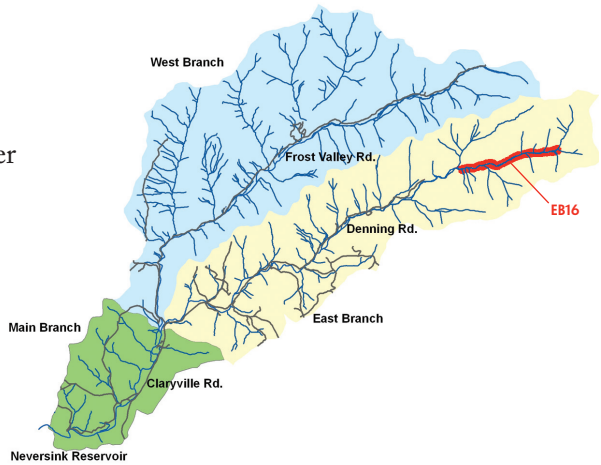
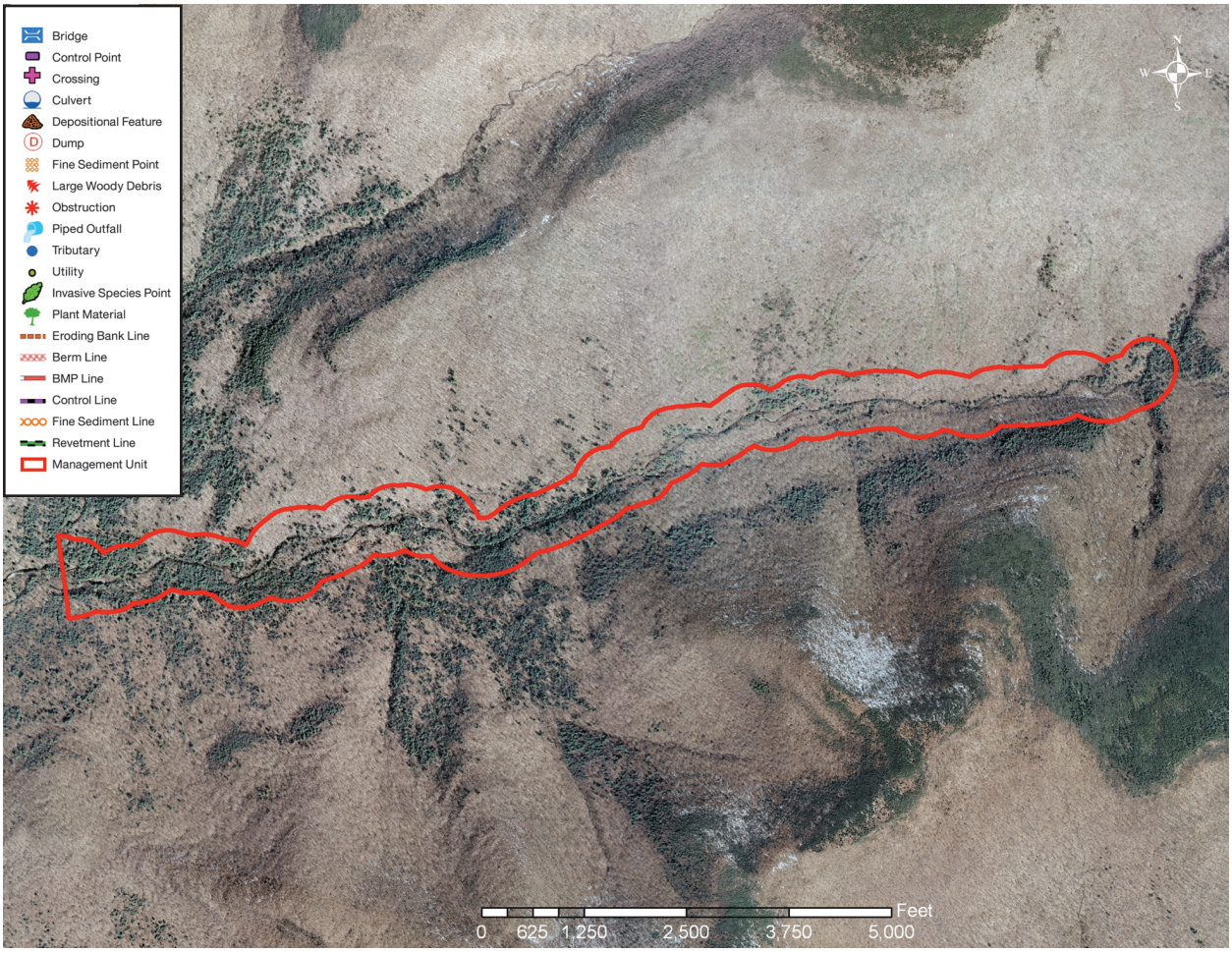
Neversink River East Branch

MANAGEMENT UNIT 16

- Stream features were not inventoried in detail in this management unit
- 1.47 acres of inadequate vegetation within the riparian buffer
- None of stream is within 50 ft. of the road
- No houses are located within the 100-year floodplain boundary





Stream Feature Inventory 2010 (Figure 1)

Management Unit Description

This management unit begins at a convergence with Deer Shanty Brook, continuing approximately 14,757 ft. to the upstream end of the East Branch of the Neversink River. The drainage area ranges from 1.80 mi^2 at the top of the management unit to 7.800 mi^2 at the bottom of the unit. The valley slope is 2.84 %. The average valley width is 478.75 ft.

Summary of Recommendations East Branch Management Unit 16

EBMU16 covers reaches of the Neversink River on New York State land in the Catskill Preserve. These lands are in "forever wild" status and so are unmanaged; hence, this management unit was not inventoried in detail and no recommendations were made.

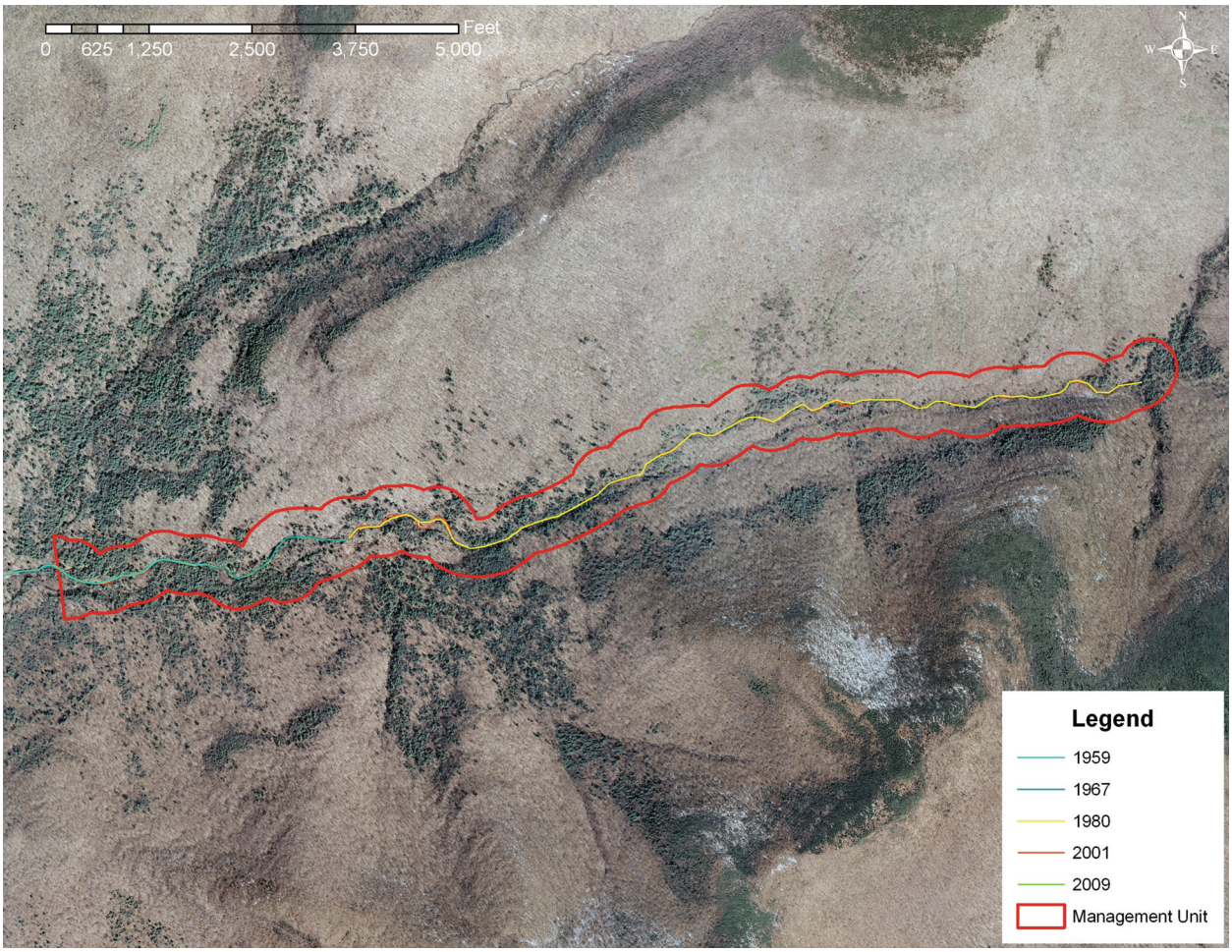
Historic Conditions

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 indicate little lateral channel instability. According to records available from the NYSDEC DART database 0 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. (**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.

EBMU16 begins on New York State forest preserve land, as the stream flows down the steepest valley and channel slopes on the East Branch. This reach is laterally confined by valley walls on both sides of the stream from the top of the management unit until Station 61500 where the valley floor begins to widen on the left side. Relatively good floodplain connectivity exists on the left side until Station 58200, where the channel hits a brief valley pinch point before opening on both sides at Station 57100. The stream maintains relatively good floodplain connectivity on both sides from this point until the end of the management unit. Donovan Brook enters the main channel at Station 59500, contributing 0.95 mi^2 of drainage from nearby Table and Lone Mountains.

The dense forest surrounding the stream in this management unit provides a continuous source of large mature trees that can be blown down or washed into the stream during storm events. Because of the steep valley slope and confinement of the channel, these trees are effectively transported downstream until they eventually reach a portion of the stream that does not have the power to move them any further. Once they are deposited in the stream channel, the trees then become large woody debris obstructions that contribute to sediment deposition and alterations to stream morphology. EBMU16 serves as a source for many of the debris obstructions documented in management units further downstream.

EBMU16 ends at station 55500 where Deer Shanty Brook enters from the right.

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).

Due to its relatively steep slope and channel confinement, this management unit is largely a sediment transport reach. Transport reaches are in a state of *dynamic equilibrium,* effectively conveying sediment supplied from upstream during each flow event. 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.

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 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.

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 (46.54%) followed by mixed-closed tree canopy (29.38%). There is no documented *impervious* area within this unit's buffer. There were no occurrences of Japanese knotweed were documented in this management unit during the 2010 inventory.

There are no documented wetlands in EBMU16.

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 houses are located in the 100-year floodplain in EBMU15. 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.

High flows are confined throughout most of this management unit, but some floodplain connectivity does exist on the lower elevations on both sides of the stream near the bottom of EBMU16. The risk of flood inundation is relatively high in this area, however, there is no infrastructure that could be threatened.

BANK EROSION No bank erosion was inventoried in this management unit.

INFRASTRUCTURE No infrastructure was inventoried in this management unit.

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 uses 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. No piped outfalls or road drainages that convey storm water runoff directly into the Neversink River were inventoried in EBMU16.

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.

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**.