

# Neversink River East Branch

## MANAGEMENT UNIT 6

### Summary of Post-Flood Recommendations

<b>Intervention Level</b>	<p>Full restoration of the bank erosion site between Station 23040 and Station 22820 (BEMS # NEB6_22800).</p> <p>Passive restoration of the bank erosion site between Station 22530 and Station 22420 (BEMS # NEB6_22400).</p> <p>Passive restoration of the bank erosion site between Station 22010 and Station 21950 (BEMS # NEB6_21900).</p> <p>Assisted restoration of the bank erosion site between Station 21860 and Station 21680 (BEMS # NEB6_21600).</p> <p>Assisted restoration of the bank erosion site between Station 20850 and Station 20700 (BEMS # NEB6_20700).</p>
<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.

The East Branch of the Neversink River continues to move away from the left valley wall as it enters EBMU6, maintaining a densely forested left floodplain at the top of this management unit. Historical

aerial imagery of this reach indicates that the channel has migrated significantly since 1980, as a result of avulsions caused by large woody debris jams. New woody material was released and existing materials were relocated throughout the channel and floodplains during flooding that has occurred since the summer of 2010. This led to significant changes in channel alignment and sediment transport patterns throughout this management unit.

The assessment of river processes and recommendations for the first two eroding bank segment in this management unit, BEMS # NEB6\_24600 and BEMS # NEB6\_23600 remain unchanged.

A massive bank failure begins at Station 23040, continuing approximately 220 feet until Station 22820 (BEMS # NEB6\_22800) (See stitched photos A73-75 on page 8 for pre-flood condition). Since the survey conducted in 2010, additional mature trees have slid down the slope with their roots intact and re-establish at a lower elevation on the bank. The root mass of an additional row of trees was documented as undercut and threatening to slide during the 2011 post-flood stream survey. There are no longer various shrubs and sedges established near the toe, which indicate that this bank is now unlikely to stabilize without treatment. Furthermore, glacial till is exposed for the entire length of the eroding bank and is a significant source of fine sediment.



*Slope failure and fine sediment source on the right bank. (IMGP1642)*

*Full restoration* is recommended for this site. This restoration could include installation of a bankfull stage bench at the toe of the slope, an increased radius of curvature, and establishing a riparian buffer including woody vegetation to strengthen the stream bank and slow erosive forces of higher flows during future flood events. A monitoring program could be implemented at this site to monitor the rate of bank retreat and sediment entrainment.

At Station 22580, the channel becomes very straight and aggraded before entering a meander to the left. A hill slope failure exists on the right bank beginning at Station 22530, continuing approximately 110 feet to Station 22420 (BEMS # NEB6\_22400). As evidenced by the lack of change in post-flood condition of the bank, this failure appears to be able to recover without treatment (*passive restoration*), but it is recommended that this bank be monitored for future changes in condition.

The stream flows adjacent to Denning Road located in the right floodplain for the remainder of this management unit.

An eroding bank segment begins at Station 21860, continuing approximately 180-feet to Station 21680 (BEMS # NEB6\_21600). The materials in this bank consist of glacial till, a significant source of fine sediment and risk to water quality. Recommendations for this bank erosion site minimally include monitoring for significant changes in condition and possible *assisted restoration* with techniques to stabilize the bank (see photo B89 on page 11 for pre flood condition).



*Eroding bank segment on the right bank. (IMGP1646)*

A bank failure was documented on the left bank beginning at Station 20850, continuing approximately 300-feet to Station 20520 (BEMS # NEB6\_20700). This steep bank is ranges from 15 feet to 48 feet

high and consists of glacial till, a significant source of fine sediment and risk to water quality. Most of the revegetation of the slope previously documented appears to have been scoured away in recent flood events, suggesting that this bank will require assistance to stabilize. Recommendations for the site are *assisted restoration*, which could include use of trees falling from the top of the slope to build a rootwad revetment at the toe, establishment of a *bankfull* stage bench, and use of bioengineering techniques to further stabilize the slope.



*Eroding bank segment on the left bank. (IMGP1654)*

During the 2010 survey an eroding bank segment was documented on the outside of a meander bend beginning at Station 20300, continuing approximately 465-feet until Station 19835 (BEMS # NEB6\_19800). At the time, woody obstructions at Station 19800 and Station 19650 were contributing to this erosion by deflecting flows into the bank and the proximity of Denning Road to this erosion site raised concern for risk of infrastructure damage (see photo A99 on page 14 for pre-flood condition). This stream reach was realigned with engineering guidance in a post-flood emergency restoration effort, and the created banks were planted with willows in an effort to establish a riparian buffer to protect the bank during future high flow events. This site should be monitored for future changes in condition and to assess the stability of the realignment and planting effort.



*Left bank failure. (IMG1665)*



*Post-flood restoration effort including realignment and planting. (IMG1668)*

EBMU6 ends at Station 18700 where Denning Road crosses the stream channel. This bridge appears to be well maintained and was documented in good structural and functional condition in 2010. As evidenced by significant scour on both abutments after the flooding associated with TS Irene, this bridge constricts flow during large events, as its abutments are not spaced wide enough and cause backwatering during significant flows. The abutment scour on the right bank was reported after the flooding was large boulder were placed to reduce future scour in this location. In addition, possible flanking on the sheet piling at the base of the left abutment

was documented in the 2011 stream survey. This abutment has since been protected with a stacked rock revetment; scour should be monitored during future high flow events.



*Denning Road bridge—note repair at downstream end of right abutment. Stacked rock revetment has since been installed. (IMG1681)*