East Kill Management Unit 5

Town of Jewett – Scribner Hollow Road Bridge (Station 51119) to Station 40130

This management unit began at Scribner Hollow Road Bridge, and continued approximately 10,989 ft. to a private bridge on the Farber Farm in the Town of Jewett.

Management Unit 5 location
see Figure 4.0.1 for more detailed map

Stream Feature Statistics

18.8% of stream banks experiencing erosion
6.4% of stream banks have been stabilized
0% of stream banks have been bermed
486 feet of clay exposures
48 acres of inadequate vegetation
5,727 feet of road within 300ft. of stream

Summary of Recommendations Management Unit 5	
Intervention Level	Assisted Self-Recovery
Stream Morphology	No recommendations at this time
Riparian Vegetation	Monitor for introduction of Japanese Knotweed and eradicate new introductions. Increase width of riparian buffer in appropriate locations.
Infrastructure	Interplant rip-rap installations
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	No recommendations at this time
Water Quality	Investigate source of nutrient enrichment at tributary confluence (Station 46535)
Further Assessment	Consider hydraulic analysis of bridge openings

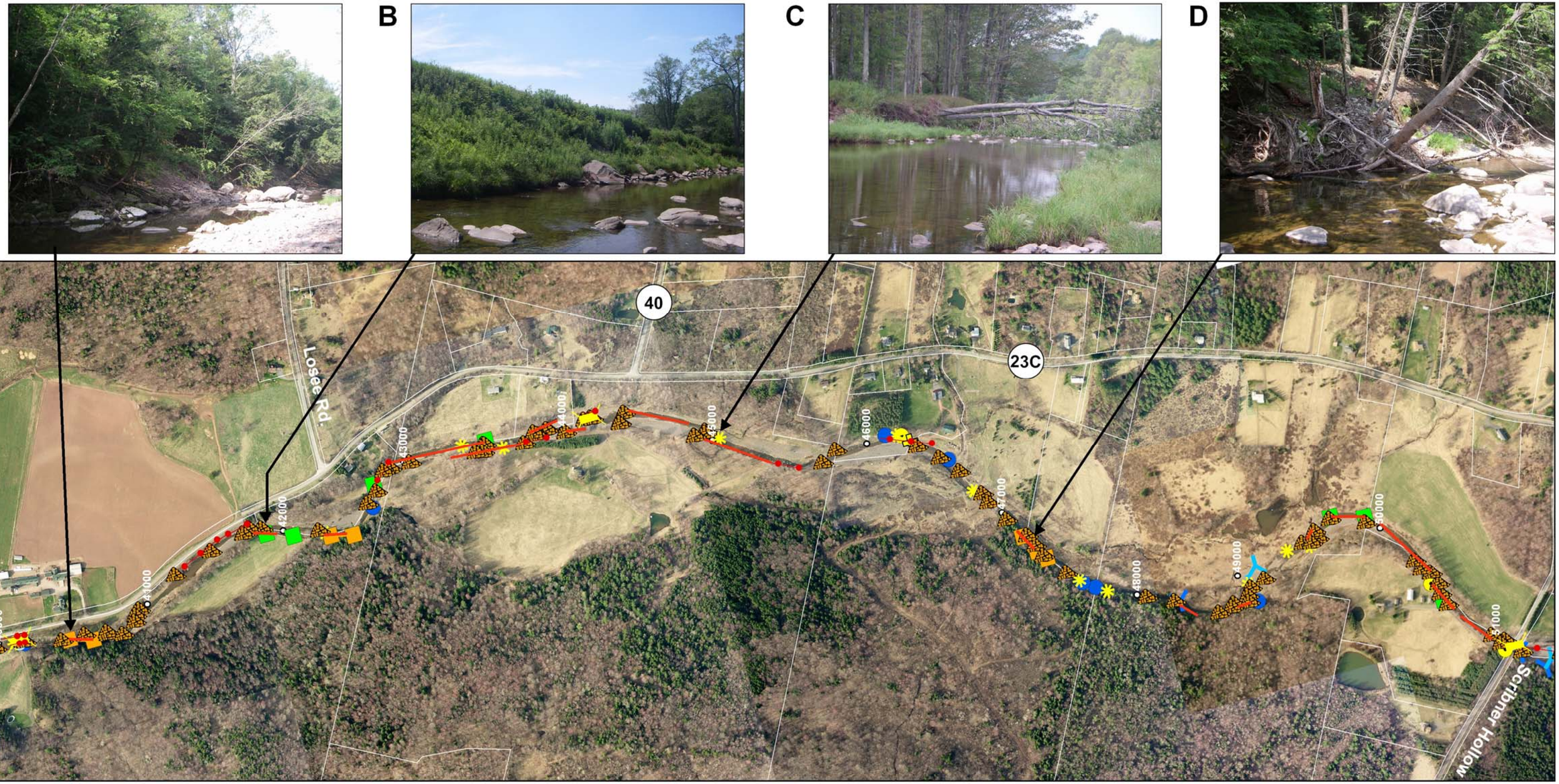


Figure 4.5.1 Management Unit 5 - 2006 aerial photography with stream feature inventory

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 alignment has not changed significantly over the years along this management unit; the channel has remained fairly stable. In 1959, there was one location, between Stations 45400 and 44600 where the channel had split and a secondary channel formed southwest of the main channel. Sometime between 1959 and 1967 the secondary channel was cut off from the main channel, since then, the main channel has remained stable along that reach of the East Kill.

As of 2006, according to available NYS DEC records dating back to 1996, there have been three stream disturbance permits issued in this management unit. Following the 1996 flood, a permit was issued for gravel removal upstream and downstream of the Sheehan Bridge. In 1996, a second stream disturbance permit was issued for the removal of tree and brush debris, and excavation of sand and gravel to restore stream flows to pre-flood conditions along 1,500 feet of stream near station 43900. In 2006, a third stream disturbance permit was issued for the replacement of a private bridge (Station 44200) and the removal of a gravel bar downstream of the bridge.

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

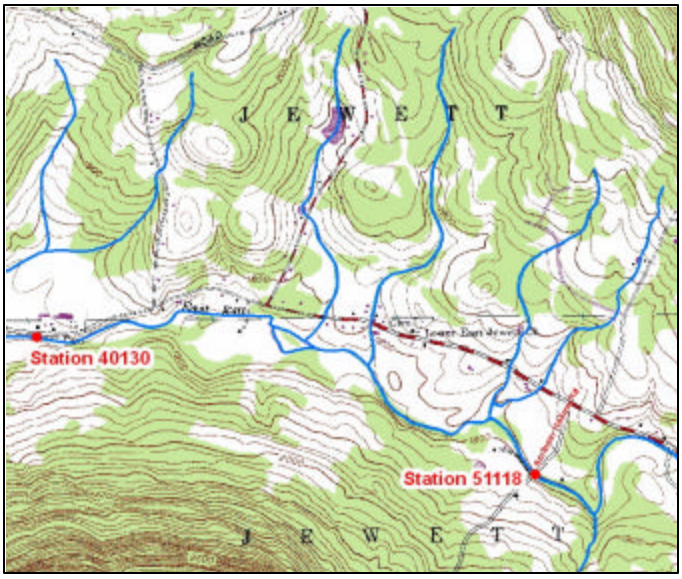
The 2006 stream feature inventory revealed that 18.8% (4,137 ft.) of the stream banks exhibited signs of active erosion along the 21,978 ft of total channel length in the unit (Figure 4.5.1). *Revetment* had been installed on 6.4% (1,398 ft.) of the stream banks. No berms were identified in this management 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 4.5.1. Stream stationing presented on this map is measured in feet and began at the confluence with the Schoharie Creek at Jewett. "Left" and "right" stream bank 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 #5 began at the Scribner Hollow Road Bridge. The drainage area ranged from 14.89 mi^2 at the top of the management unit to 19.34 mi^2 at the bottom of the unit. The valley slope was 0.75%.

Valley *morphology* was unconfined with a broad glacial and *alluvial* valley flat for most of this management unit. At the top and bottom of this management unit, valley morphology was laterally controlled by a narrow valley floor. Generally, stream conditions in this management unit were somewhat unstable, with over 4,000 feet of erosion and deficient sediment transport ability resulting in aggradational conditions throughout.



1980 USGS topographic map – Hunter Quadrangle
contour interval 20ft

There were 17 eroding banks documented in this management unit, including seven 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 and revetted stream banks with native trees and shrubs.

Piped outfall at Station 51070

This management unit began as the stream flowed under Scribner Hollow Road Bridge (#3201160, Station 51119, Figure 4.5.1 Inset A). Sediment deposition upstream and downstream of the bridge was observed at the time of the assessment; downstream there was full channel aggradation and a side bar on the right. During periods of high water, streams tend to deposit sediment when velocity slows due to flow constriction under a bridge. If this bridge is replaced in the future, it is recommended that a hydraulic analysis be conducted in order to determine the appropriate bridge width that will provide the capacity to convey flood flows through the opening. Near the bridge abutment, there was a 12 inch piped outfall (Station 51070), entering above the rip-rap along the left stream bank. This outfall provided drainage for Scribner Hollow Road.

Downstream of the bridge, the left bank was compromised by erosion in two locations. The first erosion was considered a *mass failure* (Stations 50974 – 50736), a large slope failure associated with downcutting stream channels and undermined support of steep slopes**.** This resulted in an erosion area of approximately 4,052 ft^2 that had compromised woody vegetation along the bank. At the second location, approximately 2,149 ft^2 of the left bank was affected by hydraulic erosion (Stations 50676 – 50471). Although both areas were significant erosion

Erosion at Stations 50676 - 50471

sites, they appeared to be slowly recovering, with herbaceous vegetation becoming established along portions of the face of the bank. However, without deep-rooted shrub and tree species, it is likely that the left bank will continue to erode during future high flows. At the top of the bank, there was a driveway, open field and mowed lawn. These erosion sites may be good candidates for remediation using vegetative toe and bank protection; during the field assessment, a riparian planting site was identified along the second erosion site. Both of these eroding sites on the left, should be included as part of the identified planting site (see details and planting recommendations below).

Downstream of the Scribner Hollow Road Bridge, there was a long private driveway that ran along the top of the eroding stream bank on the left. Beyond the driveway, the area was dominated by herbaceous vegetation including an open field and mowed lawn. This area is a recommended riparian planting site (Station 50589). A vigorous buffer with mature trees is important at this site because it may also filter nutrients and pollutants, if any, from the adjacent agricultural fields. Recommendations for this site include establishing a riparian buffer with the planting of deep-rooted native trees and shrubs along the streambank and the upland area. Increasing the buffer width to at least 100 feet will help to stabilize the stream bank and protect water quality through this reach by improving buffer functionality. The location of the driveway and some of the on-site buildings pose limitations for establishing a buffer of an appropriate width; moving the driveway away from the stream should be considered. Due to the erosion and the driveway location, this site will require a more detailed assessment prior to proceeding with vegetative plantings.

Riparian planting site at Station 50589

Through this reach of the stream, there was excessive sediment deposition including side bars, a *point bar*, and a *transverse bar*. Along the right stream bank, there was minor erosion (Stations 50411 – 49979) for approximately 432 feet. There was a forested buffer between the eroding bank and the adjacent agricultural field along most of the bank; along the downstream portion of this erosion, the riparian buffer was narrow. It is recommended

Riparian planting site at Stations 49900 - 49691

that the riparian zone be maintained along this bank and widened with native woody vegetation to achieve the critical 100-foot buffer in locations along the bank that have a narrow section of trees and shrubs. As the stream *meandered* downstream, the *thalweg*, or deepest part of the stream channel, flowed up against the right stream bank causing approximately 1,673 ft^2 of the bank to erode (Stations 49900 – 49691). The vegetation along the top of this bank was herbaceous; during the assessment, this site was identified as a riparian planting site (Stations 49900 – 49691). Remediation of this site using vegetative toe and bank protection is recommended through plantings of native sedges along the stream's edge, and shrubs and trees in the upland area. Establishing a buffer width of at least 100 feet will provide the greatest benefit for stream bank stability and water quality; buffer width should be increased by the greatest amount agreeable to the landowners. Due to the close proximity of this eroding bank to the previous erosional area, and the recommendation to improve the buffer along both sites, it may be beneficial to coordinate planting efforts. As with all unstable banks, careful consideration should be given to the on-site conditions when determining the appropriate species and locations for plantings, to ensure that vegetative material is not washed away during subsequent periods of high water.

Continuing downstream, there was a 1.2 acre riverine wetland (Stations 49585 - 49060). This wetland was classified as R3USA. Set back from the stream, along the right, there was a 0.4 acre palustrine wetland with emergent herbaceous vegetation (Stations 49357 – 49074). This wetland was classified as PEM1C (see Section 2.6 for detailed

Wetland boundaries approximately delineated by NWI (Stations 49585 - 49060)

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. Within the riverine wetland area, there was erosion (Stations 49600 – 49529) along 71 feet of the right stream bank. Again, this area only had herbaceous vegetation, which provides minimal bank stability protection. Riparian improvements along the toe and upland area may help to stabilize this bank.

There was woody debris accumulation and excessive sediment deposition through the riverine wetland and continuing downstream including multiple point, side and transverse bars. Along the left stream bank there was a point bar (Stations 49151 – 48723) with a steeper slope at the top of the bar. Along the left side of the bar, there was evidence that showed a small secondary channel where water would flow along the back edge of the bar during periods of high water stage.

Point bar at Stations 49151 - 48723

Along the right bank, there were two *divergences* (Stations 49127 and 48864) where a flood chute split off from the main channel. Flood chutes convey flow through a secondary channel during periods of high flows. The second divergence had abundant woody debris accumulation at the start of the channel. Only one channel convergence was observed during the assessment, it may be that both divergences provided channels for flow to the same flood chute. The flood chute converged (Station 48851) with the main channel approximately 276 feet downstream from the first channel divergence; there was woody debris accumulation at its confluence with the

Flood chute convergence at Station 48851

East Kill. Just downstream of the divergences, a small unnamed intermittent tributary (Station 48773) entered along the left bank. There was flow at the time of the assessment.

Mass failure at Stations 48731 - 48643

Just downstream of the tributary, there was a mass failure (Stations 48731 – 48643) along the left bank that caused 1,579 ft^2 of erosion and compromised mature woody vegetation. Multiple trees lined the toe of the bank and appeared to be contributing to localized scour, potentially exacerbating the erosion at this site. Aggradational conditions persisted through this stretch of the stream.

Continuing downstream, there was another mass failure (Stations 48400 – 48269) along 131 feet of the left stream bank that had resulted in approximately 3,004 ft^2 of erosion, exposing mixed till and compromising trees along the bank. At the time of the assessment, the bank appeared to be slowly recovering; there was a vegetated bench along the toe of the bank and some young woody vegetation had been established along the face of the bank, which may help the bank to stabilize over time. This site may be appropriate for vegetative remediation with sedge plantings on the bench and along the toe of the bank to reinforce the vegetation that had begun to establish itself. Prior to proceeding with any work, this site may require a more detailed site assessment.

Mass failure at Stations 48400 - 48269

Wetland boundary approximately delineated by NWI (Stations 47457 - 46800)

Downstream, two unnamed intermittent tributaries entered along the left bank. At the time of the assessment, these tributaries were not flowing; they appeared to be tributaries that carried run-off from the hill slope during precipitation events. Woody debris and a small tree had accumulated along this stretch of stream; the debris did not appear to pose a significant obstruction to flows.

Continuing downstream, there was a 1.5 acre palustrine wetland (Stations 47457 - 46800) with scrub-shrub vegetation along the left stream bank. This wetland was classified as PSS1A (see Section 2.6 for detailed wetland type descriptions). Near the upstream portion of this wetland, there was a mass failure (Stations 47281 – 47126, Figure 5.5.1 Inset D) along the left bank. This mass failure had resulted in an erosion area of approximately 1,938 ft^2, exposing areas of mixed till and compromising mature trees along the bank. There were multiple exposures of lacustrine clay (Stations 47389 – 47189) along the stream bank and the channel bed throughout this erosion site, and just upstream of the erosion. Clay inputs into a stream are a serious water quality concern because they increase *turbidity,* degrade fish habitat, and can act as a carrier for other pollutants and pathogens. Excessive sediment deposition continued through this stretch of stream including side and point bars along the channel bed of both sides of the stream. Further downstream there was also a fallen tree (Station 46775) along the left bank that appeared to be causing localized scour upstream and downstream of the debris.

Clay exposure at Stations 47389 - 47189

Tributary at Station 46535

As the stream meandered to the left, an unnamed tributary entered from the right stream bank (Station 46535). This tributary drained the lower slopes of the Blackhead Mountains before it reached the flatter topography of the valley floor where it entered the East Kill. 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 East Kill. 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. At the time of the assessment, the tributary was entrenched and flow was subsurface at the confluence. As evidenced by the significant algal growth around the confluence, this tributary also appeared to cause nutrient enrichment, a process in which the addition of nutrients (primarily nitrogen and phosphorus) to water bodies stimulates algal growth. Runoff associated with the nearby agricultural activity is the likely cause of the nutrient enrichment. Investigation of the possible sources of nutrient inputs and developing measures to prevent *eutrophication* of the tributary is recommended. The New York State Department of Environmental Conservation classifies streams and rivers based on their "best use" (NYSDEC, 1994). This tributary was classified C by the NYS DEC, indicating that the best uses for this stream are supporting fisheries and other non-contact activities.

Stream crossing at Station 46726

Continuing downstream approximately 328 feet of the right stream bank was reinforced with rock rip-rap and placed woody debris including large trees (Stations 46400 – 46072). The rip-rap was in poor structural and functional condition and the riparian buffer beyond the rip-rap

installation was sparse, with herbaceous vegetation to the edge of the bank. There was a well established stream crossing (Station 46276) associated with the nearby agricultural lands that interrupted the rip-rap along the bank. This crossing appeared to contribute to the excessive sediment deposition along this stretch of stream and may contribute to the poor stability of the stream bank and failing rip-rap. There was also a 4-inch piped outfall (Station 46205), with no outfall protection, entering through the rip-rap on the right. Along the downstream portion of the rip-rap there was a flowing spring seep (Station 46124) that appeared to compromise the stream bank causing minor erosion along the rip-rap. Interplanting the rip-rap and reinforcing the toe of this stream bank with native shrub and sedge species is recommended. The risk to bank stability and water quality can be minimized by maintaining mature trees along the critical 100 foot buffer zone. There may be limitations to achieving the appropriate buffer width due to nearby residential and agricultural structures and pathways. However, a vigorous buffer with mature trees is important at this site because it may also filter nutrients and pollutants from the adjacent agricultural fields. The buffer width should be increased by the greatest amount agreeable to the landowners with plantings of native tree and shrub species. Following the 1996 flood, DEC issued an emergency stream disturbance permit (Station 46220) for flood repairs along 1,500 feet of stream channel including, woody debris removal and excavation of sand and gravel to restore stream flows to pre-flood conditions.

Continuing downstream, there were two wetlands. The first wetland was a 0.6 acre riverine wetland (Stations 46142 - 45756) along the left stream bank. This wetland was classified as R3USA. The second wetland was a 4.3 acre palustrine wetland (Stations 45756 - 44400) with forested vegetation. This wetland was classified as PFO1A (see Section 2.6 for detailed wetland type descriptions). Through this wetland, the left stream bank was reinforced with rip-

Wetland boundary approximately delineated by NWI (Stations 46142 - 44400)

rap with some inter-planted vegetation including, willows and sedges. Although the rip-rap was in poor structural and functional condition at the time of the assessment, the vegetation that had established itself through the rip-rap appeared to provide some bank stability and there was a forested riparian buffer beyond the rip-rap. Just downstream of the revetment, there was erosion (Stations 45385 – 44945) along 440 feet of the left bank. The stream had caused approximately 2,200 ft^2 of the bank to erode, exposing mixed till and compromising some mature trees. Vegetation along the top of the bank was mixed; there was herbaceous vegetation that interrupted the continuity of the forest in some areas along the bank. Augmenting these areas with native trees and shrubs may help to improve bank stability. At the downstream portion of this eroding bank there were two fallen trees (Station 45039, Figure 5.5.1 Inset C) lying across the stream channel that provided an obstruction at all flows. At the time of the assessment, the debris did not appear to exacerbate the erosion at this site, however, during high flows the stream may flank this obstruction potentially contributing to increased erosion along this bank. There continued to be excessive sediment deposition through this reach of the stream including side, point and transverse bars.

Erosion at Stations 45385 - 44945

Downstream, there was minor erosion (Stations 44800 – 44420) along 380 feet of the right stream bank. The bank was vegetated with shrubby and herbaceous vegetation, beyond which there was a successional forest. Continuing downstream, there was a private bridge (Station 44190) that was very low across the stream. There was excessive sediment deposition upstream and downstream of the bridge. Deposits such as these commonly occur when an inadequately

Bridge at Station 44190

sized bridge opening causes water to back up upstream of the bridge and reduces stream velocity. As stream velocity slows sediment drops out causing aggradation of the channel bed. The height and width of this bridge opening poses a constriction to flow. In high stage, the floodwater may seek conveyance through alternative paths, forming new channels around the bridge constriction, as appeared to have happened at this site. Following the 1996 flood, DEC issued an emergency stream disturbance permit (Station 43888) for flood repairs upstream and downstream of the bridge including, removal and excavation of sand and gravel to restore stream flows to pre-flood conditions. A second stream disturbance permit was issued in 2006 to remove sediment downstream of the bridge; this permit was also issued for the removal of the existing bridge and replacing it with a more appropriately sized bridge span that will convey flow during high-water. At the time of the assessment, work had not begun to replace this bridge. The permit allows in-stream or stream bank work between June 15th and September 30th of any year the permit is in effect; this permit expires on September 30, 2008.

Erosion at Stations 43980 - 43791

Just downstream of the bridge there was a significant side bar (Stations 44168 – 43918) with some herbaceous vegetation including sedges and grasses. At the time of the assessment, there was some flow along the back edge of the bar; it is likely that this small secondary channel receives only intermittent flow, with most of the flow passing through the main channel during low flows. Behind the bar, the stream had eroded approximately 1,887 ft^2 of the right bank (Stations 43980 – 43791) compromising some young trees. There was also some minor erosion (Stations 44146 - 44022) along 124 feet of the left stream bank, followed by 143 feet of rip-rap (Stations 43900 – 43757) that was in good structural condition but in poor functional condition, with herbaceous vegetation along the top of the revetted bank, beyond which there appeared to be mature planted evergreen trees. The herbaceous portion of the stream bank should be planted with native shrubs and trees to

Riparian planting site at Station 43526

improve the riparian buffer along this reach of stream. Excessive sediment deposition continued downstream including multiple side and transverse bars.

Continuing downstream, there was 443 feet of erosion (Stations 43730 – 43287) along the left stream bank exposing mixed till and compromising woody vegetation. Opposite this erosion site, there was a riparian buffer planting site along the right stream bank (Station 43526) identified during the field assessment. There was 4,685 ft^2 of erosion (Stations 43500 – 42914) along 586 feet of the right stream bank compromising some small trees. Excessive sediment deposition continued through this stretch of the stream. There was some woody debris accumulated along the bank that appeared to be contributing to localized scour and upstream aggradation. Recommendations for this site include augmentation of the existing buffer with the planting of additional native trees and shrubs along the streambank and the upland area, and reinforcing the toe of the bank by planting sedges. Buffer width should be increased by the greatest amount agreeable to the landowners. Increasing the buffer width to at least 100 feet will increase the buffer functionality and protect the stream from nearby land uses.

As the stream meandered to the left, the right bank was reinforced with rip-rap. The bank was high and steep with some mature woody vegetation to the top of the bank, beyond which there was mown lawn and a private residence. The rip-rap was in fair functional condition and poor structural condition. Interplanting the rip-rap and reinforcing the toe of this streambank with native shrub and sedge species is recommended. This planting will help to strengthen the revetment, while enhancing aquatic habitat. At the time of the field assessment, a recommended riparian

Rip-rap at Stations 42923 - 42713

plating site (Station 42758) was identified along the revetted bank due to the minimal riparian buffer between the stream and the mown lawn. As with previously mentioned riparian planting sites, recommendations for this planting site include enhancing the riparian buffer with native tree and shrub species and increasing the buffer width by the greatest amount agreeable to the landowners, with 100 feet being the optimal width for improving bank stability and protecting water quality.

Tributary and beaver dam at Station 42829

Along the meander bend, an unnamed tributary entered along the left stream bank. There was a beaver dam constructed across the tributary just upstream of its confluence with the East Kill. 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 the food chain), reduces water velocities and flood-related hazards, filter sediment and release water to the stream and groundwater slowly throughout the year.

As the stream began to meander to the right, there was a mass failure (Stations 42407 – 42263) along the left bank. Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows. Along this section of stream, during high water the toe of the bank was compromised and flow was undermining the steep slope, resulting in an erosion area of approximately 2,452 ft^2, exposing glacial till (Stations 42407 – 42263) throughout the bank and compromising mature trees. During high flows and times of active

Mass failure & clay exposure at Stations 42407 - 42263

erosion, a significant amount of clay may enter the stream from this bank; this poses a water quality threat due to the turbidity associated with clay exposures. Along the downstream portion of this eroding bank, there was a fallen tree that appeared to be contributing to localized scour and exacerbating the erosion at this site.

Wetland boundary approximately delineated by NWI (Stations 42461 - 41944)

Planting site at Stations 42063 - 41900

Along this portion of the stream, there was a 0.7 acre palustrine wetland with scrub-shrub vegetation (Stations 42461 - 41944). This wetland was classified as PSS1A (see Section 2.6 for detailed wetland type descriptions). There was excessive sediment deposition upstream of, through, and downstream of the wetland.

Downstream of the eroding bank, there was a recommended riparian planting site (Stations 42063 – 41900, Figure 5.5.1 Inset B) along the left bank. A natural riparian buffer was absent along this agricultural field, with herbaceous vegetation to the top of the bank and on the face of the relatively steep bank. Without deep-rooted shrub and tree species, this bank may be compromised during future high flows. Recommendations for this site include establishing a riparian buffer with the planting of 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 increase the buffer's functionality and protect the stream from nearby land uses. Starting along the downstream portion of this proposed riparian planting site there was a failing bank (Stations 41936 – 41787) resulting in an erosion area of approximately 1,640 ft^2 and exposing mixed till. The downstream portion of this erosion was along a thinly forested bank. Extending the planting area to include augmentation of the existing buffer may help to stabilize the eroding bank. Reinforcing the toe of the bank with native sedge species is also recommended.

As the stream meandered gently to the left and State Route 23C encroached on the stream channel, the right bank was reinforced with rip-rap (Stations 41789 – 41323). The

Rip-rap at Stations 41789 - 41587

rip-rap along the upstream portion (Stations 41789 – 41587) of the Route 23C road embankment was comprised of large rock and is in good structural and functional condition. The downstream portion of this revetted bank (Stations 41587 – 41323) was comprised of smaller rock with herbaceous vegetation throughout and some shrubby vegetation interspersed along the face of the embankment. This rip-rap was in fair structural and functional condition. Interplanting the rip-rap and reinforcing the toe of this streambank with native shrub and sedge species is recommended. This planting will help to strengthen the revetment, while enhancing aquatic habitat. Excessive sediment deposition continued along this stretch of stream.

There was a well established stream crossing (Station 40923) associated with the nearby agricultural lands that interrupted the narrow riparian buffer along the bank. This crossing may be contributing to the excessive sediment deposition along this stretch of stream. Aggradational conditions including, side and point bars and full channel aggradation, persisted through this crossing area to the bridge at the end of this management unit.

Stream crossing at Station 40923

Continuing downstream, the stream remained relatively close to State Route 23C, with a narrow woody buffer along the right. On the left, there was a mass failure (Stations 40564 – 40413, Figure 5.5.1 Inset A) along 151 feet of the stream bank. Along this section of stream, the thalweg flowed up against the toe of the bank through a deep pool, undermining the steep slope, resulting in an erosion area of approximately 3,024 ft^2 and compromising mature trees along the bank. There was exposed lacustrine clay (Stations

Tributary at Station 40453

40564 - 40413) along the bed and bank of this erosion site. During high flows and times of active erosion, a significant amount of clay may enter the stream from this bank, contributing to increased turbidity and impaired water quality. Entering along the left, there was an unnamed intermittent tributary (Station 40453) that drained the hill slope. At the time of the assessment there was no flow through this tributary. However, it appeared to have been contributing to the erosion at this site; the channel created by the tributary flow had exposed many roots, and some trees were compromised and had started to fall along the intermittent channel. Further downstream, another tributary (Station 40154) entered along the left bank of the East Kill. It was a small intermittent unnamed tributary that had little flow at the time of the assessment.

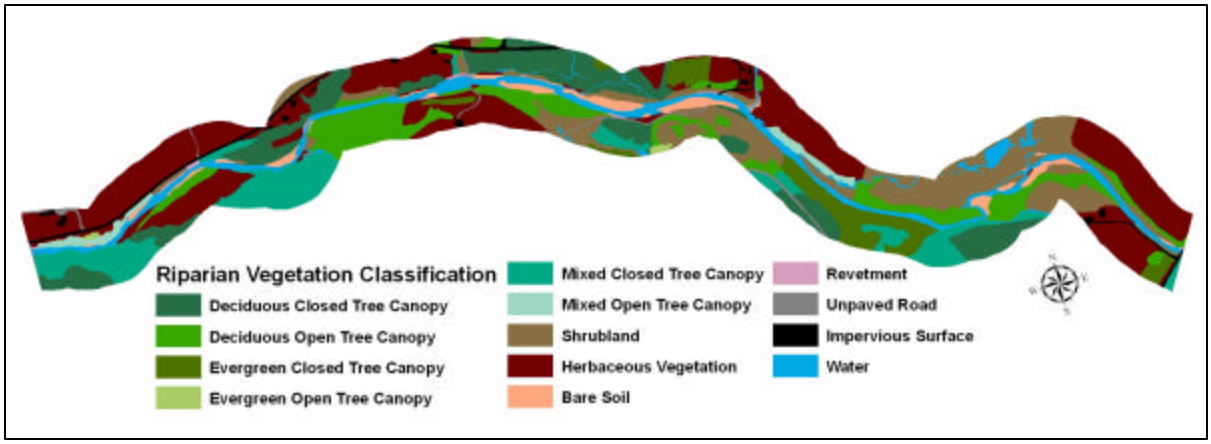
Bridge at Station 40131

This management unit ended at a private bridge (Station 40130) that provided access to agricultural land. There was rip-rap along both stream banks upstream and downstream of the bridge. Excessive sediment deposition upstream of the bridge was observed at the time of the assessment. Deposits such as these are commonly caused by inadequate sizing of the bridge opening. An undersized bridge opening causes water to back up upstream of the bridge, reducing stream velocity, which results in sediment deposition. While bankfull flows and may flow freely through this bridge, higher flows may backwater, resulting in the upstream aggradation. If this bridge is replaced in the future, it is recommended that a hydraulic analysis be conducted in order to determine the appropriate bridge width that will provide the capacity to convey flood flows through the opening.

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 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. Five suitable riparian improvement planting sites were documented within this management unit. There were also several locations within this unit that would benefit from interplanting of revetted embankments.

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 stream banks. The result can include rapid stream bank 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 2006 (Riparian Vegetation Mapping, Appendix A). The first appearance of Japanese knotweed on the East Kill mainstem does not occur until management unit #7. The best means for controlling knotweed is prevention of its spread, therefore, efforts should be made to ensure that all fill brought into the area is clean and does not have fragments of knotweed or other



Riparian vegetation classification map based on aerial photography from 2001

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. Periodic monitoring for knotweed introductions in this unit is recommended.

An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (see above map and Riparian Vegetation Mapping, Appendix B). In this management unit, the predominant vegetation type within the 300 ft. riparian buffer was forested (46 %) followed by herbaceous (29%). *Impervious* area (2.3 %) within this unit's buffer was primarily the local and private roadways, and residential and agricultural structures. 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 stream bank 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 East Kill on the basis of recent surveys. The new FIRM hardcopy maps are available for viewing at the Greene County Soil & Water Conservation District Office and the Jewett Municipal Building. 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 maps (above), six 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 stream banks. Woody debris within the stream channel was observed throughout the unit. This woody debris was providing 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 East 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 East Kill. Fine sediment inputs into a stream increase

turbidity and can act as a transport mechanism for other pollutants and pathogens. There were three significant 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 the East Kill. The cumulative impact of oil, grease, sediment, salt, litter and other unseen pollutants found in road runoff can significantly degrade water quality. There were three 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. 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 2005, two homeowners within the drainage area of this management unit had made use of these programs to replace or repair a septic system.

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