

Section 5.3

Demonstration Stream and Floodplain Restoration Projects

Neversink Basin Demonstration Stream Restoration Project Site

Improvement of Riparian Buffer Function, Channel Morphology and Sediment Transport

West Branch of the Neversink River Sullivan County Route 157 Northern Approach to Bridge 187

As part of the 2007 Filtration Avoidance Determination for the NYC Water Supply, it was agreed to construct, by February 2012, a demonstration restoration project for the Neversink River. After completing the watershed assessment and stream feature inventory of East, West and mainstems, and following discussions with highway superintendents and engineers from the counties, a site was selected just above the confluence of the East and West Branches of Management Unit 2 of the West Branch as a potential demonstration site. Following discussions to establish priorities with town and county officials and Neversink landowners, a general consensus was made to develop the project described below, contingent on the receipt of permits.

During the summer of 2010, a comprehensive stream feature inventory was made of 33+ miles of the East and West Branches and mainstem of the Neversink River upstream of the reservoir. This project site was chosen as a potential project to meet the 2007 FAD Deliverable 4.6 of NYC DEP, which is due for completion by 2/28/12.



Photo 1. Site of West Branch Neversink Stream Demonstration Project

Sullivan County Bridge 187 was replaced in 2009 along Sullivan County Rte 157 bridge at Claryville. Currently, the river approaches the bridge at an oblique angle (> 45 degrees) through the bridge aperture. Backwatering and aggradation occur upstream of the bridge, and a large point bar has developed on this bend making the radius of curvature going through the bridge even tighter. Approximately seven hundred feet of road embankment has been rip-rapped on the approach from the north, and there is no vegetated buffer between the road and stream. The primary activity along this stretch of river is trout fishing; this project aims to improve stream function at the site by protecting the newly installed bridge and re-establishing the natural stream buffer that was compromised through former road loss due to erosion and the subsequent construction of the new bridge.

Objectives:

- Improve the riparian buffer and stream function
- Mitigate contaminants from road salts, PAHs and metals.
- Protect the bridge abutment from direct channel flow

Project design elements include:

- Minor stream channel re-alignment and narrowing to achieve a more perpendicular approach to bridge and improved sediment transport capacity;
- Construct a bankfull-stage rock-and-soil bench along the base of the rip-rapped embankment, tied into stable vegetated buffer at upstream end of meander bend; transplant “willow clumps” from the vegetated center bar to this bench
- Construct and demonstrate the use of bioengineering equipment called "the stinger," to create voids for interplanting installed rip-rap with new vegetation. This equipment will subsequently be made available watershed-wide for use in similar riparian buffer improvement projects (see attached Technical Note);
- Interplant existing rip-rap with potted native tree and shrub stock.
- Design may also incorporate trout habitat improvement structures built into right and/or left bank. These might include, among other possibilities rock lunkers built into the left bench to provide overhanging cover, or a flow diversion structure on the right bank to maintain or improve scour pool habitat. Alternative designs will be evaluated as part of the hydraulics analysis



Photo 2 Looking downstream toward Sullivan County Bridge 187



Photo 3: Looking upstream, with willow-dominated center bar.

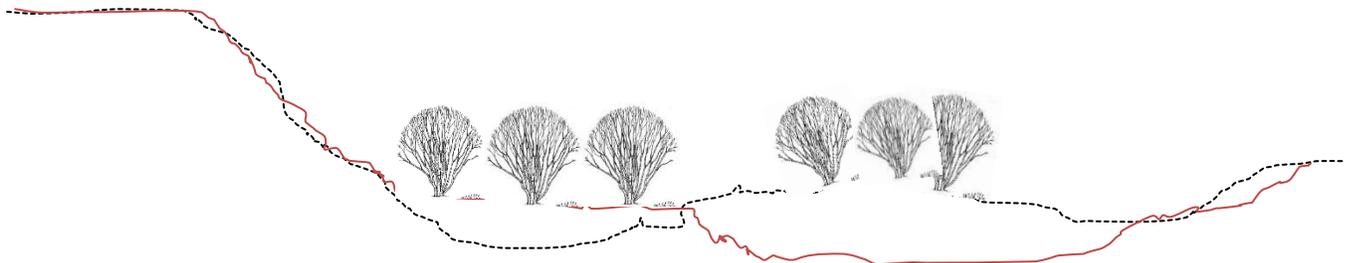


Shaded area is the new floodplain bench, comprising the cobble, gravel, willow clumps and sedges, relocated from the center bar to the base of the rip-rapped embankment. This floodplain bench will be stabilized with large rock integrated into the on-site materials.

The embankment will be treated with willow stakes, set into the rock, and the fringe of the road berm will be replanted with shrubs and/or trees.

Proposed cross-section changes:

Dashed line represents existing conditions;
Solid line represents conceptual proposed conditions



Catskill Streams Buffer Initiative

The Neversink River Stream Management Plan recommends exploring with landowners the benefits of protection and restoring forested riparian buffers. Promoting a diverse vegetation community along streambanks and in the floodplains will help to reduce threats of serious bank erosion while improving riparian and aquatic habitat.

The Catskill Streams Buffer Initiative (CSBI) is a program currently in place to assist residential landowners to protect property and preserve natural habitat through the use of vegetation along streambanks in the Neversink watershed. CSBI has been set up to fund projects by NYC DEP through Sullivan County Soil & Water Conservation District via the Rondout & Neversink Stream Program to work directly with streamside landowners in order to diagnose streamside-related problems and recommend solutions to effectively manage streamside property for water quality protection. By restoring strong and healthy streamside buffers with Catskill Mountain indigenous plant species, CSBI helps landowners create and restore streamside habitat, reduce streambank erosion, monitor and remove invasive species.

Backyard Stream Buffers

Frequently streambank erosion and stream channel instabilities begin as small problems that may have been avoided, minimized or corrected by well-informed streamside landowners. A better understanding of the roles of floodplains, native streamside vegetation and riparian buffers can help guide landowners as they adopt practices to protect streams and improve overall stream stability. The rooting structure of trees help form a dense mat of roots to bind the soil together, while the multi-stemmed nature of most native shrubs help to break up the erosive power of flowing water over the floodplain. The CSBI program works directly with streamside landowners who currently maintain minimal streamside vegetation, mowed lawn right up to the stream edge, for example, to formulate a plan for re-vegetating the streambank while considering the landowners concerns, goals and objectives.

Objectives for Backyard Stream Buffer Projects

- Reduce erosion
- Reduce water velocity over floodplain
- Increase riparian buffer area while reducing area that is mowed
- Increase streamside habitat (terrestrial & aquatic)
- Filter pollution from upland areas
- Fill gaps in otherwise continuous streamside buffer
- Promote establishment of Native Plants in buffer areas
- Remove any non-native species from buffer area

Invasive Species Removal

The Neversink watershed is unique in the Catskill Mountains due to its minimal amount of invasive species compared to other rivers in the same region. However, the threat of introducing invasive species to this area is still quite high, especially given the close proximity to other thriving populations of invasive species. Japanese Knotweed, for example, was not found in the entire Neversink River watershed above the reservoir but exists, in large populations below the dam and throughout the rest of Sullivan County. In recent years the primary means of dispersal into knotweed free areas has been through movement of soil or fill contaminated with knotweed fragments. The primary goal for dealing with invasive species in the Neversink watershed will be education. The CSBI program holds several events annually to educate landowners and municipal officials on the importance of maintaining invasive free areas for promoting native buffers. Print newsletters and brochures are distributed regularly to reinforce the messages for early detection of invasive species on the watch list for Neversink.

Bio-engineered Erosion Control Solutions

Treating bank erosion with traditional methods such as riprap revetment or solid concrete walls often places little value on fisheries, wildlife habitat, water quality or aesthetic appeal. Recent advances by resource agencies and conservation organizations in the understanding of stream processes have opened up the possibilities that bioengineered solutions may be more widely accepted. Bioengineering is the combination of biological, ecological, and mechanical concepts, when paired together, help to control erosion and serve as good wildlife and fisheries habitat.

The CSBI program has been set up to offer bioengineered solutions for minor erosion occurring on private lands where acceptable. The Rondout & Neversink Stream Program works directly with landowners to design and install bioengineered solutions to slow bank erosion and give riparian buffers the opportunity to regenerate.