

# Neversink River East Branch

## MANAGEMENT UNIT 10

### Summary of Post-Flood Recommendations

<b>Intervention Level</b>	Full restoration of the stream reach including the eroding bank site between Station 38380 and Station 37930. (BEMS NEB10_37900)  Assisted restoration of the bank erosion site between Station 36720 and Station 36450. (BEMS NEB10_36400)  Passive restoration of the bank erosion site between Station 35600 and Station 35540. (BEMS NEB10_35500)
<b>Stream Morphology</b>	No change.
<b>Riparian Vegetation</b>	No change.
<b>Infrastructure</b>	No change.
<b>Aquatic Habitat</b>	No change.
<b>Flood Related Threats</b>	No change.
<b>Water Quality</b>	None.
<b>Further Assessment</b>	No change.

### Stream Channel and Floodplain Current Conditions

The following description of stream morphology is the result of a survey conducted in December, 2011. “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.

A berm begins along the right bank at Station 38800, ending nearly 400-feet downstream at Station 38440. At the time of the summer 2010 survey it was noted that the side cast stream materials in this berm, along with a shallow and overwidened channel in this reach suggest that the stream may have been cleared with a bulldozer at some point in the past. Consistent with past activities, this stream reach appears to have been excavated following the flooding associated with TS Irene. The resulting side bar and main channel are not

sized to transport sediment effectively, and the bar appears to block former floodplain channels, effectively disconnecting the stream from the floodplain in this stream reach. A *full restoration* effort in this stream reach to shape and align it to improve effectiveness of sediment transport described is described below.

In 2010, the bank along this berm was documented as actively eroding for approximately 185 feet from Station 38660 to Station 38475. This eroding bank segment is no longer present due to the reconstructed channel through this stream reach.



*Stream channel reach that is overwidened and shallow due to post-flood restoration efforts. (IMG1572)*

Continuing downstream, the stream begins to meander to the right exposing a long bank erosion section on the left bank beginning at Station 38380 and continuing approximately 450-feet to Station 37930 (BEMS NEB10\_37900). Since 2010 this bank has experienced continued hydraulic erosion which led to significant bank retreat. Most of the several large trees along this bank that were experiencing root scour in 2010 were carried downstream during recent high flow events.

A point bar consisting of cobble sized materials on the inside of the meander bend directly across from the bank erosion site documented in 2010 has since aggraded due to sediment deposition. It appears that in an effort to protect Denning Road from future flooding, large woody debris and root wads were collected from this stream reach and placed along the tree line behind this point bar.



*Point bar continues to form across from erosion area. (IMG1574)*

*Full restoration* is recommended for this site, including stabilization of the left bank using bioengineering techniques, establishment of a riparian buffer to slow near-bank velocities and reduce shear stresses on the bank during future high flow events, and re-alignment of the channel to establish a more sustainable radius of curvature for this stream reach.

Approximately 100 feet downstream from the point bar, the stream takes a hard left turn and enters into a straight reach highlighted by excessive accumulation of large woody debris and channel instability. While the exact location of the woody debris jams and obstructions have shifted slightly, the river processes impacting this stream reach have remained the same since the summer of 2010. Debris accumulation has resulted in channel braiding along the well connected right and left floodplains. Continued channel instability is also evident in the formation of *headcuts* below obstructions. Scour is occurring directly downstream of the obstructions because the water faces an abrupt vertical drop as it flows over the debris. This continuous scour is resulting in headcuts which are actively migrating upstream, and will continue to do so until they meet a substrate that is not erodible.



*Root wads and large woody debris placed along the tree line behind the cobble point bar. (IMGP1578)*



*Headcut in stream reach characterized by woody obstructions. (IMGP1581)*

Prior to TS Irene, several dry side channels diverged from the main channel into the right floodplain and ran adjacent to Denning Road. Since TS Irene, these channels have been taking active flow. If a majority of the flow becomes diverted into these channels by woody debris obstructions upstream, this could pose a threat to the road during future high flow events.

Erosion on the left bank begins at Station 36720 and continues until Station 36450 (BEMS NEB10\_36400). Hydraulic erosion has exposed cobble sized alluvial material at the toe of this bank. A large hemlock located at the downstream end

of a depositional point bar at Station 36500 is causing an obstruction to high flows, further contributing to deposition and exacerbating erosion of the left bank.

Large rocks are beginning to deposit at the toe of this eroding bank. However, due to the near vertical slope of the bank and the increased scour caused by the obstruction immediately downstream, this bank is still at risk for further erosion during high flow events. Therefore, *assisted restoration* is recommended for this site, including removal of the woody obstruction downstream and possibly bioengineering techniques to stabilize the bank.



*Eroding bank segment and woody debris obstruction. (IMGP1858)*

During the 2010 survey a stacked rock wall was documented between Station 36380 and Station 36300. The revetment was designed to provide bank stabilization and protection for this section of Denning Road. This revetment was repaired due to damage to Denning Road during the flooding associated with TS Irene. It was extended to 190 feet long with an average height of 12 feet. The top two courses of the revetment adjacent to Denning Road are now a sloped stone wall. The revetment was documented in good structural and functional condition. The culvert protruding through the revetment is still present, remaining a potential source for contaminants from road runoff.



*Stacked rock wall on right bank protecting Denning Road. (IMGP1586)*

From Station 35600 through Station 35525 (BEMS NEB10\_35500) an eroding bank segment has resulted in exposure of the root structure of the mature vegetation across from a depositional bar. In December 2011 this eroding bank segment was also documented as a potential source of fine sediment from glacial till. It is still possible for this bank to stabilize without treatment (*passive restoration*). However, it is recommended that this site be monitored for changes in condition.

EBMU10 ends at Station 34900 where Erts Brook converges from the right floodplain.



*Bank erosion site in need of continued monitoring.  
(IMG1598)*