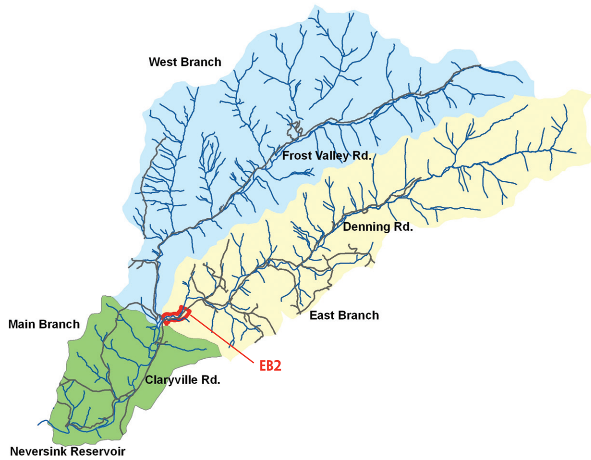
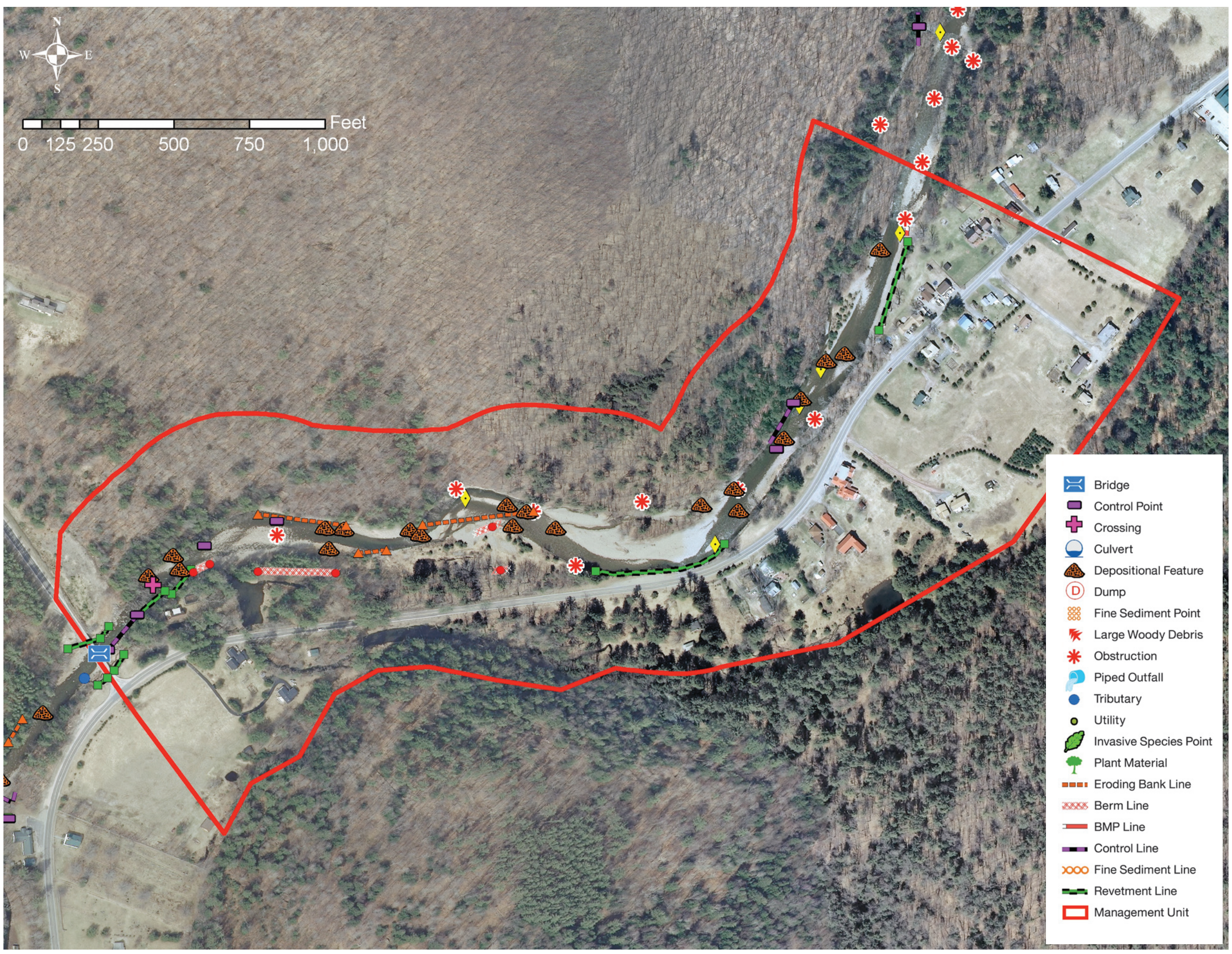
Neversink River East Branch

MANAGEMENT UNIT 2

STREAM FEATURE STATISTICS

- 11% of stream length is experiencing erosion
- 14.91% of stream length has been stabilized
- 36.02 acres of inadequate vegetation within the riparian buffer
- 460 ft. of the stream length is within 50 ft. of the road
- No structures are located within the 100-year floodplain boundary





Stream Feature Inventory 2010 (Figure 1)

Management Unit Description

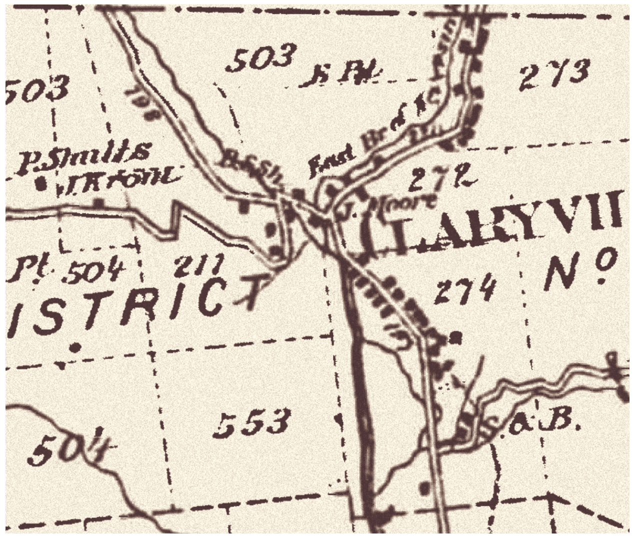
This management unit begins at a bridge crossing of West Branch Road, continuing approximately 3,839 ft. to the border between Ulster and Sullivan Counties. The drainage area ranges from 26.80 mi^2 at the top of the management unit to 27.50 mi^2 at the bottom of the unit. The valley slope is 1.08%. The average valley width is 995.25 ft.

Summary of Recommendations
East Branch Management Unit 2

Intervention Level	Passive Restoration of the bank erosion site between Station 3150 and Station 2720 (BEMS ID # NEB2_2700). Assisted Restoration of the bank erosion site between Station 2600 and Station 2510 (BEMS ID # NEB2_2500). Passive Restoration of the bank erosion site between Station 2450 and Station 2150 (BEMS ID# NEB2_2100).
Stream Morphology	Assess excessive sediment deposition caused by backwatering at bridge abutments. Conduct baseline survey of channel morphology.
Riparian Vegetation	Improve riparian buffer along left bank between Station 5270 and Station 3900. Improve riparian buffer on right and left banks between Station 1550 and Station 1450.
Infrastructure	Investigate flood threats to Denning Road. Assess ability of West Branch Road bridge to effectively convey flood flows.
Aquatic Habitat	Fish population and habitat survey.
Flood Related Threats	Assess threats to building structures in left floodplain.
Water Quality	None.
Further Assessment	Long-term monitoring of erosion sites.

Historic Conditions

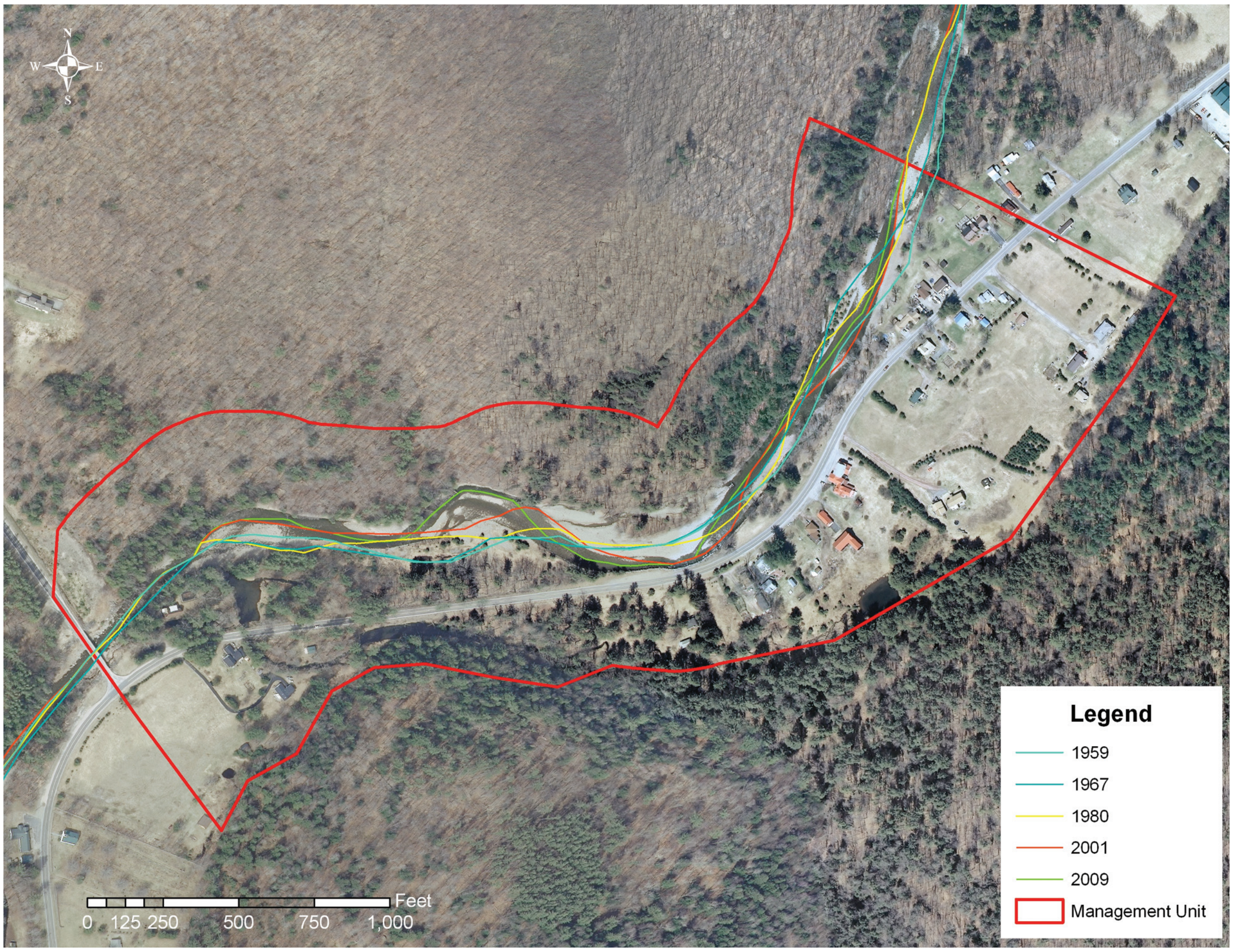
As the glaciers retreated about 12,000 years ago, they left their "tracks" in the Catskills. See Section 2.4 *Geology of Upper Neversink River,* for a description of these deposits. These deposits make up the soils in the high banks along the valley walls on the Neversink mainstem and its tributaries. These soils are eroded by moving water, and are then transported downstream by the River. During the periods when the forests of the Neversink watershed were heavily logged for bark, timber, firewood and to make pasture for livestock, the change in cover and the erosion created by timber skidding profoundly affected the Neversink hydrology and drainage patterns.



Excerpt from 1875 Beers Map (Figure 2)

The 1875 Beers Atlas of this area indicates that by that time, the stream had been harnessed for manufacturing, primarily saw mills, woodworking shops and tanneries *(Figure 2).* Raceways were built in the floodplains to divert water to ponds for use as needed. Floodplains were profoundly altered in the process, as these watercourses also became areas of preferential channelized flow when floodwaters inundated the floodplains. When woody debris jams blocked the primary channels, these raceways sometimes eroded out to become major secondary channels, or even took over the full flow to become a new primary watercourse.

During large runoff events, floodplains adjacent to the confluence of major tributaries receive large slugs of material eroded out of the steep streams draining the valley walls. overwhelmed the Neversink's ability to transport it, creating an alluvial fan. Like changes in the floodplains made by humans, these episodes can result in catastrophic shifts in channel alignment. In the roughly one hundred and twenty centuries since the retreat of the glaciers, the position of Neversink River has moved back and forth across its floodplain numerous times in many locations. A comparison of historical channel alignments *(Figure 3, following page)* and in-stream observations made during a stream feature inventory in 2010 *(Figure 1, page 1)* indicate significant lateral channel instability and 5 NYS Article 15 stream disturbance permits have been issued in this management unit, according to records available from the NYSDEC DART database database (**http://www.dec.ny.gov/cfmx/extapps/envapps/**).



Historical channel alignments from five selected years (Figure 3)

Stream Channel and Floodplain Current Conditions

The following description of stream morphology references stationing in the foldout Figure 4. "Left" and "right" references are oriented looking downstream, photos are also oriented looking downstream unless otherwise noted. Stationing references, however, proceed upstream, in feet, from an origin (Station 0) at the confluence with the Neversink Reservoir. Italicized terms are defined in the glossary. This characterization is the result of surveys conducted in 2010.

EBMU2 begins as the stream flow across the border of Ulster and Sullivan Counties. The channel flows close to the right valley wall throughout the management unit, restricting any significant lateral channel movement to the right. Although there is relatively good connectivity with the left floodplain, the presence of a significant amount of infrastructure development has resulted in several attempts to prevent flows from spilling out into this low elevation area. As a result, the buildings and roads in this area are at a very high risk of inundation during flood events and subsequent property damage.

Potential flood risks to infrastructure in the left floodplain are increased by the lack of an adequately vegetated riparian buffer. There is little to no mature woody vegetation along the left stream bank between Station 5270 to Station 3900. A riparian buffer including woody vegetation can strengthen the stream bank and slow erosive forces of higher flows during flood events. It is recommended that this area be further assessed for the potential of restoring the riparian buffer using various planting techniques. Establishing this vegetated buffer would reduce the need for flood prevention measures such as the flow deflecting structure present at Station 5050. *(A426)* This structure was created from piled earthen materials and is approximately 30-feet in length. Yard trimmings and woody debris have recently been piled on top of it, most likely in an attempt to add to the structures ability to deflect flow. A dumped stone revetment begins at Station 3900, continuing approximately 300-feet downstream to Station 3600. *(A430)* This revetment is providing temporary stabilization to the bank directly in front of a building structure.

Due to the frequent accumulation of sediment in this management unit, EBMU2 could be primarily classified as a sediment storage reach. Evidence of this sediment aggradation begins at Station 4950, where a cobble side bar has formed along the right side of the stream. This bar continues for approximately 400-feet before ending at Station 4550. A depositional center bar also consisting of cobbles begins at Station 4600 and continues downstream until Station 4400. *(A451)*

Flow deflecting structure on left bank (A426)

Dumped stone revetment providing temporary stabilization (A430)

Depositional center bar (A451)

Scour is occurring directly downstream of the bar because the water faces an abrupt vertical drop as it flows over the depositional area. *(A455)* This continuous scour is resulting in a headcut which is actively migrating upstream, and will continue to do so until it meets a substrate that is not erodible.

Scour downstream of center bar (A455)

Convergence of main and side channel (B335)

Bedrock control along right bank and stream bed (B345)

The side channel that previously diverted a portion of the flow into the right floodplain upstream in EBMU3 converges back with the main channel at Station 4500. *(B335)* In this same general location exposed bedrock begins within the stream bed as well as along the right side, effectively preventing the channel from migrating vertically or laterally to the right. This bedrock control continues downstream for approximately 155-feet before ending at Station 4345. *(B345)* Along the left side of the stream, a fallen tree with its root wad still intact has caused an obstruction at Station 4350. *(B42)* During higher flows this debris reduces velocities and sediment transport capacity along the left side of the stream, resulting in the deposition of sediment. A side bar begins just downstream of the obstruction at Station 4250, and continues downstream until Station 3970. *(A459)* This depositional area is densely populated with sedges and other herbaceous vegetation.

The stream flows up against the road embankment along the left bank at Station 3850, and continues to follow the course of the road until Station 3420 before beginning a meander to the right. Through this stretch, the stream is only 20-30 feet from the road with no adequately vegetated riparian buffer. Due to the high risk of flood damage to the road, the left bank has been revetted with stacked boulders throughout this location. *(B349)* For the most part this revetment is in good structural condition, and will continue to prevent further erosion of the road embankment as long as it stays intact. However, it does little to prevent significantly large flows from topping the bank and reaching the road. It can also alter the natural

Fallen tree obstructing flow (B342)

Well vegetated side bar (A459)

flow regime of the stream which can have negative effects further downstream.

Excessive sediment deposition is occurring along the inside of this meander bend in the form of a large point bar. This bar begins just downstream of a large woody debris obstruction at Station 4020. It begins as a narrow extension of the right bank, but increases in width to nearly 160-feet before tapering off at Station 3200. *(A474)* A side channel is carrying a small amount of flow along the right side of the point bar. The elevation of this bar is significantly higher than the main channel which is resulting in the formation of a head cut at Station 4850 as water flows over the depositional area and makes the abrupt drop into the main channel. *(B356)*

Continuing downstream past the point bar, the stream begins to meander slightly to the left at Station 3150. Historical stream alignments indicate significant lateral channel migration throughout this reach. This instability is evidenced by the presence of both bank erosion and channel aggradation as the stream flows around this meander bend. At Station 3120, a transverse bar has formed from cobble sized materials along the

Stacked boulder revetment along left bank protecting road (B349)

Large vegetated point bar (A474)

Side channel entering main channel over side bar (B356)

Transverse bar along right half of channel (A480)

right half of the channel. *(A480)* A center bar that is densely vegetated with sedges begins at Station 3080 and continues until Station 2900. *(A481)* Also at this station, a large woody debris obstruction is causing a significant enough drop in stream bed elevation to result in a head cut. *(A483)* Dense sedge colonization is present on the point bar that has formed along the left bank between Station 3100 and Station 2700.

Center bar with densely vegetated sedges (A481)

A large woody debris obstruction that has deposited along the right bank at Station 3150 is aggravating bank erosion around the outside of the meander bend. This erosion begins in the same location as the obstruction and continues for approximately 430-feet to Station 2720 (BEMS ID # NEB2_2700). *(A476)* As flow passes through this meander bend, hydraulic pressure is causing erosion at the toe of the bank and exposing cobble sized alluvial material. This toe scour left a large portion of sod at the top of the bank without anything to support its weight, causing it to slump down to the water level. In its current position, the sod is covering a large portion of the bank erosion and offering protection from future scour. If the sod cover remains intact, it is possible for this bank to stabilize without treatment (passive restoration).

Headcut forming due to obstruction (A483)

However, it should be monitored for future changes in condition.

Two relict berms located along the left floodplain on the inside of the meander bend were most likely placed as flood protection measures when the channel was aligned closer to the road. The berm closest to the stream begins at Station 3000 and continues downstream for approximately 80-feet until Station 2920. *(B368)* Another berm exists deeper in the floodplain and spans 40-feet between Station 3000 and Station 2960.

Continuing downstream, the channel again meanders slightly to the right and the resulting hydraulic pressure put on the left bank has caused erosion. This erosion site begins at Station 2600, continuing approximately 90-feet to Station 2510 (BEMS ID # NEB2_2500). *(B378)* Cobble sized alluvial materials are exposed throughout this 5-foot high bank, and the resulting instability is causing trees on the bank to uproot and fall into the stream. Recommendations for this bank erosion site minimally include monitoring for significant changes in condition and possible assisted restoration with techniques to stabilize the bank.

Large woody debris and bank erosion (A476)

Relect berm in left floodplain (B368)

Erosion along left bank (B378)

Cobble point bar along right side of stream (A488)

Side bar vegetated with sedge (B386)

Hydraulic erosion along right bank (A490)

Across the stream from this erosion site, a cobble point bar has formed along the right side of the stream between Station 2700 and Station 2440. *(A488)* This bar reaches a maximum width of 51-feet at its midpoint and is moderately vegetated with sedges and various shrub species. A side bar begins along the left side of the stream at Station 2400 and continues downstream before ending in front of a private residence at Station 1820. *(B386)* Sedges have established over a significant portion of this depositional area.

Erosion begins along the right bank at Station 2450, continuing for approximately 300-feet until Station 2150 (BEMS ID # NEB2_2100). *(A490)* Hydraulic erosion has exposed significant amounts of cobble sized alluvial materials and is causing several trees to lean toward the stream. A transverse bar located in the channel is cause for concern because it is directing a portion of the flow perpendicular in the direction of the eroding bank. Despite these seemingly negative conditions, additional stability is being offered to the bank in the form of large sedge clumps which have established along the toe. Because of the additional stability offered by this vegetation, it is expected that this bank could stabilize without further treatment (passive restoration). However, the leaning trees could cause future problems and therefore should be monitored for any changes in condition.

Continuing downstream, a series of berms and revetments have been installed along the left bank and floodplain to protect a private residence from flood hazards. An old berm constructed of sidecast stream material begins set back in the floodplain at Station 2400 and continues downstream parallel to the stream channel until Station 2100. *(B383)* The remains of a building foundation and a private pond are located near the downstream end

Berm on left floodplain consisting of sidecast material (B383) of this berm. (According to kudish, there was a sawmill in this general area owned by John Tyler in 1872. Difficult to verify exact location based on maps) A second cobble berm is located along the left bank approximately 90-feet from a house between Station 1950 and Station 1890. Various forms of revetment begin at the downstream end of this berm at Station 1880, and continue through the end of this management unit at Station 1450. This revetment begins as stacked boulders which continue for approximately 100-feet until Station 1780. *(A500)* At Station 1780, this revetment transitions into a mortared stone wall that continues until Station 1620. *(A502)* Boulders have been placed beginning at the downstream end of the stone wall and continue through the remainder off EBMU2. *(A504)* Because the building structure in the left floodplain is located in such close proximity to the stream, these revetments have been installed in an attempt to provide some relief from large flood events. Although currently preventing the left bank from eroding along this reach, revetments such as this can only withstand a certain level of shear stress before beginning to fail. As significant flood events are becoming more frequent and severe, the amount of risk associated with living within the stream corridor is ever increasing.

A depositional bar is forming across from the revetment along the right bank, beginning at Station 1850 and continuing downstream until Station 1750. *(B392)* This bar consists of cobble sized materials and is covered with various species of sedge and herbaceous vegetation. A power line crosses the downstream end of this bar on its way to the house on the left bank, representing a potential hazard in the event that it fell into the stream.

Stacked boulder revetment on left bank (A500)

Revetment transitioning to mortared stone wall (A502)

Large boulders placed downstream of stone wall (A504)

Depositional bar forming across from revetment (B392)

West Branch Road bridge (A507)

It is recommended that this entire MU be included in a comprehensive Local Flood Hazard Mitigation Analysis to investigate hydraulics and sediment transport in the stream corridor, from Station 10500 on the East Branch, upstream of Sawmill Road through Station 14800 on the Mainstem, downstream of the Halls Mills covered bridge. The purpose of the analysis would be to develop a comprehensive solution for reducing flooding threats to this relatively dense population center of the Neversink Valley.

EBMU3 ends at Station 1450 as the stream channel is crossed via bridge by West Branch Road. *(A507)* This bridge has been constructed relatively recently and is in good structural condition. However, it was not designed to effectively convey the large flows that are relatively common to the East Branch of the Neversink River. Two abutments encroach severely on the bankfull channel, and as a result are causing aggradation of the stream channel in the vicinity of the bridge. This aggradation and subsequent raise in stream bed elevation can increase the likelihood of flood damage to surrounding infrastructure during significant events. Boulder and cobble sized rip-rap have been dumped along both the right and left banks at the upstream and downstream sides of the bridge abutments. *(B400)* Quarry stone can be seen scattered throughout the channel and is likely an indicator that this rip rap is unstable and becomes dislodged during large flood events. The right and left banks between Station 1550 and Station 1450 have insignificant riparian vegetation and should be assessed for potential restoration using planting techniques, including inter-planting of the existing rip rap. Recommendations for this bridge include further assessment to determine its ability to effectively convey large flows and sediment loads.

Boulder and cobble sized rip rap on both sides of bridge abutments (B400)

Sediment Transport

Streams move sediment as well as water. Channel and floodplain conditions determine whether the reach aggrades, degrades, or remains in balance over time. If more sediment enters than leaves, the reach aggrades. If more leaves than enters, the stream degrades. (See Section 3.1 for more details on Stream Processes).

This management unit is largely dominated by sediment storage reaches and occasionally punctuated by short transport reaches. The channel in EBMU2 is controlled on the right throughout the majority of the management unit by the valley wall, but does maintain a well connected, albeit developed, floodplain corridor on the left side. The densely forested portion of the watershed upstream of this management unit serves as a continuous source of large woody material that is transported downstream and deposited during flood events. This large woody debris often serves as an obstruction to sediment transport, resulting in the aggradation of bed material. Sediment is stored where large woody debris has accumulated in the management unit, and is transported relatively effectively in most other locations. Transport reaches are in a state of *dynamic equilibrium,* effectively conveying sediment supplied from upstream during each flow event. Storage reaches act as a "shock absorber", holding bedload delivered during large flow events in depositional bars and releasing it slowly over time in more moderate flood events. These depositional areas are very dynamic, with frequent lateral channel migrations through bank erosion, *avulsions* and woody debris accumulations. This is one process by which floodplains are created and maintained. Sediment storage reaches can result from natural conditions or as the unintended consequence of poor bridge design, check dams or channel overwidening. Infrastructure influenced deposition of sediment is evident in EBMU2 at the bridge crossing at the downstream end of the management unit, which is inadequately designed to effectively transport sediment. This is evidenced by significant channel aggradation in the reach upstream of the bridge. Unpredictable conditions created by changes in channel geomorphology represent risks for nearby property owners during flood events. However, these dynamic disturbance regimes also produce unique and diverse habitat patches, attracting equally diverse plant communities and wildlife.

To better understand sediment transport and sediment transport dynamics a baseline survey of channel form and function is recommended for this management unit.

Riparian Vegetation

One of the most cost-effective methods for landowners to protect streamside property is to maintain or replant a healthy buffer of trees and shrubs along the bank, especially within the first 30 to 50 ft. of the stream. A dense mat of roots under trees and shrubs binds the soil together, and makes it much less susceptible to erosion under flood flows. Mowed lawn does not provide adequate erosion protection on stream banks because it typically has a very shallow rooting system. Interplanting with native trees and shrubs can significantly increase the working life of existing rock rip-rap placed on stream banks for erosion protection. Riparian, or streamside, forest can buffer and filter contaminants coming from upland sources or overbank flows. Riparian plantings can include a great variety of flowering trees and shrubs which are native and therefore well-adapted to the Catskills climate and soil conditions, and as a result often require less maintenance following planting and establishment. Figure 4.4.1.5 shows areas in the stream corridor where vegetated buffer could be improved; these areas may, however, be providing important ecological functions in their current condition. Technical guidance is available from the Catskill Streams Buffer Initiative at the Rondout/Neversink Stream Management Program (for more information, see Section 2.6 Riparian Vegetation).

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 it's 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 increase surface runoff impacts.

An analysis of vegetation was conducted using aerial photography from 2009 and field inventories *(Figure 5).* In this management unit, the predominant vegetation type within the riparian buffer is herbaceous vegetation (36.91 %) followed by mixed-closed tree canopy (20.67 %). *Impervious* area makes up 5.68% of this unit's buffer. No occurrences of Japanese knotweed were documented in this management unit during the 2010 inventory.

There are 8.79 acres of wetland (10.50% of EBMU2 land area) within this management unit mapped in the National Wetland Inventory (see Section 2.5, Wetlands and Floodplains for more information on the National Wetland Inventory and wetlands in the Neversink watershed). Wetlands are important features in the landscape that provide numerous beneficial functions including protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods (See Section 2.5 for wetland type descriptions and regulations).

Riverine is the largest wetland type in EBMU2, totaling 4.97 acres in size. The other wetland type in this management unit is Freshwater-Forested Shrub (3.82 acres).

Flood Threats

INUNDATION 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. No building structures are located in the 100-year floodplain in EBMU2. The upper Neversink River is scheduled to have its FIRMs updated with current surveys and hydrology and hydraulics analysis in the next few years, and the mapped boundaries of the 100-year floodplain are likely to change.

A large portion of Denning Road which runs through the left floodplain of this management unit falls just outside the 100-year floodplain boundary and is at high risk of inundation during flood events. There are also several building structures that fall just outside of the floodplain boundary, but could still be inundated during large floods.

BANK EROSION Due to a number of conditions, hydraulic bank erosion was documented at 3 locations in this management unit. These erosion sites are recommended for a restoration category based on their severity and likelihood of stabilizing naturally. The first erosion site is along the right bank beginning at Station 3150 and continuing for approximately 430-feet to Station 2720 (BEMS ID # NEB2_2700). Passive restoration is recommended at this site. The second is approximately 90-feet in length on the left bank between Station 2600 and Station 2510 (BEMS ID # NEB2_2500). Recommendations for this bank erosion site minimally include monitoring for significant changes in condition and possible assisted restoration with techniques to stabilize the bank. The final bank erosion site in this management unit begins along the right bank at Station 2450, continuing for approximately 300-feet until Station 2150 (BEMS ID # NEB2_2100). It is expected that this bank could stabilize without further treatment *(*passive restoration*)*

INFRASTRUCTURE 14.91% (1,145 ft.) of the stream bank length in this management unit has been stabilized with revetments in seven different locations. A dumped stone revetment begins at Station 3900, continuing approximately 300-feet downstream to Station 3600. The left bank has been revetted with stacked boulders between Station 3850 and Station 3420. Boulders have also been stacked along the left bank between Station 1880 and Station 1780. These boulders transition to a stacked rock wall which continues until Station 1620. Boulders have been placed beginning at the downstream end of the stone wall and continue through the remainder of EBMU2. Boulder and cobble sized rip-rap have been dumped along both the right and left banks at the upstream and downstream sides of the bridge abutments at the downstream end of this management unit.

There were 4 berms documented in EBMU2, totaling 5.70 % (437.7 ft) of the total length of stream banks. These berms were all constructed from local stones and earthen materials.

Aquatic Habitat

Aquatic habitat is an important aspect of the Neversink River ecosystem, providing recreational, aesthetic, and economic benefits to the community. While ecosystem health includes a broad array of conditions and functions, what constitutes "good habitat" is specific to individual species. When we refer to aquatic habitat, we often mean fish habitat, and specifically trout habitat, as the recreational trout fishery in the Catskills is one of its signature attractions for both residents and visitors. Good trout habitat, then, might be considered one aspect of "good human habitat" in the Neversink River valley.

Even characterizing trout habitat is not a simple matter. Habitat characteristics include the physical structure of the stream, water quality, food supply, competition from other species, and the flow regime. The particular kind of habitat needed varies not only from species to species, but between the different ages, or life stages, of a particular species, from eggs just spawned to juveniles to adults.

New York State Department of Environmental Conservation (DEC) classifies the surface waters in New York according to their designated usses in accordance with the Clean Water Act. The following list summarizes those classifications applicable to the Neversink River.

1. The classifications A, AA, A-S and AA-S indicate a best usage for a source of drinking water, swimming and other recreation, and fishing.
2. Classification B indicates a best usage for swimming and other recreation, and fishing.
3. Classification C indicates a best usage for fishing.
4. Classification D indicates a best usage of fishing, but these waters will not support fish propagation.

Waters with classifications AA, A, B and C may be designated as trout waters (T) or suitable for trout spawning (TS). These designations are important in regards to the standards of quality and purity established for all classifications. See the DEC Rules & Regulations and the Water Quality Standards and Classifications page on the NYSDEC web site for information about standards of quality and purity.

In general, trout habitat is of a high quality in the Neversink River. The flow regime above the reservoir is unregulated, the water quality is generally high (with a few exceptions, most notably low pH as a result of acid rain; see Section 3.1, Water Quality), the food chain is healthy, and the evidence is that competition between the three trout species is moderated by some partitioning of available habitat among the species. The East Branch of the Neversink River been given a "C(T)" class designation, supporting fishing and indicating the presence of trout. Trout spawning likely occurs in this management unit, but has not yet been documented in the DEC classification.

Channel and floodplain management can modify the physical structure of the stream in some locations, resulting in the filling of pools, the loss of stream side cover and the homogenization of structure and hydraulics. As physical structure is compromised, inter-species competition is increased. Fish habitat in this management unit appears to be relatively diverse.

It is recommended that a population and habitat study be conducted on the Neversink River, with particular attention paid to temperature, salinity, riffle/pool ratios and quality and in-stream and canopy cover.

Water Quality

The primary potential water quality concerns in the Neversink as a whole are the contaminants contributed by atmospheric deposition (nitrogen, sulfur, mercury), those coming from human uses (nutrients and pathogens from septic systems, chlorides (salt) and petroleum by-products from road runoff, and suspended sediment from bank and bed erosion. Little can be done by stream managers to mitigate atmospheric deposition of contaminants, but good management of streams and floodplains can effectively reduce the potential for water quality impairments from other sources.

Storm water runoff can have a considerable impact on water quality. When it rains, water falls on roadways and flows untreated directly into the Neversink River. The cumulative impact of oil, grease, sediment, salt, litter and other unseen pollutants found in road runoff can significantly degrade water quality. There were no piped outfalls documented in EBMU2 during this stream feature inventory.

Sediment from stream bank and channel erosion pose a potential threat to water quality in the Neversink River. Clay and sediment inputs into a stream may increase *turbidity* and act as a carrier for other pollutants and pathogens. There are currently 3 documented bank erosion sites in EBMU2 that could be sources of fine sediment. None of these sites represent a significant source of turbidity.

Nutrient loading from failing septic systems is another potential source of water pollution. Leaking septic systems can contaminate water making it unhealthy for swimming or wading. Four structures are located in relatively close proximity to the stream channel in this management unit. These homeowners should inspect their septic systems annually to make sure they are functioning properly. Each household should be on a regular septic service schedule to prevent over-accumulation of solids in their system. Servicing frequency varies per household and is determined by the following factors: 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 out more often.

The New York City Watershed Memorandum of Agreement (MOA) allocated 13.6 million dollars for residential septic system repair and replacement in the West-of-Hudson Watershed through 2002, and the program was refunded in 2007. Systems eligible included those that are less than 1,000-gallon capacity serving one-or-two family residences, or home and business combinations, less than 200 feet from a watercourse. Permanent residents are eligible for 100% reimbursement of eligible costs; second homeowners are eligible for 60% reimbursement. For more information, call the Catskill Watershed Corporation at 845–586–1400, or see **http://www.cwconline.org/programs/septic/septic_article_2a.pdf**.

Community Comments

Fall 2012

Station 5200–4800 (Bruning's to Papa's) *"Reopen old river channel for flood flow"*

"Considerable property erosion behind the house. The stream is much closer to the house than it used to be. The foundation has been eroded and sand deposited under the house, trapping moisture…water damage to first floor wooden floors…pool has been effectively ruined..Substantial damage to the stone walkways, pool fencing and driveway."

"Water overtops the bridge across the East Branch at Frost Valley Road."

"Interested in stream bank protection, elevating my residence, channel maintenance."

"Interested in stream bank protection, channel maintenance and new FEMA flood maps."

"Interested in stream bank protection, channel maintenance and new FEMA flood maps"