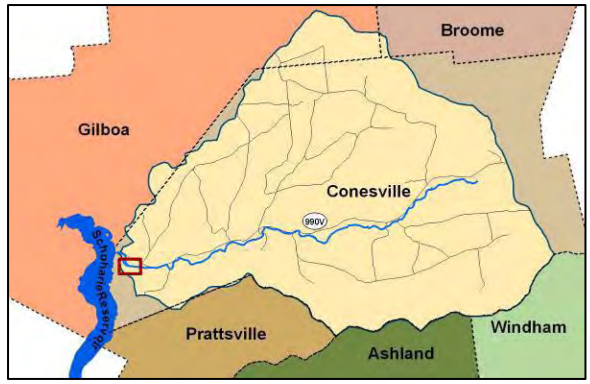
Manor Kill Management Unit 9

Town of Conesville – Station 4523 to Station 1775

This management unit begins at Station 4523, continuing approximately 2,748 ft to Station 1775 in the Town of Conesville.

Stream Feature Statistics

31% of streambanks experiencing erosion
0% of streambanks have been stabilized
0% of streambanks have been bermed
83.8 feet of clay exposures
27.2 acres of inadequate vegetation
0 feet of road within 300 feet of stream
16.1% of streambanks were proposed for planting



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	Treat, remove and prevent the spread of Japanese knotweed, where feasible. Plant a buffer of trees and shrubs along proposed planting sites and increase width of riparian buffer in appropriate locations.
Infrastructure	No recommendations at this time.
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	No structures in 100-year floodplain – protect floodplain from development.
Water Quality	Encourage homeowners to participate in the CWC septic program, if eligible.
Further Assessment	Establish bank erosion monitoring sites at the two mass failures - Stations 2552-2411 and Stations 2289 – 1906.

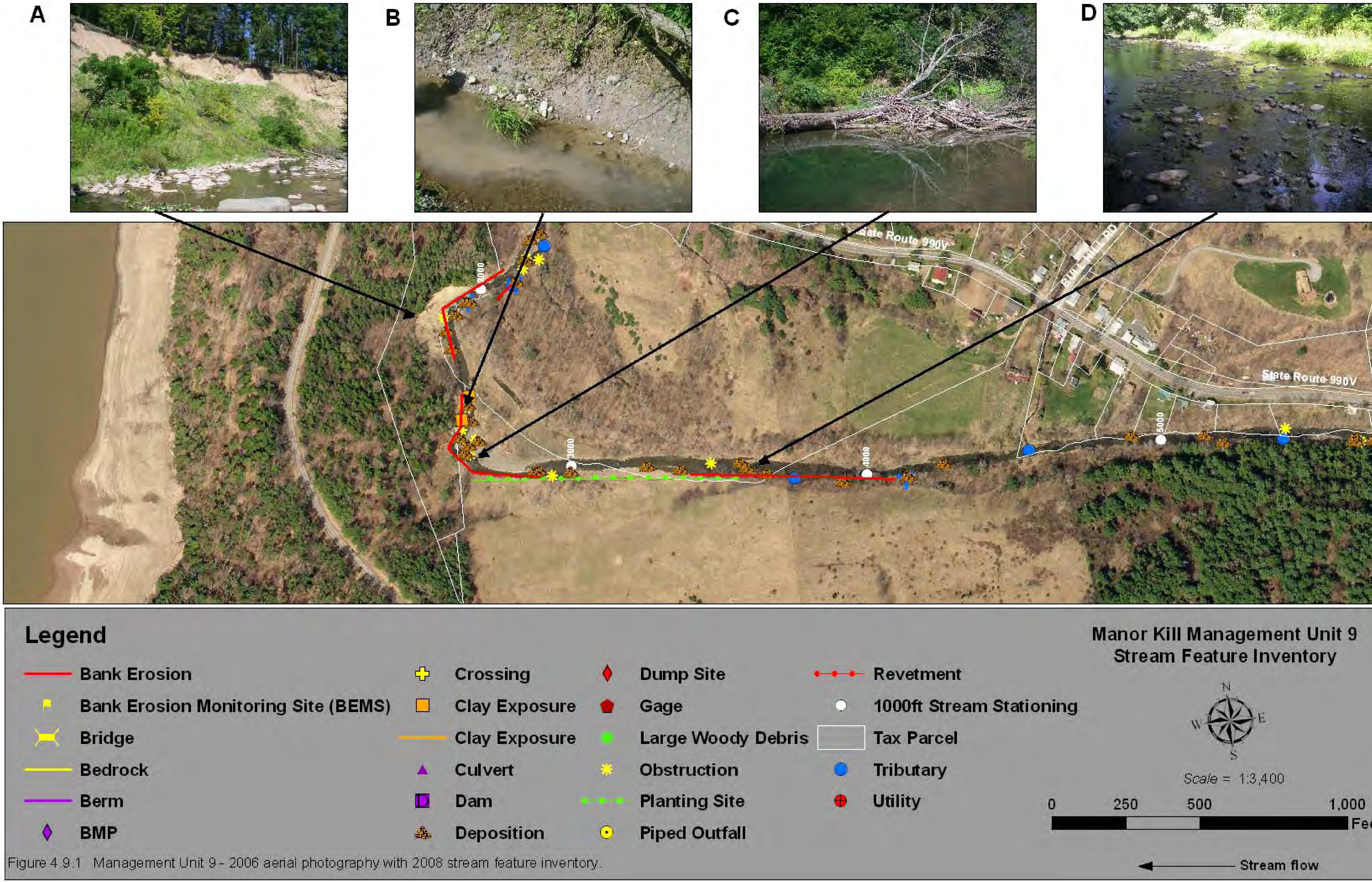
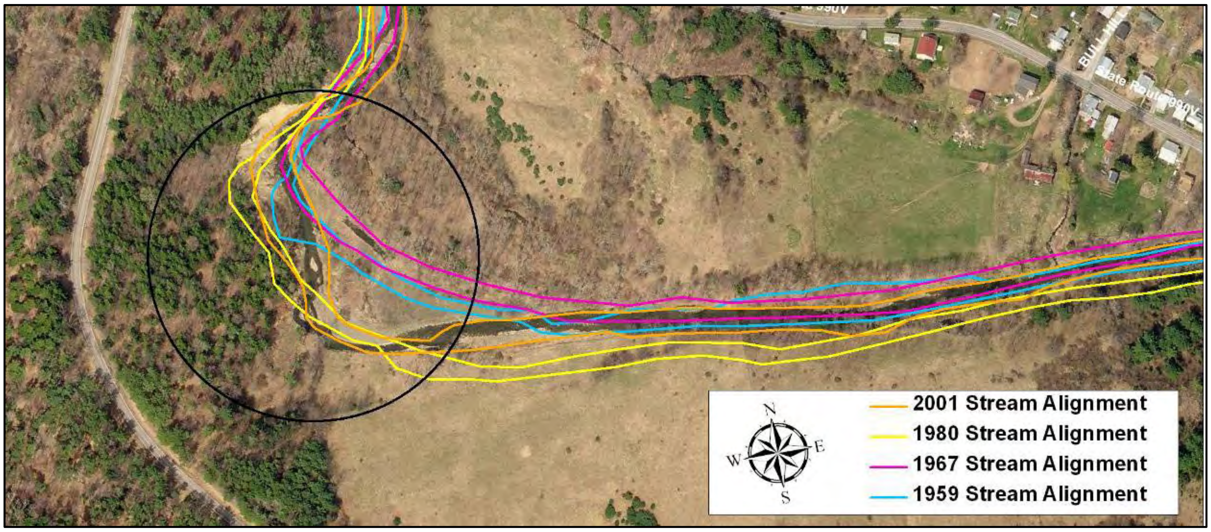


Figure 4.9.1 Management Unit 9 - 2006 aerial photography with 2008 stream feature inventory.

Historic Conditions



Historic stream channel alignments overlayed with 2006 aerial photograph

As seen from the historical stream channel alignments (above), the *planform* of the channel has remained fairly stable through the upstream portion of the management unit; the downstream portion appears to be experiencing *lateral migration*. Lateral migration is the movement of a channel across its floodplain, which usually results in extensive bank erosion. The outside banks of meander bends tend to move laterally across the valley floor and down the valley.

As of 2007, according to available NYS DEC records dating back to 1998, there have been no stream disturbance permits issued in this management unit.

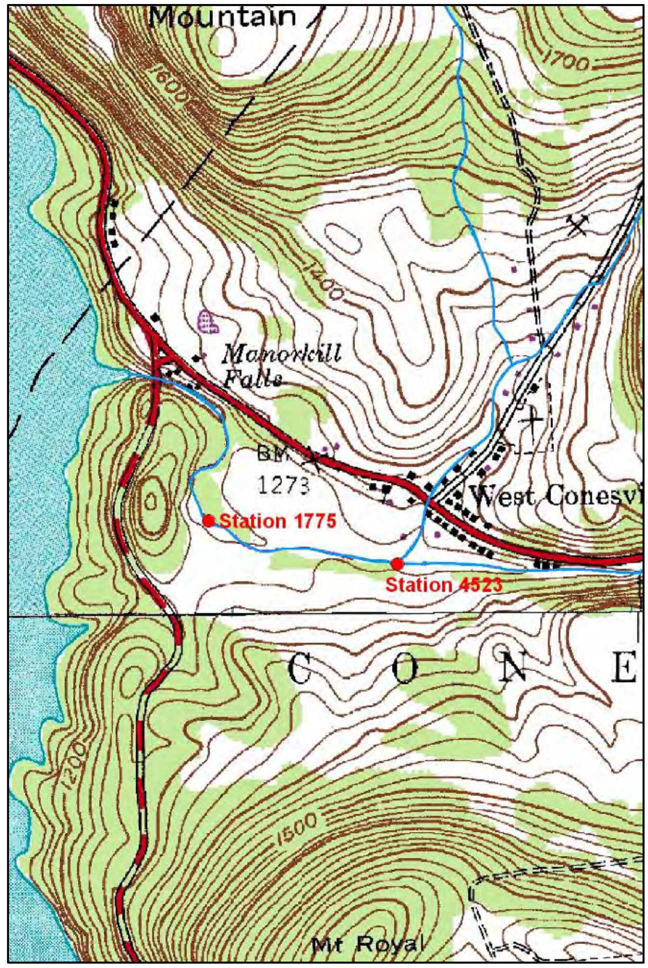
Stream Channel and Floodplain Current Conditions (2008)

Revetment, Berms and Erosion

The 2008 stream feature inventory revealed that 31% (1,706 ft.) of the streambanks exhibited signs of active erosion along the 5,496 ft. of total streambank length in the unit (Fig. 4.9.1). There were no revetments or berms identified in this management unit during the 2008 assessment.

Stream Channel Conditions (2008)

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 confluence with the Schoharie Reservoir in Conesville. “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 2008.



1980 USGS topographic map – Prattsville Quadrangle contour interval 20ft

Management unit # 9 began at Station 4523. The drainage area ranged from 32.62 mi² at the top of the management unit to 34.29 mi² at the bottom of the unit. The valley slope was 0.9%.

Valley morphology in this management unit was relatively unconfined with a broad glacial and alluvial valley flat. Generally, stream conditions in this management unit were unstable, with deficient sediment transport ability resulting in aggradational conditions throughout, and approximately 1,706 feet of erosion. There were six eroding banks documented in this management unit, including two mass failures. Management efforts in this unit should focus on preservation of existing wetlands and forested areas and improvements to the riparian buffer by planting herbaceous areas with native trees and shrubs.

Management Unit 9 began just downstream of a tributary confluence. Along the right bank, two stands of Japanese knotweed were observed. Japanese knotweed is an invasive non-native species which does not provide adequate erosion protection due to its very shallow rooting system; knotweed also grows rapidly and tends to crowd out more beneficial

Japanese Knotweed at Station 4304

streamside vegetation. The best means for controlling knotweed is prevention of its spread. Therefore, efforts should be taken to ensure that existing stands are not fragmented via unnatural processes (i.e. mowing without removal of all mowed material) and transported into downstream areas. Small stands should be eradicated immediately to avoid further spread within this unit and to downstream management units. There are removal methods that may be used for larger stands (see Section 2.7); these methods should be used with caution and carefully executed to avoid further spread of Japanese knotweed.

Along the left bank there was a well-vegetated side bar (Station 4262). This side bar was composed of cobble and gravel and was approximately 685 feet in length. A secondary channel flowed behind the bar and converged with the main channel at Station 4122. This channel had surface and subsurface flow, but appeared to function primarily as a flood chute that conveys flow through a secondary channel during periods of high flows. Beginning with this side bar and extending approximately 700 feet (Figure 4.9.1, Inset D, Station 2887) the stream began to over-widen and there were multiple areas of channel *aggradation*, the process by which streams are raised in elevation by the deposition of material eroded and transported from other areas. These depositional features included several side bars, transverse bars and full channel aggradation.

Downstream of the convergence the left bank was experiencing hydraulic erosion (Station 4081-3781) for approximately 682 feet. There was a thin buffer of young trees at the top of the bank that separated the stream from an agricultural field. A portion of the bank had

Erosion at Station 4304

high overhanging material with exposed roots, compromised trees and a failing wire fence. At Station 3746 a tributary entered from the left. This tributary drains the adjacent agricultural fields and appears to contribute to the upstream and downstream erosion.

Continuing downstream, a riparian planting site (Station 3543) was proposed for approximately 885 feet along the left streambank. This site was a successional old field with herbaceous vegetation to the edge of the stream. Recommendations include continuing to allow succession to occur with natural regeneration of shrub and early successional tree species. This would be accomplished by not mowing, as well as planting native trees and shrubs along the streambank and the upland area. Buffer width should be increased by the greatest amount agreeable to the landowners. Increasing the buffer width to at least 100 feet will help to stabilize the stream bank and protect water quality through this reach by slowing stormwater runoff and filtering pollutants associated with nearby land use. Portions of the streambank along the planting site were experiencing erosion; therefore prior to proceeding with any vegetative plantings, a more detailed assessment may be necessary. The eroding conditions should be given careful consideration when identifying the appropriate species and locations for plantings.

Planting Site at Stations 3543-2658

As the stream meandered to the right, hydraulic erosion began along the downstream portion of the proposed planting site and extended 374 feet (Stations 2888-2552). The erosion was approximately 6 feet in height; much of the bank material had slumped over the face of the bank, exposing roots. Opposite the erosion, a point bar had


Erosion at Stations 2888-2552

formed. Point bars commonly form on the inside of meander bends, where stream velocity is slower during high flows, allowing sediment to drop out of the water column and settle along the stream bed.

Following the hydraulic erosion along the left bank, there was a mass failure (Stations 2552-2411) resulting in an erosion area of approximately 6,662 ft², exposing areas of lacustrine clay (Figure 4.9.1, Inset C, Stations 2497-2420) and compromising mature trees along the bank. Fallen trees were in multiple locations along the streambank. The mass failure was forested at the top of the bank with herbaceous vegetation on the face of the upstream portion of the bank.

Mass Failure at Stations 2552-2411

Along the erosion there were multiple obstructions including woody debris and beaver dams that contributed to scouring and aggradation. At Station 2630 large fallen trees had accumulated additional woody debris causing a deep scour pool adjacent to the debris (Figure 4.9.1, Inset B, Station 2630). These trees also appeared to contribute to localized upstream and downstream aggradation as well as multiple smaller scour pools. Additional beaver dams and woody debris contributed to aggradational conditions along a large center bar (Station 2602) which had multiple channels flowing through. Beaver dams in the stream extended from center bar to center bar (Station 2600), and from center bar to the right bank, (Station 2579) also contributing to aggradation and backwatering. While beaver impoundments can sometimes be a nuisance, beavers have historically played a beneficial and ecologically important role in the stream system. Beaver activity adds organic debris (trees, leaves, etc. which provide the base of

Beaver Dam at Station 2600

the food chain), reduces water velocities and flood-related hazards downstream, and creates wetland areas that filter sediment and release water to the stream and groundwater slowly throughout the year.

Further downstream trees that had fallen from the mass failure caused an additional obstruction accumulating woody debris and contributing to a localized scour pool as well as upstream and downstream aggradation (Station 2462). Woody debris is beneficial to a stream system as it provides critical habitat for fish and insects, and adds essential organic matter that will benefit organisms downstream. However, if the debris becomes a hazard it may need to be cut or removed.

Woody Debris at Station 2462

As the stream meandered to the right, the thalweg, or deepest part of the stream channel, flowed up against the left streambank causing a second mass failure (Figure 4.9.1, Inset A, Stations 2289 – 1906). This mass failure resulted in an erosion area of approximately 12,547 ft², exposing roots and compromising mature trees. Land was forested from the top of the erosion to Prattsville Road – a distance of approximately 300 feet. Along the erosion, multiple trees had fallen into the stream contributing to localized scour and aggradation.

Woody Debris at Station 2134

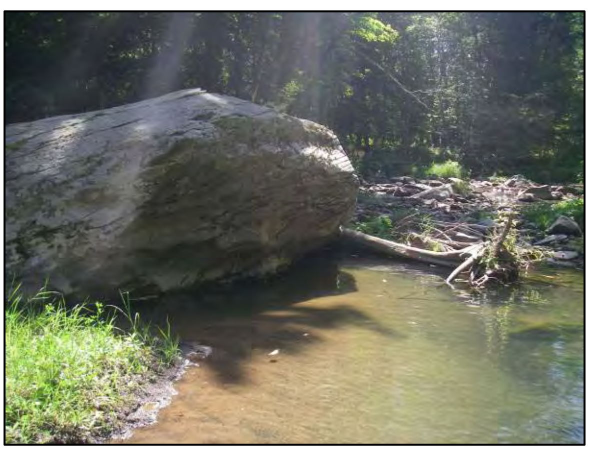
Opposite the erosion, a point bar had formed along the right bank. This point bar was composed of cobble and gravel with some herbaceous vegetation. Along the back side of the bar, there was a secondary channel that converged with the main channel at station 2104.

There was flow at the time of assessment; the divergence of this secondary channel was not observed.

Erosion at Stations 1961-1891

Continuing downstream, there was a channel divergence (Station 2056) along the right streambank where an additional secondary channel split off from the main channel and flowed behind a side bar for approximately 165 feet. At the time of the assessment flow was subsurface. The convergence of this channel appeared to contribute to hydraulic erosion (Stations 1961-1891) along the right bank. This erosion exposed roots and compromised trees of a young forest. At Station 1890 a tributary entered from the right bank which also appeared to contribute to downstream erosion.

Woody debris obstructions continued further downstream at Stations 1847 and 1787 where trees had fallen into the stream and contributed to localized scouring and deposition. At Station 1812 a large boulder in the center of the stream caused additional woody debris to accumulate; the boulder appeared to contribute to upstream and downstream aggradation as well as localized scouring of the bed along its sides. Just downstream of the boulder, a center bar extended from Station 1812 into Management Unit 10, Station 1714. This center bar was composed of cobble and gravel with some herbaceous vegetation. Management Unit 9 ended at Station 1775.



Boulder at Station 1812

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 3.2 for more details on Stream Processes).

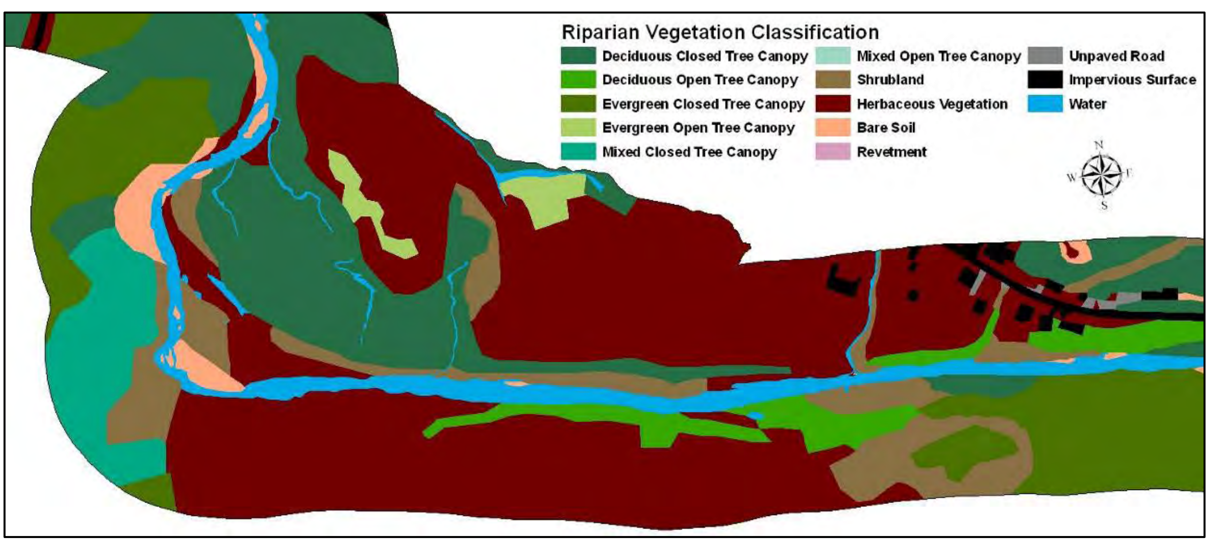
Sediment transport in this unit is influenced by valley morphology and multiple beaver dams and woody debris obstructions. The unconfined valley form and topography suggest that this unit is a sediment storage zone, supplied by tributaries and active erosion. This unit suffers from wide-spread sediment transport deficiencies. Bed load transported through this unit exceeds the transport capacity of this management unit, resulting in channel aggradation and some areas of lateral migration. In general, sediment storage areas benefit the general health of the stream system by limiting bed load delivered to downstream reaches during large storm events. However, mature riparian vegetation will be important in such settings to limit the extent of lateral channel migration and continued bank erosion.

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 feet 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 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. There was one riparian improvement planting site documented within this management unit; the proposed planting site covered approximately 16.1 percent of the streambanks in this unit.

Knotweed at Station 3074

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. Japanese knotweed locations were documented as part of the stream feature inventory conducted during the summer of 2008 (Riparian Vegetation Mapping, Section 2.7). In total, three Japanese knotweed occurrences, covering an estimated length of 55 feet, were documented during the stream feature inventory. The best means for controlling knotweed is prevention of its spread, therefore, effort should be made to ensure that all fill brought into the area is clean and does not have fragments of knotweed or other invasive plants. If Japanese knotweed sprouts or small stands are observed, they should be eradicated immediately to avoid further spread within this unit and downstream management units.



Riparian vegetation classification map based on aerial photography from 2006

An analysis of vegetation was conducted using aerial photography from 2006 and field inventories (see above map and Riparian Vegetation Mapping, Section 2.7). In this management unit, the predominant vegetation type within the 300 ft. riparian buffer was herbaceous (52.52%) followed by forested (32.22%). *Impervious* area (0.08 %) within this unit's buffer was primarily the local and private roadways. 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.

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 Manor Kill on the basis of recent surveys. The new FIRM hardcopy maps are available for viewing at the Schoharie County Soil & Water Conservation District Office.

100-year floodplain boundary map

According to the current floodplain maps (above), no 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 good throughout this management unit. Canopy cover was adequate along much of both streambanks. Woody debris within the stream channel was observed throughout the unit. This woody debris provides critical habitat for fish and insects and adds essential organic matter that will benefit organisms downstream.

In 2008, researchers from SUNY Cobleskill conducted macroinvertebrate and fish surveys along the Manor Kill. However, there were no sampling sites within Management Unit 9. See the macroinvertebrate and fish reports (Appendix F) for more detailed information regarding the surveys and their findings

It is recommended that an aquatic habitat study be conducted on the Manor Kill 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 Manor Kill. Fine sediment inputs into a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. There was one significant clay exposure 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 the Manor Kill. The cumulative impact of oil, grease, sediment, salt, litter and other unseen pollutants found in road runoff can significantly degrade water quality. However, there were no stormwater culverts observed in this management unit in 2008.

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. There were a few buildings located in close proximity to the stream channel in this management unit. These building owners should inspect their septic 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 2007, no homeowner 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.

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Koltun, G.F., Landers, M.N., Nolan, K.M. & Parker, R.S. (1997) Sediment transport and geomorphology issues in the water resources division. In *Proceedings of the U.S. Geological Survey (USGS) sediment workshop: expanding sediment research capabilities in today's USGS, February 4-7, 1997, Reston, VA. and Harpers Ferry, WV.* Reston, VA: US Geological Survey.