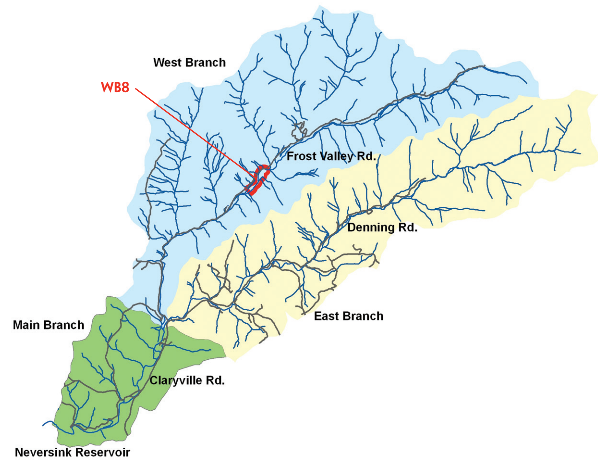
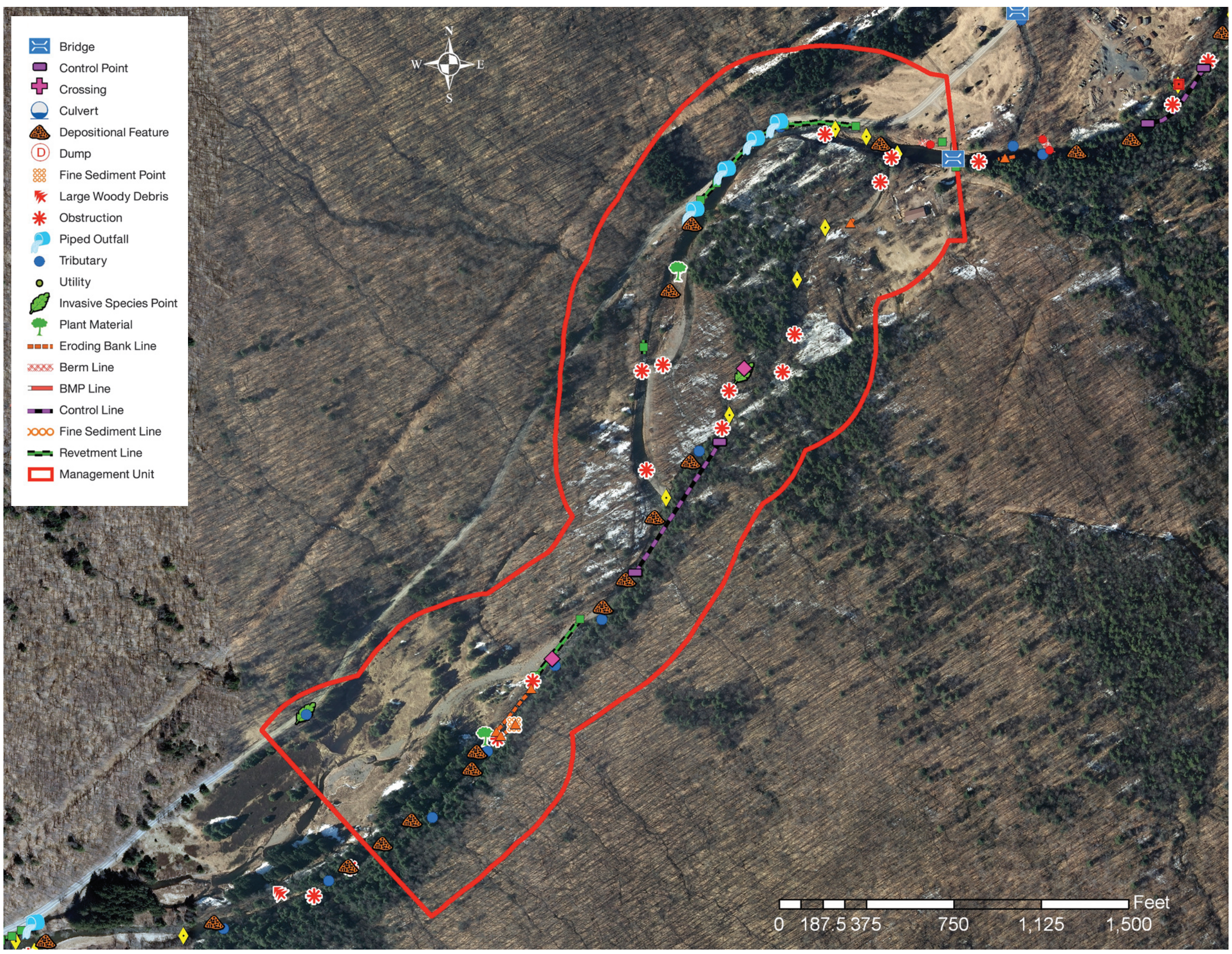
Neversink River West Branch

MANAGEMENT UNIT 8

STREAM FEATURE STATISTICS

- 4.00% of stream length is experiencing erosion
- 13.51% of stream length has been stabilized
- 11.73 acres of inadequate vegetation within the 100 ft. buffer
- 900 feet of the stream is within 50 ft. of the road
- No structures are located within the 100-year floodplain boundary





Stream Feature Inventory 2010 (Figure 1)

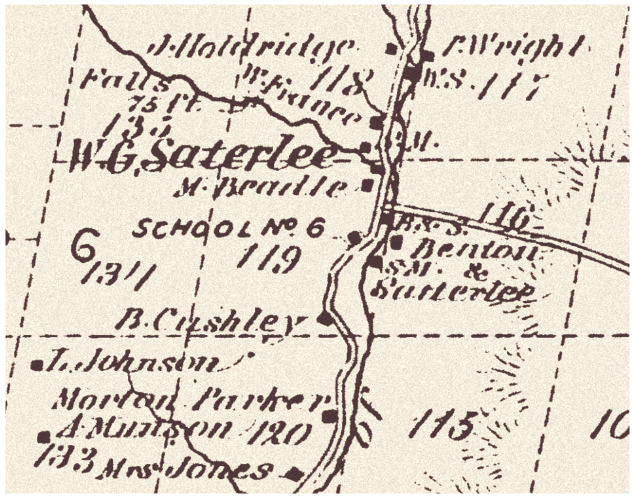
Management Unit Description

This management unit begins slightly downstream of the confluence of High Falls Brook at a private bridge near the downstream extent of Frost Valley YMCA property at Station 32100, continuing approximately 4,600 ft. to a wide point in the valley slightly upstream of a reach where the river flows adjacent to Frost Valley Road at Station 32100. The drainage area ranges from 21.20 mi^2 at the top of the management unit to 22.20 mi^2 at the bottom of the unit. The valley slope is close to 0.78%. The average valley width is 777.15 ft.

Summary of Recommendations West Branch Management Unit 8

Intervention Level	Full restoration project of channel and revetment along Frost Valley Road from Station 31700 to Station 30700. Assisted restoration of the bank erosion site on the side channel 200' from the divergence at Station 31800 (BEMS NWB8_31500) and from Station 28300 to Station 28220 (BEMS NWB10_28220). Passive restoration of the bank erosion between Station 28455 and Station 28225 (BEMS NWB10_28225).
Stream Morphology	Protect and maintain sediment storage capacity and floodplain connectivity. Conduct baseline survey of channel morphology.
Riparian Vegetation	Investigate and evaluate 11.73 acres of potential riparian buffer improvement areas for future buffer restoration. Potential riparian buffer improvement sites exist between Station 32000 and Station 31800, Station 31600 and Station 30800, and Station 30500 and Station 30100 (Figure 7).
Infrastructure	Full restoration project of channel and right bank (including revetment adjacent to Frost Valley Road) from Station 31700 to Station 30700.
Aquatic Habitat	Fish population and habitat survey.
Flood Related Threats	None.
Water Quality	Monitor water quality impacts of flow conveyed directly to the main channel from Frost Valley Road.
Further Assessment	Include MU8 in comprehensive Local Flood Hazard Mitigation Analysis of Claryville MUs.

Historic Conditions



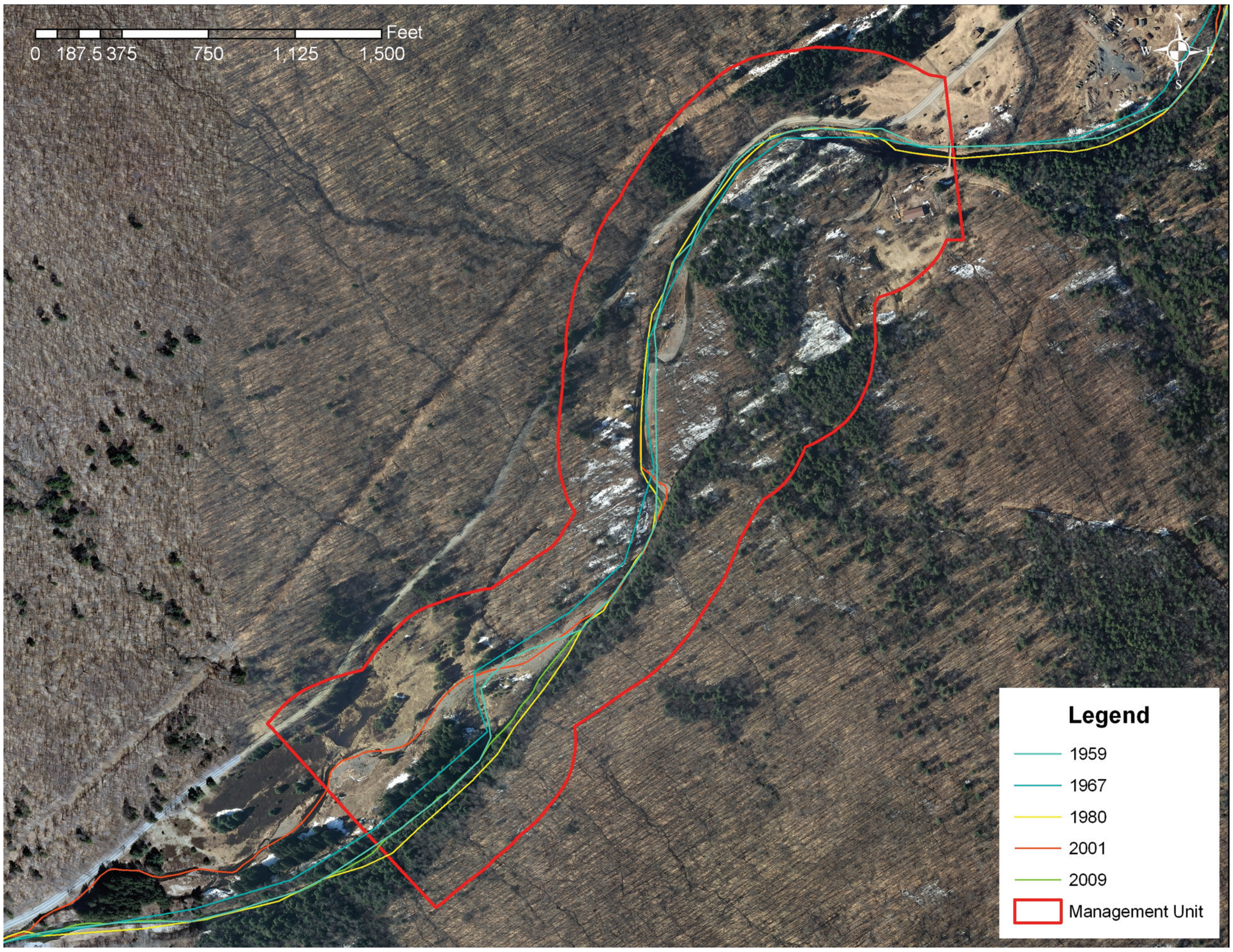
Excerpt from 1875 Beers Map (Figure 2)

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.

According to the map of Forest Industries in the Catskills and the associated descriptions included in *The Catskill Forest: A History* by Michael Kudish (Purple Mountain Press, 2000), Mr. William G. Satterlee and David H. Benton owned two sawmills that were formerly located in WBMU9 and MBMU8. These sawmills, the furthest upstream known industry on the West Branch Neversink, were located near High Falls Brook. According to Beers’ 1875 Atlas, one was located along High Falls Brook (in MBMU9) while the second was on the main channel slightly downstream of the confluence in this management unit. Reports vary, but these mills were believed to be operational through at least 1870.

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



Historical channel alignments from five selected years (Figure 3)

floodplain numerous times in many locations. A comparison of historical channel alignments *(Figure 3)* and in-stream observations made during a stream feature inventory in 2010 *(Figure 1, page 1)* indicate significant lateral channel instability. According to records available from the NYSDEC DART database, no NYS Article 15 stream disturbance permits have been issued in this management unit. These permits pertain to activities which have the potential to significantly impact stream function, such as bank stabilization, stream crossings, habitat enhancement, and logging practices. database (**http://www.dec.ny.gov/cfmx/extapps/envapps/**).

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.

WBMU8 begins at a private bridge on the Frost Valley YMCA property. The bridge was constructed in 1995 and documented in good structural and functional condition. The *normal span* of the bridge is 100 feet and the *effective span* is 55 feet, with 10 feet of encroachment on the left bank and no encroachment on the right bank. Depositional features often form upstream of bridges where the bridge approaches restrict flows that would otherwise effectively transport sediment. The lack of sediment aggradation in the channel upstream and downstream of this bridge indicate that it may have been designed to avoid obstruction of floodplain flows. *(A26)* Portions of the left and right banks between Station 32000 and Station 31800 should be further assessed as potential buffer improvement sites *(Figure 7)*.

Private bridge on Frost Valley YMCA property (A26)

An abandoned bridge abutment was observed downstream of the current bridge on the right bank constructed of stacked rock in poor structural and functional condition. It is possible that there was a bridge in this location associated with the former sawmill located on the right bank downstream of the High Falls Brook Confluence. Willow was observed growing on this bank which could be a plant source for restoration efforts throughout the watershed. *(IMGP0306)* Slightly downstream of the old bridge abutment a 35-foot

Potential willow harvest site (IMPG0306) long stacked stone berm was observed on the right bank. It is possible that the berm is composed mostly of sidecast from bulldozing on the road nearby or during the construction of the bridge. *(IMGP0310)*

A side channel documented as conveying low flow diverges from the main channel near Station 31800. This side channel cuts directly through the forested floodplain on the left bank while the main channel makes a wide meander towards Frost Valley Road which follows the right valley wall. It is possible that this side channel was originally a raceway for the sawmill formerly located on the river in roughly this location according to Kudish and Beers' 1975 *Atlas*. While this side channel conveys the most flow through the floodplain, in some locations the flow is dispersed as it becomes braided due to many large woody debris jams leading to depositional features, scour pools and diverting flow throughout. *(A43, A44)*

An eroding bank segment was observed in the side channel approximately 200 feet downstream of the divergence on the left bank extending 40 feet along a cleared field with no riparian buffer (BEMS NWB8_31500). The site was documented as active as hydraulic erosion is leading to bank scour and undercutting during high flow events. Recommendations for this site include *assisted* restoration to improve bank stability and establish a healthy riparian buffer. *(A38)*

Remnants of a recreational ropes course which had mostly likely been washed out during a flood event were observed on the right bank of the side channel near Station 30100. 200 feet down

Relict bridge abutment in floodplain (IMPG0310)

Low flow side channel (A43)

Woody debris jam in side channel (A44)

Eroding left bank (A38)

stream the side channel begins to flow adjacent to the left valley wall. A tributary conveying flow from the left valley wall joins the side channel approximately 300 feet upstream of the convergence. Exposed mudstone bedrock was observed acting as a stream bed grade control on the left bed for 650 feet extending 300 feet up the side channel from the convergence with the main channel and 350 feet downstream from the convergence on the left bed of the main channel. *(A52, A61)* The side channel converges with the main channel over 2,000 feet downstream from the convergence at Station 29500.

Tributary conveying flow from left valley wall (A52)

While the braided side channel conveys flow during high flow events in the left floodplain, the main channel flows within 50 feet of Frost Valley Road for approximately 900 feet from Station 31700 to Station 30800. Near Station 31700 flow in the main channel splits around a cobble center bar thickly vegetated with grass, sedge and willow. Two headcuts, at Station 31650 and Station 31500 were observed in the cobble channel on the right side of the bar near Frost Valley Road. *(IMPG0323, IMPG327)*

Exposed mudstone bedrock (A61)

Headcut and vegetated center bar (IMPG0323)

Headcut (IMPG0327)

Dumped rip rap revetment (IMPG0331)

Sloped stone revetment (IMPG344)

Downstream of Station 31600 the main channel flows directly adjacent to Frost Valley Road. A revetment composed of dumped rip-rap and slope stone was observed extending 800 feet from Station 31600 to Station 30800. The revetment was documented in in fair structural and functional condition due to structural failures and scour pools against the structure observed in several locations. *(IMGP0331 and IMGP0344)* This revetment should be further investigated for potential enhancement of the riparian buffer zone through interplanting.

In addition, four piped outfalls where observed conveying drainage from Frost Valley Road and the right valley wall directly to the channel. The first piped outfall, located at Station 31270, is constructed of a plastic 2-foot diameter culvert with a 3-foot outfall and good outfall protection. The headwall supporting the culvert was failing. *(IMGP0338)* The second piped outfall, located at Station 31150, is also constructed of a 2-foot diameter plastic culvert with a 1-foot outfall and good outfall protection. *(IMGP0341)* The third piped outfall, located at Station 30980, is also a 2-foot diameter plastic culvert with a 1-foot outfall and good outfall protection. The headwall was documented in good condition. The final piped outfall, located at Station 30750 coveys road drainage through the unstabilized bank (downstream of the revetment as the main channel pulls away from Frost Valley Road) directly to the main channel via a 2-foot diameter smooth steel culvert with poor outfall protection and no headwall. The contribution of flow from this piped outfall marks the beginning of aggradation in the main channel. *(IMGP0352, IMGP348)*

Piped outfall conveying drainage from Frost Valley Road (IMGP0338)

Recommendations for this site include a *full restoration* project from Station 31700 continuing 1,000 feet to Station 30700. This project would require geomorphic and sediment transport analyses of the reach and would likely include redesign and restoration of the revetment as well as placement of *flow deflection structures* to reduce erosive forces on the right bank at Frost Valley Road and finally possibly relocation of the channel to follow historic channel alignments further south in the left floodplain. The willows observed growing on the left bank downstream of the project site near Station 30500 are a potential source of plant materials for this restoration effort. In addition, the water quality impact of the flow conveyed from Frost Valley Road directly to the main channel should be further

Piped outfall conveying drainage from Frost Valley Road (IMGP0341)

Piped outfall conveying drainage through unstabilized bank (IMGP0352)

Aggradation in main channel (IMGP0348)

Convergence of side and main channels (A55)

Cobble point bar (A66)

Groundwater seeps from left valley wall (A67)

investigated and potentially mitigated to protect and improve water quality in the Neversink River.

A dry side channel diverges from the main channel around a thickly vegetated center bar near Station 30400 and converges among two woody debris obstructions near Station 30050 before converging with the long braided side channel discussed above near Station 29500. *(A55)*

Downstream of the convergence and bedrock grade control on the left bank, a cobble point bar with no vegetation was observed on the left bed near Station 29100 and a cobble point bar with shrub vegetation was observed on the right bed near Station 28900 *(A66)*. These depositional features continue the trend of aggradation in the main channel that began slightly upstream, and indicate lateral migration of the channel due to the low channel gradient in this management unit.

At Station 28890 and Station 28600 groundwater seeps or intermittent tributaries were observed on the left bank conveying flow from the left valley wall. *(A366)* A stacked rock revetment was observed on the right bank extending 340 feet from Station 28820 to Station 28480. The revetment was documented in good functional condition and good structural condition. It appeared to be designed to prevent flow in a dry cobble-bed channel which conveyed flow as the main channel as recently at 2001 based on the review of historic channel alignments. *(A70, A71)*

The dry cobble channel meanders through the right floodplain which includes riparian forests, freshwater emergent wetlands and riverine wetlands. This side channel converges with the main channel in WBMU7. Downstream of the revetment in the main channel an active eroding

Intermittent tributary from left valley wall (A366)

bank segment was observed on the right bank extending 240 feet from Station 28455 to Station 28225 (BEMS NWB10_28225). The site was documented as caused by hydraulic erosion leading to scour with exposed alluvial materials and undercut root wads. Some leaning trees from the forested riparian buffer at the top of the bank were also observed. *(A75, A76)* Bank retreat can be expected in this area as all flow was recently diverted into this channel leading to higher flows and the confinement by the left valley wall limits any lateral migration to the right bank. However, the wide band of riparian forest between the main channel

Stacked rock revetment on right bank (A70)

Eroding right bank leaving exposed root wads (A75)

Stacked rock revetment on right bank (A71)

Hydraulic erosion undercutting right bank (A76) and the emergent freshwater wetland on the right floodplain will significantly slow erosion. Therefore, it is recommended that this bank be left to stabilize without treatment (*passive restoration*) and that the site be monitored for changes in condition.

Another active eroding bank segment was observed on the right bank extending 80 feet from Station 28300 to Station 28220 (BEMS NWB10_28220). The site was documented as caused by hydraulic erosion leading to scour with exposed glacial till. This site was recorded as a fine sediment source due to the fluvial entrainment of the glacial till particles, although it is most likely not a source of turbidity in the main channel. No vegetation or hardening at the toe were observed on this eroding bank segment. A large woody debris pile at the end of the eroding segment appeared to be leading to additional bank scour. *(P2760035, IMGP0369, IMGP0368)*

Recommendations for this site include *assisted restoration* using bioengineering techniques stabilize the eroding bank and prevent further entrainment of fine sediments. It is possible that this site is aggravated by the additional flow diverted to this channel when the dry side channel upstream was

Large woody debris pile causing scour (P2760035)

Actively eroding right bank (IMGP0369)

Actively eroding right bank (IMGP0368)

Cobble depositional bar (A79)

Cobble side bar (A80)

blocked with revetment. The channel may widen and stabilize without further restoration efforts, but this reach should be monitored for changes in condition and re-evaluated for a possible *full restoration* project if bank conditions persist or worsen.

A depositional bar composed of cobble with some shrub vegetation was observed at Station 28100 followed by the beginning of an aggradational trend for the entire channel. *(A79)*. At Station 27730 an intermittent tributary was observed joining the main channel from the left valley wall, and a cobble side bar was observed extending 200 feet from Station 27700 to Station 27500. *(A80)*

WBMU8 ends at Station 27500.

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 contains both sediment storage reaches and sediment transport reaches. The 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 migration through bank erosion, *avulsions* and woody debris accumulations. The densely forested portion of the watershed within 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 storage reaches can result from natural conditions, like the widening valley floor and decreased channel slope as is the case in this management unit or as the unintended consequence of poor bridge design, check dams or channel overwidening. This is one process by which floodplains are created and maintained.

In some locations in WBMU8 the river is confined by the left valley wall and high banks on the right bank leaving little accessible floodplain for sediment deposition and storage. These represent sediment transport reaches, with relatively low channel sinuosity, and narrow, bankfull-stage floodplains of moderate entrenchment with mature vegetation. Transport reaches, like the areas in WBMU8 with boulder and bedrock grade and planform control, are in a state of *dynamic equilibrium,* effectively conveying sediment supplied from upstream during each flow event. However, the densely forested floodplain serves as a continuous source of large woody material that that can be introduced into the channel during flood events. This large woody debris often serves as a local obstruction to sediment transport, resulting in the aggradation of bed material and the development of floodplains over the long-term. Healthy, undeveloped floodplains throughout the Neversink watershed like those in this management unit reduce the velocity of higher flows, thereby mitigating the threat of stream bank erosion and property damage during flood events.

To better understand sediment transport dynamics of this section of the Neversink, 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 bind 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, native to the Catskills, which are adapted to our regional climate and soil conditions and typically require less maintenance following planting and establishment.

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. There were no occurrences of Japanese knotweed documented in this management unit during the 2010 inventory.

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 deciduous closed tree canopy (38.51 %) followed by evergreen closed tree canopy (19.88%) and mixed closed tree canopy (14.17%). There are 9.5 acres of potential buffer improvement area in this management unit (see Fig. 7). *Impervious* area makes up 1.91% of this unit's buffer. No occurrences of Japanese knotweed were documented in this management unit during the 2010 inventory.

There are 3.76 acres of wetland (3.94% of WBMU8 land area) within this management unit mapped in the National Wetland Inventory in two distinct classifications (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 A type descriptions and regulations). The wetland classified as Riverine is 1.34 acres in size and the wetland classified as Freshwater Forested Shrub is 1.36 acres in size.

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. 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. There are no structures WBMU8 within the 100-year floodplain as identified on the FIRM maps.

BANK EROSION Due to the semi-confined channel conditions in WBMU10, the banks within the management unit are at a relatively high risk of erosion as the main channel is frequently forced into the easily erodible alluvial materials on the less-confined bank. Three areas of erosion were documented in the management unit during the stream feature inventory.

An eroding bank segment was observed in aside channel approximately 200 feet downstream of the divergence on the left bank extending 40 feet along a cleared field with no riparian buffer (BEMS NWB8_31500). The site was documented as active as hydraulic erosion is leading to bank scour and undercutting during high flow events.

Downstream of the revetment in the main channel an active eroding bank segment was observed on the right bank extending 240 feet from Station 28455 to Station 28225 (BEMS NWB10_28225). The site was documented as caused by hydraulic erosion leading to scour with exposed alluvial materials and undercut root wads.

Another active eroding bank segment was observed on the right bank extending 80 feet from Station 28300 to Station 28220 (BEMS NWB10_28220). The site was documented as caused by hydraulic erosion leading to scour with exposed glacial till. This site was recorded as a fine sediment source due to the fluvial entrainment of the glacial till particles, although it is most likely not a source of turbidity in the main channel. No vegetation or hardening at the toe were observed on this eroding bank segment.

INFRASTRUCTURE An abandoned bridge abutment was observed downstream of the current bridge on the right bank constructed of stacked rock in poor structural and functional condition. Slightly downstream, near Station 31900, a 35-foot long stacked stone berm was observed on the right bank. It is possible that the berm was constructed mostly of sidecast from bulldozing on the road nearby or during the construction of the bridge.

A revetment composed of dumped rip-rap and slope stone was observed extending 800 feet from Station 31600 to Station 30800 immediately adjacent to Frost Valley Road. The revetment was documented in in fair structural and functional condition due to structural failures and scour pools against the structure observed in several locations.

A stacked rock revetment was observed on the right bank extending 340 feet from Station 28820 to Station 28480. The revetment was documented in good functional condition and good structural condition. It appeared to be designed to prevent flow in a dry cobble-bed channel which conveyed flow as the main channel as recently at 2001 based on the review of historic channel alignments.

Aquatic Habitat

Aquatic habitat is one aspect of the Neversink River ecosystem. 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 mainstem and tributaries in WBMU8 are classified as "C(T)" connoting best usage for 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 are four piped outfalls that convey storm water runoff directly into the Neversink River in this management unit.

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 is one bank erosion site in WBMU8 that is a potential minor source of fine sediment. None of the 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

Structures are located within the floodplain, contrary to original report, including a Frost Valley bridge and several outbuildings.

"We are concerned by the rapid bank erosion at Stations 28455–28220 as this area in the past was good for fishing and believe the stream and fish habitat would benefit from assisted, instead of passive restoration."

Station 31500-31000 (Downstream of Frost Valley maintenance) *"Embankment is unstable"*