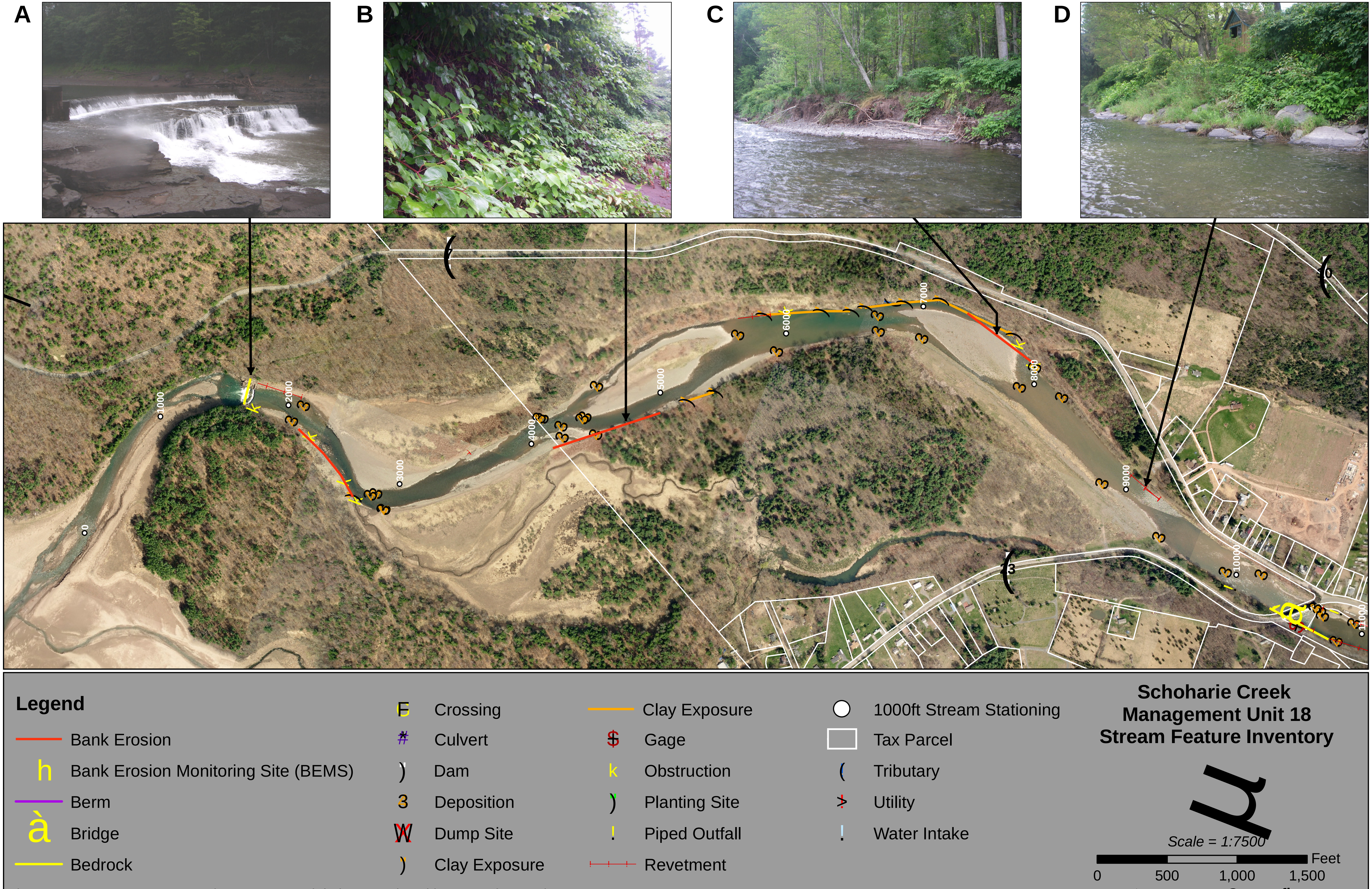


Figure 4.18.1 Management Unit 18 - 2006 aerial photography with stream feature inventory

Historic Conditions

As seen from the historical stream alignments (below), the *planform* of the channel has remained fairly stable since 1959. As of 2006, according to available NYS DEC records dating back to 1996, no stream disturbance permits were issued in this management unit.

Historic stream channel alignments overlayed with 2006 aerial photograph

Devasego Falls located at the downstream end of this management unit was a popular tourist site until these falls, along with the Devasego Inn, were submerged in the early 1920's by the construction of Gilboa Dam, which impounded New York City's Schoharie Reservoir. The Schoharie Reservoir was placed into service in 1926 and hold 17.6 billion gallons of water at full capacity. Water stays in the reservoir a short time before it is drawn into the Shandaken Tunnel and travels southeast 18 miles, where it enters the Esopus Creek at the Shandaken portal in Ulster County. It then flows another 11 miles down the Esopus Creek into the Ashokan Reservoir for longer-term storage and settling. When it leaves the Ashokan, it is carried southeast under the Hudson River via the

Postcard of Devasego Falls before Schoharie Dam construction
Photo credit: Zadock Pratt Museum

92-mile Catskill Aqueduct. It ordinarily makes its way to the Kensico Reservoir in Westchester for further settling and mixing with Delaware system water, before moving down aqueducts to the Hillview Reservoir in Yonkers and entering New York City's water supply distribution system (DEP, 2007).

Stream Channel and Floodplain Current Conditions (2006)

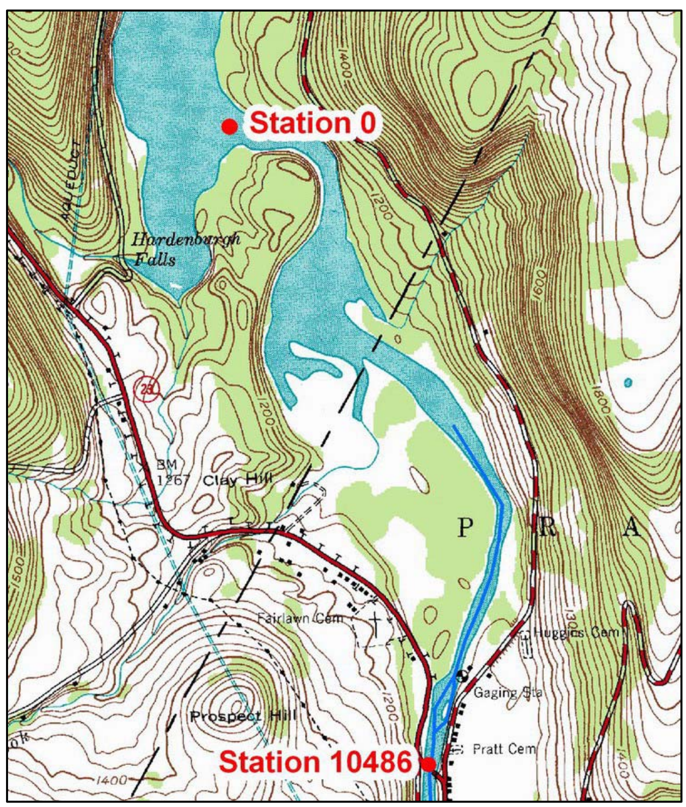
Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 9.7% (2,024 ft) of the streambanks exhibited signs of active erosion along the 20,973 ft of total channel length in the unit (Figure 4.18.1). The total surface area of active erosion totaled approximately 66,585 ft^2. *Revetment* had been installed on 5% (1,040 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 4.18.1. 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 #18 began at the County Route 23 Bridge in Prattsville. All land adjacent to the stream corridor in this unit was owned by the NYC Department of Environmental Protection (DEP).

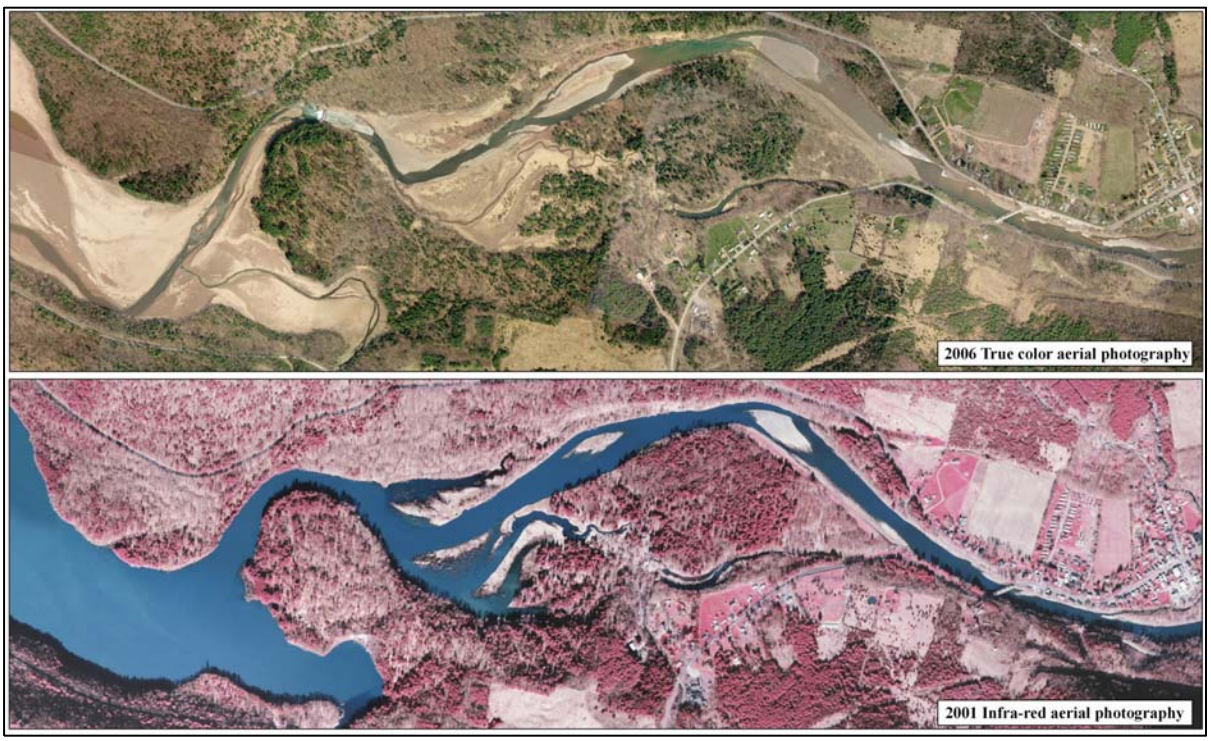


1980 USGS topographic map - Prattsville Quadrangle contour interval 20 ft

The drainage area ranged from 236.48 mi^2 at the top of the management unit to 243.72 mi^2 at the bottom of the unit. The valley slope was 0.24%.

Valley *morphology* of this management unit was generally unconfined with a broad glacial and *alluvial* valley flat, however sections of both the left and right streambank were confined by the valley wall. Generally, stream conditions in this management unit were stable with the exception of one large erosion site (Station 2250). Management efforts in this unit should focus on preservation of existing conditions.

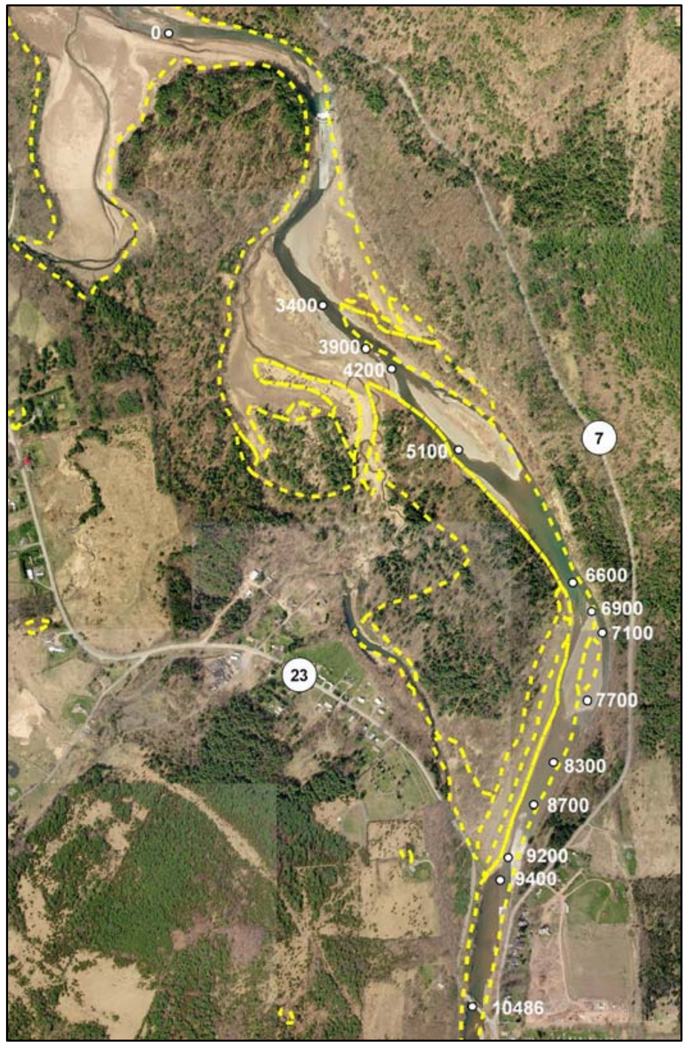
During the 2006 stream feature inventory water levels in management unit 18 were uncharacteristically low (photo below) due reduced water storage in the Schoharie Reservoir necessary while completing upgrades to the Gilboa dam located at the downstream end of the Schoharie reservoir. Following an engineering analysis in 2005, it was determined that the



2001 (bottom photo) & 2006 (top photo) Management Unit 18 aerial photographs

Gilboa Dam did not meet current NYS Dam Safety requirements, primarily since the dam was built put into service under the standards of the 1920s . This analysis caused fear that in the case of a severe flood (larger than the flood of record in 1996), the water in the reservoir could rise to a level which could push the Gilboa Dam downstream, releasing flood waters and causing damage to downstream communities. In 2006, the NYC Department of Environmental Protection implemented a $24 million dollar project targeted at bringing the eighty year old dam up to current New York State dam safety standards. The plan, completed in December of 2006, included the installation of debris protection structures, drainage units, an overflow notch and anchoring cables. A full scale $300 million dollar reconstruction of the dam, which will bring the dam up to an even higher standard of safety, is expected to begin in 2008.

Nine wetlands were located within this management unit. The entire stream channel within this unit was classified as a lacustrine wetland (L1UBHh, 95.5ac Station 10486-0). The remaining wetlands were all classified as palustrine wetlands; three were forested (PFO1Ch, 4.7ac, Station 9200-8300) (PFO1Ah, 60.7ac, Station 8700-4200) (PFO1Ah 6.9ac, Station 5100-3400), one had shrub-scrub vegetation (PSS1Ch, 4.3ac, Station 5100-3900) and four were dominated by emergent vegetation (PEM1Ch, 4.0ac, Station 9400-7100) (PEM1Ch, 1.1ac, Station 7700-7100) (PEM1Ch, 0.5ac, Station 6900-6600) (PEM1Ch, 2.5ac, Station 4200-3400). Wetlands are important features in the landscape that provide numerous beneficial functions including protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods (see Section 2.6 for detailed wetland type descriptions).



Wetlands (Station 0-10486)
approximate wetland boundary delineated by NWI

In 1979, a10 ft high gravel berm had been constructed along the left streambank (Station 9300). This berm restricted flood waters from accessing the available floodplain and appeared to exacerbate ice jamming on the Schoharie Creek, causing flooding problems within the hamlet of Prattsville. The berm also had caused stream channel entrenchment and an increase in channel width to depth ratio which promoted deposition in the reach. Deposition can trigger the lodging and adhesion of ice to the bed and formation of ice jams. The top of the berm was at an elevation higher than the road and homes on the east side of the stream causing flood water to encroach on the adjacent homes and roadway before flowing onto its natural floodplain on the west side of the creek.

To address flooding issues, several conceptual plans were generated for the project area, including a proposal for complete geomorphic restoration of the area. After reviewing the conceptual plans, constructability, and corresponding cost estimates for construction, a simplified alternative of removing the berm and regrading the material was selected as the most appropriate and cost effective alternative.

Prattsville flood redemiation project post construction

In 2004, the GCSWCD and the Prattsville Highway Department completed a flood-reduction project by re-grading the berm to match the elevation of the existing floodplain in order to allow flood waters to access the natural floodplain. The natural floodplain can also act as an ice storage area during large seasonal flow events and provide a release for flood waters in the event of a localized ice jam. Construction encompassed approximately 2,200 feet of streambank along the western floodplain of the Schoharie Creek.

The stream channel downstream from the County Rt. 23 bridge in Prattsville appeared overwide and aggrading. Revetment including 131 ft of rip-rap and 316 ft of stacked rock wall had been installed along the right streambank (Inset D, Station 9200). 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.

Downstream, the stream split into two channels, flowing around both sides of a large center bar (Station 7900-6700). During high flow events, the *thalweg*, or deepest part of the stream channel, was forced to flow against the right stream bank, undermining the toe of the bank along 591 ft (Inset C, Station 7900). Numerous areas of exposed of glacial lake silt/clay were documented along the bed and banks of the right streambank (Station 7600-5850). Fine sediment inputs into a stream can be a serious water quality concern because they increase *turbidity,* degrade fish habitat, and can act as a transport mechanism for other pollutants and *pathogens*. At the downstream end of the silt/clay a 237 ft stacked rock wall had been installed along the edge of the water.

Clay exposure at Station 7600-5850

Again the stream split into two channels, flowing around both sides of another large center bar (Station 5700-4400). On the left streambank a 1 ft high lacustrine clay exposure was documented along 211 ft of the left streambank (Station 5300). While just downstream, 807 ft of the left streambank had scoured (Inset B, Station 4950). At normal water levels within this stream reach these features would likely be underwater.

Bank erosion at Station 2250

At the meander bend downstream, the hillslope was undermined by toe erosion, resulting in the mass wasting of a 53,285 ft^2 area of the left streambank (Station 2250). This erosion left the face of the stream bank unvegetated. The exposed lodgement till soil had a high silt and clay content, and appeared to contribute a significant suspended sediment load during rainfall events.

Near the end of this management unit the stream flowed over Devasago Falls (Inset A, Station 1700). These falls are usually submerged but due to low water levels in the Schoharie Reservoir for upgrades to the Gilboa dam, the falls were visible. Downstream of the falls the streambanks were lined with bedrock into the Schoharie Reservoir where this management unit ended. The Schoharie Reservoir contributes approximately 15% of NYC water annually (Joint Venture, 2004).

Bedrock along streambanks downstream from falls

Fishing is permitted on all NYC reservoirs, including the Schoharie Reservoir, providing the person has obtained an Access Permit. Row boats are allowed for fishing on the reservoir. Boats must be registered with a Boat Tag, steam cleaned by DEP, and stored in designated areas on the reservoir, all of which is free of charge. (See Section 2.10 Recreational Opportunities for more detailed information)

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).

Assessing the stream during reservoir draw-down conditions allowed the research team to gain a few insights that wouldn't be apparent during normal reservoir operations. First, as the clear water from the Schoharie Creek flowed over Devasago Falls into the reservoir it stirred up sediments from the bottom of the reservoir and the water became turbid due to resuspension. It is conceivable that these turbid waters traveled across the bottom of the reservoir to the portal with the colder stream water. This could explain how the creek and reservoir appeared clear, but the water entering the tunnel was turbid. The second observation was the effect of draw-down on the exposed banks of the Schoharie. The portions of the stream that are normally covered with reservoir water contained a high clay and silt content and were eroding and collapsing due to precipitation and gravity without the support of the reservoir waters. In normal reservoir conditions, the banks probably erode with wave action, but once drawn-down they are vulnerable to a faster rate of erosion over their entire face.

This management unit was characterized by an overwide and shallow stream channel with generally aggrading conditions. Aggradation in this unit is exacerbated by the backwater from the Schoharie Reservoir.

Riparian Vegetation

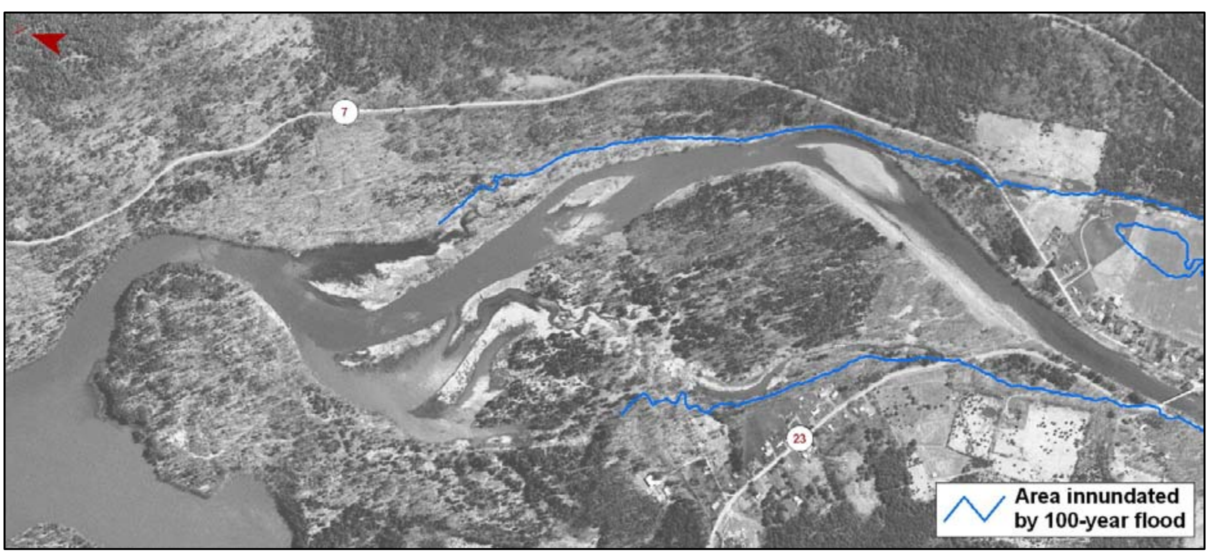
One of the most cost-effective and self-sustaining methods for landowners to protect streamside property is to maintain or replant a healthy buffer of trees and shrubs along the banks and floodplains, especially within the first 50 to 100 ft of the stream. A dense mat of roots under trees and shrubs 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, 18 Japanese knotweed occurrences along an estimated length of 9,329 ft were documented in this management unit. Japanese knotweed locations were documented as part of the stream feature inventory conducted during the summer of 2006 (Riparian Vegetation Mapping, Appendix B).

An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (Riparian Vegetation Mapping, Appendix B). In this management unit, the predominant vegetation type within the 300 ft riparian buffer was forested (67%) followed by shrubland (16%). 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 (2%) 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



100-year floodplain boundary map

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 (above), seventeen 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. 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. Within this management unit, overwide, aggradational conditions could lead to potential thermal impairment and filling of pools.

It is recommended that an aquatic habitat study be conducted on the Schoharie Creek with particular attention paid to springs, tributaries and other potential thermal refuge for cold water fish, particularly trout. Once identified, efforts should be made to protect these thermal refugia locations in order to sustain a cold water fishery throughout the summer. The quality and impact of the warm-water fishery should also be evaluated in this unit (e.g. smallmouth bass and walleye).

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 four 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 eight 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, no homeowners within the drainage area of this management unit had made use of these programs to replace or repair a septic system.

References

DEP, 2007. Overview Reservoirs Schoharie. Available on web: http://www.nyc.gov/html/dep/watershed/html/schoharieinfo.html

DEP, 2006. DEP News: Gilboa Dam of Schoharie Reservoir. Available on web: http://www.nyc.gov/html/dep/html/news/gilboa.html (Accessed 11/22/06).

Joint Venture, 2004. *Catskill Turbidity Control Study: Phase 1 Final Report*. Prepared by Gannet-Flemming and Hazen and Sawyer for NYCDEP.

Photo credit: Zadock Pratt Museum Devasego Falls Catskill Mountains, N.Y. postcard. Available on web: http://www.prattmuseum.com/history/2000%20History%20Feature/2000%20History%20Feature%20-%20Prattsville%20Postcards%20in%20detail2.htm