East Kill Management Unit 4

Town of Jewett – Station 62465 to Scribner Hollow Road Bridge (Station 51119)

This management unit began at Station 62465, and continued approximately 11,346 ft. to the Scribner Hollow Road Bridge in the Town of Jewett.

Stream Feature Statistics

17.4% of stream banks experiencing erosion
8.8% of stream banks have been stabilized
0.5% of stream banks have been bermed
447 feet of clay exposures
38 acres of inadequate vegetation
5,108 feet of road within 300ft. of stream

Management Unit 4 location
see Figure 4.0.1 for more detailed map

Summary of Recommendations Management Unit 4	
Intervention Level	Assisted Self-Recovery, Full Restoration
Stream Morphology	Modify channel morphology to minimize headcut, erosion and clay inputs at mass failure in close proximity to State Route 23C (Stations 56223 – 55909)
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	Restoration of mass failure (Stations 56223 – 55909) to minimize clay inputs
Further Assessment	Consider hydraulic analysis of private bridge openings

Legend

- Bank erosion
- Bank Erosion Monitoring Site (BEMS)
- Bridge
- Bedrock
- Crossing
- Berm
- Culvert
- Dam
- Deposition
- Dump Site
- Clay Exposure
- Clay Exposure
- Gage
- Obstruction
- Planting Site
- Piped Outfall
- Revetment
- Tax Parcel
- Tributary
- Utility
- Water Intake
- 1000ft Stream Stationing

East Kill Management Unit 4
Stream Feature Inventory

N W E S

Scale = 1:7000

0 250 500 1,000 Feet

Stream flow

Figure 4.4.1 Management Unit 4 - 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 changed significantly over the years in three locations along this management unit, otherwise the channel has remained fairly stable. In each of the three locations, the channel has experienced *lateral migration*, the movement of a channel across its floodplain over time. The first significant change in channel alignment (Stations 59900 – 58400) began approximately 2,565 feet downstream from the beginning of this management unit. A review of historical aerial photographs, showed evidence that the main channel diverged, forming a secondary channel, sometime between 1959 and 1967. Between 1967 and 1980, the main channel and the secondary channel had experienced periods of degradation and aggradation as it moved across the valley floor, and by 2001 the secondary channel was no longer an active channel. Approximately 1,000 feet further downstream, a second change in channel alignment occurred (Stations 57400 – 55800). Historically, through this section of stream, there has been a split channel, the locations and lengths of the secondary channel has changed over time as the outside banks of the meandering channel moved laterally across the valley floor and down the valley. The channel alignment remained relatively stable for approximately 3,600 feet until the third change in channel alignment occurred (Stations 52200 – 51200). Through this section of stream, a secondary channel formed sometime between 1959 and 1967, which persisted through 1980; sometime

between 1980 and 2001 the secondary channel was cut off from the main channel with the 2001 alignment following a similar path as the channel in 1959.

As of 2006, according to available NYS DEC records dating back to 1996, there have been no stream disturbance permits issued in this management unit.

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

The 2006 stream feature inventory revealed that 17.4% (3,946 ft.) of the stream banks exhibited signs of active erosion along the 22,693 ft. of total channel length in the unit (Figure 4.4.1). *Revetment* has been installed on 8.8% (1,998 ft.) of the stream banks. One berm, along 0.5% of the stream banks (120 ft.), was 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 4.4.1. Stream stationing presented on this map is measured in feet and begins 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.

1980 USGS topographic map – Hunter Quadrangle
contour interval 20ft

Management unit #4 began at Station 62,465. The drainage area ranged from 10.15 mi^2 at the top of the management unit to 14.89 mi^2 at the bottom of the unit. The valley slope was 0.92%.

Valley *morphology* in this management unit was relatively

unconfined with a broad glacial and alluvial valley flat until lower in the management unit. Near station 56900, the stream meandered to the right toward State Route 23C. Valley morphology was influenced by the encroachment of State Route 23C until the stream meandered to the left, moving away from the road. As the stream moved away from the road, valley morphology was laterally controlled by a narrow valley floor and was then relatively unconfined for the remainder of this management unit. Generally, stream conditions in this management unit were somewhat unstable, with deficient sediment transport ability resulting in aggradational conditions throughout, and almost 4,000 feet of erosion. There were 18 eroding banks documented in this management unit, including three 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. In addition, consideration should be given to full restoration of the mass failure (Stations 56223 – 55909) that impairs water quality and may threaten State Route 23C.

Erosion at Stations 62550 - 61905

This management unit began with an eroding bank; starting near the end of management unit # 3 there was some minor hydraulic erosion and scour (Stations 62550 – 61905) along the left stream bank, for approximately 87 feet, that continued into management unit # 4 for an additional 558 feet. Along the eroding bank, mature trees had been compromised and were hanging over the stream channel. In one location (Station 62435) along the bank, several large trees were lying across the channel, providing an obstruction to flow that contributed to aggradation upstream of the debris and scour downstream. There was mixed till throughout the bank, a pool along the toe, and excessive sediment deposition in the form of side and point bars along the right bed and bank, opposite the erosion. An unnamed intermittent tributary entered from the left through the eroding bank, possibly contributing to the erosion along the bank and aggradation in the stream channel; there was no flow at the time of the assessment.

Mass failure at Stations 61894 - 61677

The hydraulic erosion on the left streambank was followed by a *mass failure* (Station 61894 to Station 61677). Streambank erosion often occurs on the outside of meander bends where the stream velocity is greatest during high flows; along this section of stream, the thalweg flowed up against the toe of the bank undermining the steep slope, resulting in an erosion area of approximately 9,784 ft^2, exposing mixed till and compromising mature trees along the bank. Along the upstream end of this erosion, there was a clay exposure and seepage along the left bank at station 61881. The seepage may further exacerbate the erosion at this site. 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. There were two aggradational areas downstream of the eroding bank, a side bar along the left bed and a point bar along the right bed of the channel. Both bars were well vegetated with sedges and willows.

Clay exposure & seepage at Station 61881

As the stream meandered to the left, there was minor scour and the right bank was undercut (Stations 61122 – 60802) resulting in an erosion area of approximately 2,243 ft^2. Along the downstream portion of the erosion, there was a large tree and a root wad beside the right bank (Station 60930) that appeared to be contributing to bank scour upstream and downstream of the debris.

Erosion at Stations 61122 - 60802

Downstream of the eroding bank, just before the stream meandered to the right, there was a channel *divergence* (Station 60771) where a flood chute split off from the

main channel. Flood chutes convey flow through a secondary channel during periods of high flows; this flood chute converges (Station 60257) with the main channel approximately 514 feet downstream. Throughout this meander bend (Stations 60758 – 59735), there was excessive sediment deposition along the right and left channel bed including, side, point and transverse bars. There was also minor erosion and scour along 311 feet of the left bank (Stations 61011 – 60700), with some compromised trees that had fallen in the stream along the bank. Opposite the erosion, there was a small unnamed tributary entering from the left with aggradation at its confluence with the East Kill. This tributary along with the eroding banks, likely contributed to the aggradational conditions through this stretch of stream.

Riparian planting site at Station 59700

Downstream, the land cover on the right stream bank changed from forested to an open field, with herbaceous vegetation and a few scattered shrubs and trees. This site is ideal for improving the riparian zone through plantings because the streambank appeared to be relatively stable despite the lack of mature deep-rooted vegetation. Recommendations for this site include establishing a riparian buffer with the planting of native trees and shrubs along the streambank and the upland area (Figure 4.4.1 Inset D, Station 59700). 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 such as filtering nutrients and pollutants, if present, from the nearby land use.


Rip-rap at Stations 59612 - 59066

Just downstream of the recommended riparian planting site, the streambank was reinforced with rip-rap along the right bank (Stations 59612 – 59066). The rip-rap was in fair structural and functional condition. It is

Tributary at Station 59423

recommended to interplant native shrub and sedge species through the rip-rap and along the toe of this stream bank. This planting will help to strengthen the revetment, while enhancing aquatic habitat.

There was a gap in the rip-rap along the right bank at the confluence of an unnamed tributary (Station 59423) with the East Kill. This tributary drains the lower slopes of Black Head and Thomas Cole Mountains before it reaches the flatter topography of the valley floor where it enters the East Kill. The New York State Department of Environmental Conservation (DEC) 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.

Downstream of the tributary and upland from the revetment, there was a sparsely vegetated field that was serving as a storage location for heavy equipment and machinery. There was bare soil or herbaceous vegetation to the edge of this revetted bank. As mentioned previously, inter-planting of the rip-rap is recommended here. Recommendations for this site also include establishing a riparian buffer with the planting of native trees and shrubs in the upland area (Station 59200). 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.

Riparian planting site at Station 59200

Opposite the revetted bank on the left, there was a substantial *point bar* (Stations 59735 – 58838), or sediment deposition caused by a decrease in sediment transport capacity

Wetland boundary approximately delineated by NWI Stations 49346 - 58386

on the inside of a meander bend. The tributary that entered from the right bank likely contributed to the excessive aggradation along this stretch of stream. Starting at the downstream end of this point bar, there were two federal wetlands adjacent to each other (Stations 59346 – 58386). The first wetland was 1.8 acres and classified as R3USA, the second one was 1.2 acres and classified as PEM1A (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. Within these wetlands, along both stream banks, there was abundant woody debris including many large trees and a root wad along the left bank and large trees along the right bed and bank. There continues to be excessive sediment deposition with point bars on the channel bed along both the left and right stream banks, and a *transverse bar*, or a diagonal accumulation of sediment across the stream channel.

Downstream of the wetlands, there was 1,043 ft^2 of erosion (Stations 58535 – 58334) along the right bank, exposing approximately 113 cubic yards of lacustrine clay. The stream bank was forested and at the time of the assessment, it appeared as though clear-cutting had taken place upland from the stream's edge. That may have contributed to an increase in surface runoff entering the stream and potentially exacerbating the erosion at this site.

Erosion & clay exposure at Stations 58535 - 58334

Wetland boundary approximately delineated by NWI Stations 58068 - 57721

Continuing downstream, along the left bank, there was a 0.8 acre federally designated riverine wetland (Stations 58068 – 57721), classified as R3USA (see Section 2.6 for detailed wetland type descriptions). Conditions along this bank were unstable, there was approximately 2,261 ft^2 of erosion (Stations 58020 – 57737), and two woody debris accumulations along this bank that appeared to contribute to scour at this site. There was a thin line of trees and shrubs along the top of the eroding stream bank, which provided limited stability or protection from stream flows. Beyond the narrow riparian buffer there was mown lawn. Recommendations for this site include augmentation of existing buffer with the planting of additional 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 functionality by slowing stormwater runoff, filtering pollutants, and protecting the stream from the impacts of nearby land uses. Through the eroding bank, a flood cute (Station 57913) entered from the left with a three foot drop into a scour hole. The location of the channel divergence was not observed at the time of the assessment. Flow exiting the flood chute during high flows likely contributes to, or exacerbates, the erosion along this bank. Due to the influence that the riverine wetland and flood chute have on the stream bank, prior to proceeding with any vegetative plantings, these conditions should be given careful consideration when identifying the appropriate species and locations for plantings.

Flood chute and scour hole at Station 57913

Continuing downstream, there was

Erosion at Stations 57700 – 577478
Riparian planting site

excessive sediment deposition (Stations 57700 – 56800) including, a point bar along the left channel bed, two side bars and two point bars along the right channel bed. The stream flow scoured and undercut the right bank causing approximately 1,306 ft^2 of erosion (Stations 57700 – 57478). Deep-rooted vegetation was sparse along this stream bank; there were a few mature trees at the top of the bank and an open field with herbaceous vegetation. It is recommended that this site be considered for riparian plantings including, reinforcing the toe of the bank with sedges, augmenting the existing buffer and increasing the buffer width by the greatest amount agreeable to the landowner, through plantings of native tree and shrub species. Due to the erosion along the bank, this site may require a more detailed site assessment prior to proceeding with any work. Opposite the erosion, the left bank had been reinforced with a stacked rock wall (Stations 57532 – 57386) that was in poor condition and provided minimal protection for the toe of the stream bank.

Just down stream of the stacked rock wall, along 651 feet of stream bank, there was an erosional area (Stations 57381 – 56730) of approximately 3,904 ft^2 on the left. Some mature trees were being compromised along the upstream portion of this erosion, while the remainder of the bank had mown lawn to the top of the stream bank, with a few scattered trees. At the end of the erosion, there was a fallen tree across the stream channel that provided a minor obstruction at low flows; it may pose a more significant obstruction during higher flows. Entering along this bank, there was a piped outfall that drained nearby residential land use and Shadow Mountain Road; it appeared to exacerbate the erosion along the stream bank. This site (Station 57071) was also identified as a site that would benefit from riparian plantings.

Riparian planting site as Station 57071

Recommendations are similar to those of previous planting sites within this management unit including, reinforcing the toe with sedges and establishing a riparian buffer of an appropriate width by planting native shrub and tree species. Careful consideration should be given to the eroding condition of the bank prior to beginning riparian plantings.

Riparian planting site at Station 56670

Along the right bank, there was a small erosional area of approximately 208 ft^2 from station 57381 to station 57339. Continuing downstream, there was a fourth recommended riparian planting site (Station 56670) along the left bank. There was an open field at the top of the stream bank and a riparian buffer was absent. Again, recommendations include establishing a riparian buffer with deep-rooted, native tree and shrub species. Buffer width should be maximized to improve stability of the stream bank and to protect the stream from the impacts of nearby land use.

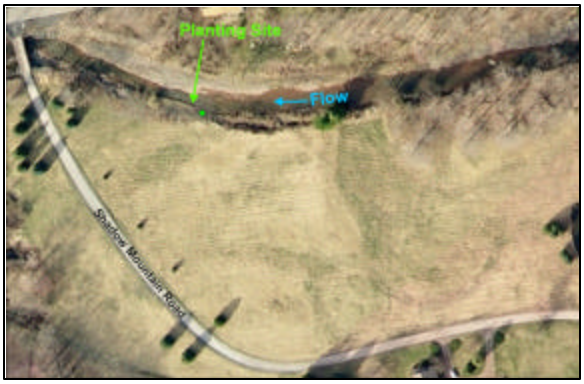
Excessive sediment deposition (Stations 56600 -55000) continued for approximately 1,600 feet, until the stream flowed under the Shadow Mountain Road Bridge, with multiple side and point bars along the left and right channel bed. There were also multiple woody debris obstructions through this stretch of stream. As the stream meandered to the right, there was a channel divergence on the left bank where a flood chute (Station 56370) split off from the main channel. The flood chute continued for approximately 389 feet until its convergence with the main channel (Station 55842). At the confluence of the flood chute with the East Kill, there was excessive sediment deposition, which was contributing to the aggradational conditions along this reach of the stream.

Flood chute at Station 56370

Erosion at Stations 56223 - 55909

Along the right bank, a small unnamed tributary entered the East Kill (Station 56276); this tributary entered along the back edge of a side bar and likely contributed to the aggradation conditions along this stretch of stream. As the stream meandered sharply to the left, there was a *headcut* (Station 56164), where the stream was actively eroding the streambed downward to a new base level; there was a drop in channel elevation of approximately three feet. As the *thalweg*, or deepest part of the stream channel, flowed directly at, and then up against, the right stream bank there was a mass failure (Stations 56223 – 55909) that stretched along the bank upstream and downstream of the headcut. This mass failure had resulted in an erosion area of approximately 14,136 ft^2, exposing areas of mixed till and lacustrine clay (Stations 56182 – 55958, Figure 4.4.1 Inset C) throughout the bank and compromising mature trees along the bank. This stream bank is relatively close to State Route 23C, if conditions persist, with the stream bed continuing to incise and the bank continuing to erode, the road may be compromised and water quality will continue to be impaired due to clay inputs. Full restoration at this site may be necessary to minimize these potential impacts. Restoration techniques may include the installation of *rock vanes*, which protect the stream bank by redirecting the thalweg away from the stream bank and towards the center of the channel; these structures tend to improve in-stream habitat through scour, oxygenation, and cover. Full restoration would also involve *bioengineering* techniques that utilize live vegetation, either alone or in combination with harder materials such as rock or (dead) wood, to stabilize soils associated with stream banks or hill-slopes. Roots stabilize the soil, while stems, branches and foliage slow high velocity water, reducing erosion and encouraging deposition of fine sediment. If this site is to be

Piped outfall at Station 55864
Photo orientation looking at



Riparian planting site at Station 55241

considered for full restoration, an in-depth survey, a thorough morphological assessment and a project design would be required.

Continuing downstream, a piped outfall (Station 55864) entered along the right stream bank, providing drainage for State Route 23C and woody debris accumulated along the left bank. Also along the left bank, there was an open field with maintained herbaceous vegetation to the top of the stream bank. It is recommended that this location be considered for riparian planting enhancement (Station 55241). This was the sixth riparian planting site identified within this management unit during the stream assessment. As with previous planting sites, it is recommended that riparian buffer improvements include, reinforcing the toe of the bank with sedges and establishing a riparian buffer through plantings of deep-rooted, native tree and shrub species. The buffer width should be increased by the greatest amount agreeable to the landowner.

Along this planting site, the stream bank was reinforced with a short length of rock rip-rap just before the utility crossing (Station 55120). The utility pole is close to the stream edge and may be compromised during high flows. In order to maintain utility crossings, utility companies cut swaths through the riparian vegetation at each crossing, thereby fragmenting riparian vegetation. The activities of the utility company at this site should be considered before beginning riparian plantings. It may be appropriate to enhance the riparian buffer upstream and downstream of the crossing with a combination of shrub and tree species, while planting only shrub species within the utility right-of-way.

Rip-rap and utility crossing at Station 55120

Berm at Stations 55154-55034
Photo orientation – looking at

As State Route 23C encroached upon the stream, there was a *berm* (Stations 55154 – 55034), or a linear mound of earthen materials and rock, along the right bank protecting the road embankment for approximately 120 feet. The berm was constructed along a thin line of trees between the streambank and the roadway. While flow through this stretch of stream was confined by the adjacent roadway, the berm may further constrict flow and interfere with floodplain function.

As the stream approached Shadow Mountain Road Bridge (#3201190, Station 54983), the right stream bank was reinforced with approximately 120 feet of rip-rap and the left bank was reinforced with approximately 25 feet of rip-rap, both revetted banks continued to the bridge abutment. The bridge had a center pier that posed an obstruction to flow, which is of particular concern during high flow periods when the stream tends to transport considerable sediment and woody material. At the time of the assessment, the bridge was closed and there was abundant woody debris that had become blocked by the center pier and which was causing an obstruction to flow under the span of the bridge. The bridge openings may be inadequate for conveying higher flows. As mentioned previously, there was excessive aggradation throughout this reach, upstream of the bridge. Sediment deposits are commonly caused by the inadequate sizing of bridge openings. An undersized bridge opening causes water to back up upstream of the bridge, reducing stream velocity, which results in sediment deposition. The Shadow Mountain Road Bridge is scheduled for replacement in 2007. The new bridge will no longer have a center pier, which will help to alleviate the aggradation and woody debris obstructions that have occurred during high

Shadow Mountain Road Bridge at Station 54983

flows. The bridge span is expected to be adequate for conveying flood flows through the opening.

Downstream of the bridge, the stream continued to flow close to State Route 23C and the right bank was reinforced with a failing stacked rock wall; excessive sediment deposition also continued downstream of the bridge. On the left, stream flow undermined the vegetation, caused erosion (Stations 54716 – 54531) and exposed mixed till along 185 feet of the stream bank.

On the right stream bank, there was a root wad among woody debris that had accumulated beside the bank, just before a small unnamed tributary flowed through a culvert (Station 55459) under State Route 23C. Just downstream of the tributary there was some minor scour causing an undercut bank (Stations 54476 – 54452) on the right for approximately 62 feet. Opposite the erosion, there was a point bar along the left bed of the stream, with large boulders and sedges.

Tributary flow through culvert at Station 55459 photo orientation – looking at

Continuing downstream, the right bank was reinforced with rip-rap that appeared to be dumped over the stream bank to protect the State Route 23C road embankment. Although the rip-rap was in fair functional condition and poor structural condition, herbaceous vegetation had been established along the revetted bank and some mature woody vegetation had grown interspersed along the rip-rap. Due to the proximity of the stream channel to the roadway, interplanting the rip-rap is recommended; native shrub and sedge species should be planted through the rip-rap and along the toe of this stream bank, while native tree species should be planted at the top of the bank to the edge of the road. These plantings will help to strengthen the revetment, while enhancing aquatic habitat.

As the stream began to meander to the left, turning away from the road, the right bank was eroding (Stations 54172 – 54108) for approximately 64 feet. The bank was vegetated with grass near the stream and with trees further up the bank; reinforcing the toe of the bank

with native sedges to improve bank stability is recommended. It is also recommended that the narrow riparian buffer be maintained or enhanced with native tree species. Opposite the eroding bank, there was a point bar and a channel divergence (Station 54154) on the left bank, where a flood chute split off from the main channel. The flood chute continued for approximately 317 feet until its convergence with the main channel (Station 53821). Just downstream of the confluence of the flood chute with the East Kill, there was excessive sediment deposition, which was contributing to the aggradational conditions along this reach of the stream.

Opposite the confluence of the flood chute, the right stream bank was eroding (Stations 53823 – 53743). The stream flow had caused scour along the toe of the bank resulting in 1,205 ft^2 of erosion, exposing lacustrine clay (Stations 53823 – 53754) and compromising mature trees along the bank. There was also an accumulation of woody debris along the bank that appeared to exacerbate the erosion at this site.

Clay exposure between Stations 53823 – 53754 photo orientation – looking at

Downstream, excessive sediment deposition (Stations 53500 – 52700) continued to affect the channel bed with point and side bars and full channel aggradation. Along the left bank, there was a stacked rock wall set back from the stream's edge in the floodplain. The rock wall appeared to be in fair structural and functional condition. Opposite the downstream end of the rock wall, there was a small clay exposure at the toe of the right bank and a failing stacked rock wall (Stations 53332 – 53288) reinforcing the right bank for approximately 44 feet. Although the rock wall was in poor structural and functional condition at the time of the assessment, it

Stacked rock wall at Stations 53332 - 53288

appeared to provide lateral control of stream flow which disconnected the stream from its floodplain on the right bank.

Continuing downstream, the right bank was reinforced with rip-rap (Stations 53267 – 53163). At the time of the assessment, the rip-rap was in poor structural and functional condition and may have originally been a stacked rock wall. The revetment was relatively old and vegetation including, grasses, shrubs and trees, has been established within the revetted area along the stream bank.

Erosion at Stations 52966 - 52818

Further downstream, along 148 feet of stream bank, there was an erosional area (Stations 52966 - 52818) of approximately 1,773 ft^2 on the right. There was a narrow forested riparian buffer along the bank, beyond which there was an open field with some shrubby vegetation. Widening the riparian zone by the greatest amount agreeable to the landowner, by planting native tree and shrub species is recommended along this site.

Downstream, there was a manmade structure composed of large boulders that provided grade control across the stream channel. At the time of the assessment, this structure provided an obstruction to flow, with a significant amount of the main channel flow passing through a narrow gap in the structure. The grade control appeared to contribute to the upstream aggradational conditions; as stream flow was constricted through the structure and velocity slowed, the stream had lost its ability to transport sediment leading to excessive deposition. This structure does not provide lateral control; therefore, higher stages may flow around the sides of the structures, potentially contributing to stream

Grade control structure at Station 52653

bank erosion or lateral movement of the stream channel.

Tributary at Station 52367
photo orientation – looking at

As the stream meandered sharply to the right, an unnamed tributary entered from the left stream bank (Station 52367). This tributary drains the lower slopes of East Jewett Range and Onteora Mountain before it enters the East Kill. The tributary was entrenched, or had eroded downward, and was contributing a large sediment load into the East Kill. Sediment deposition commonly occurs at confluence areas, which often contain extensive sediment bars, function as important sediment storage areas, and are typically among the most dynamic and changeable areas in the stream system. The New York State Department of Environmental Conservation classifies streams and rivers based on their "best use" (NYSDEC, 1994). This tributary was classified C by the NYS DEC, indicating that the best uses for this stream are supporting fisheries and other non-contact activities.

Just downstream from the tributary, there was a 0.5 acre federally designated wetland (Stations 52329 - 52121). The riverine wetland was classified as R3USA (see Section 2.6 for detailed wetland type descriptions). Along this section of stream excessive sediment had deposited, forming a transverse bar, and woody debris had accumulated along the eroding left stream bank.

Wetland boundary approximately delineated by NWI
Stations 52329 - 52121

The left bank was located on the outside of a meander bend, where stream velocity is greatest during high flows, and the thalweg flowed up against the bank, compromising bank stability and resulting in a mass failure (Stations 52289 – 52178, Figure 4.4.1 Inset B). The mass failure caused an erosion area

Flood chute at Stations 52086 - 51334

of 1,672 ft^2 along approximately 111 feet of the stream bank and compromised mature vegetation. There were many fallen trees lining the toe of the bank that appeared to be contributing to localized scour, thereby exacerbating the erosion at this site.

Downstream of the mass failure, excessive sediment deposition continued to the Scribner Hollow Road Bridge including side, center and transverse bars, as well as full channel aggradation. Along the left bank, there was a channel divergence (Station 52086) where a flood chute split off from the main channel. This secondary channel received intermittent flows during periods of high water and flowed through a forested floodplain for approximately 730 feet until it converged (Station 51334) with the East Kill.

Opposite the channel divergence, on the right, the stream bank had experienced hydraulic erosion (Stations 52126 – 51935) along 191 feet of the bank. The erosion compromised the toe of the bank, exposing the roots of many trees and causing some trees to lean over the stream channel.

Continuing downstream, the toe of the right bank was reinforced with rip-rap (Stations 51796 – 51200) along approximately 596 feet of stream. The rip-rap was in poor structural and functional condition. There was a thin line of trees at the top of the bank; beyond the trees, there was mown lawn, a barn and associated residential structures. Interplanting the rip-rap with native sedge species is recommended at this site; this will serve to strengthen the rip-rap and improve aquatic habitat. Although the riparian buffer may not be widened significantly due to the proximity of the buildings, native shrub and tree species should be planted here to

Rip-rap at Stations 51796 - 51200

Side bar at Stations 51400 -51171
photo orientation – looking upstream

augment the buffer and provide improved buffer functionality to protect the stream from the nearby land use. Opposite the upstream portion of this rip-rap, woody debris had accumulated along the left bank and was contributing to localized scour of the bank.

Continuing downstream, there was excessive sediment deposition, with a side bar along the left bed of the stream channel (Stations 51400 – 51171) forming upstream of the Scribner Hollow Road Bridge. There was a secondary channel (Stations 51364 – 51171) that received intermittent flows during periods of high water that formed along the left of the side bar.

This management unit ended at the Scribner Hollow Road Bridge (#3201160, Station 51119, Figure 4.4.1 Inset A). Sediment deposition upstream and downstream 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 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.

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).

Sediment transport in this unit was influenced by valley morphology. Throughout the majority of this unit, valley form and topography remained unconfined, which suggests that this unit was a sediment storage zone. This unit has experienced wide-spread sediment

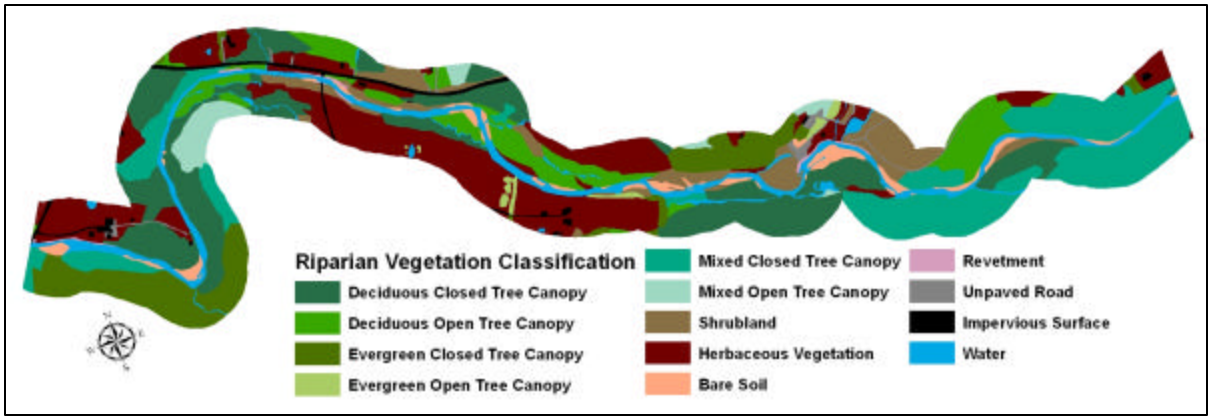
transport deficiencies. Bed load transported by the stream channel and deposited at tributary confluences along this reach of the East Kill exceeded the transport capacity of management unit # 3, resulting in channel aggradation and lateral migration. Sediment storage areas can benefit the general health of the stream system by limiting bed load delivered to downstream reaches during large storm events. Sediment sinks such as this throughout the watershed should be preserved where adjacent land uses permit. Mature riparian vegetation will be important in such settings to limit the extent of lateral channel migration and bank erosion.

The ability of the channel to convey sediment was also affected by two bridges and a manmade grade control structure that appeared to be contributing to backwater conditions and upstream channel aggradation. Installation of floodplain drainage under bridge approaches may reduce the backwater conditions and improve sediment transport continuity.

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. Six 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 and enhancing riparian buffer width.

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 B). The first appearance of Japanese knotweed on the East Kill main stem 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 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.



Riparian vegetation classification map based on aerial photography from 2001

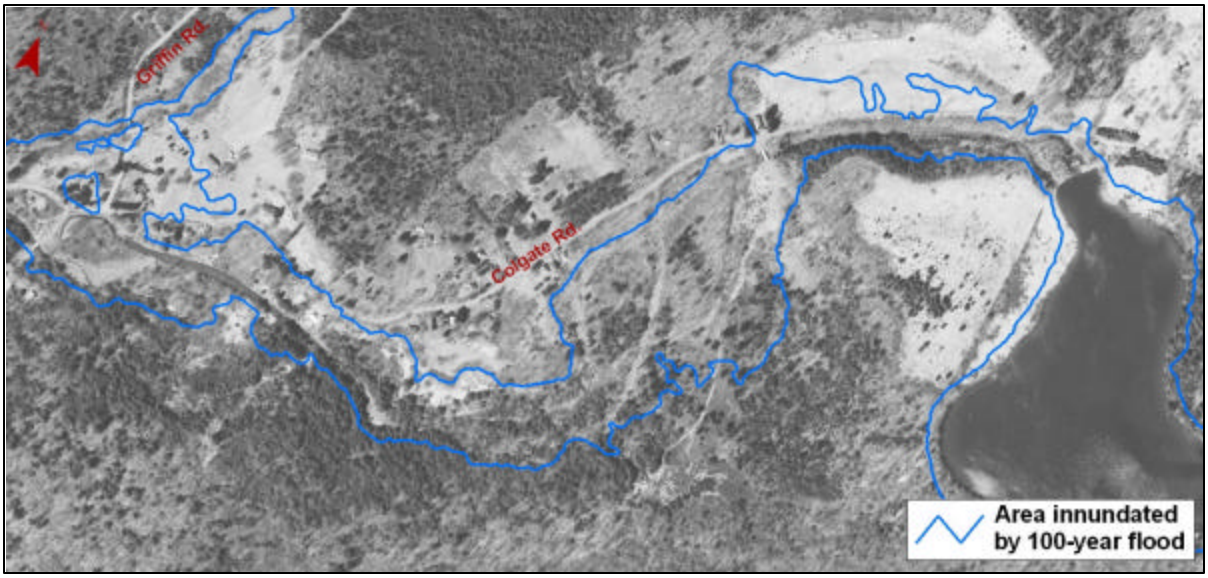
An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (see above map and Riparian Vegetation Mapping, Appendix B). In this management unit, the predominant vegetation type within the 300 ft. riparian buffer was forested (64 %) followed by herbaceous (22%). *Impervious* area (2 %) within this unit's buffer was primarily the local and private roadways, and residential 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.

According to the current floodplain maps (below), 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.



100-year floodplain boundary map

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. However, the aggradational areas may limit the amount of stream available to fish and insects during low flow periods.

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 four 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 was one culvert in this management unit providing passage for an unnamed tributary under State Route 23C. There were two 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, four 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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