THE NARROWS STREAM BANK RESTORATION AND PROTECTION PROJECT

Conewago Creek, a tributary of the Susquehanna River is a high quality trout stream originating on South Mountain near the Appalachian Trail. However, sections of Conewago Creek just north of Arendtsville, Adams County, Pennsylvania were experiencing severe bank erosion, bank failure (collapse) and sediment deposition which was destroying aquatic habitat.

Upstream site 1 – Before the start of the project – February 1999

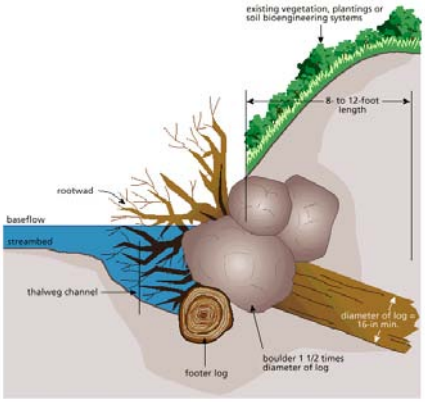
Downed trees in the stream, in turn, were causing additional bank erosion and channel scour by redirecting the flow towards the banks.

Downstream site 2 – Before the start of the project – February 1999

The near vertical eroding banks, which were approximately 15 feet high, were receding at rates approaching nearly 10 feet per year, generating over 8000 tons of sediment.

The local land-owners contacted the Adams County Conservation District for assistance, which in turn applied for an EPA Section 319 Nonpoint Source Grant from the Pennsylvania Department of Environmental Protection. A 319 Grant for The “Narrows Soil Bioengineering Project”, named after the upstream wooded canyon, was awarded in 1998.

The Narrows project involved the reshaping and stabilization of approximately 800 feet of critically eroding bank at two sites. In addition to smoothing and reducing the bank slope, the project planned for the installation of “root wads” and large native rock to protect and stabilize the eroding toes of the high banks. The project also involved the planting of trees and grasses to stabilize the upper portions of the banks, control erosion, improve visual quality, and create a riparian buffer and habitat.



Revetment system. Details of rootwad and boulder technique. Source: USDA-NRCS 1996a.

The design by the USDA Natural Resources Conservation Service called for root wads to be installed every 50 feet at the upstream site. The downstream site, which is deeper and is on a more abrupt bend, was designed with root wads installed every 30 feet.

The goal of the design was several fold: 1) The root wads and large rocks provided the large, heavy material necessary to stabilize the toes of the steep, high, eroding bank and prevent the slopes from further undercutting; 2) The root wad structures were placed 8-12 feet into the stream from the existing bank. This would allow the new stream bank to be built at a more gentle and stable slope without cutting back into the private landowners’ properties. 3) The building of the new stream bank was done with gravely material removed from the adjacent stream bank. This process “softened” the stream banks allowing the stream to “move” away from the newly stabilized banks. 4) The planting of trees and grasses will provide ground cover for erosion control, increase bank stability, create riparian habitat, provide shade cover to the stream, and produce a more natural, aesthetically pleasing project that will blend into the surrounding environment.

Root wads were easy to obtain from downed trees along the eroding banks and from trees that had to be removed in order to make an access road to the site. The large rock boulders needed for protecting the toe of the bank and “holding down” the root wads was a potentially expensive item that needed to be hauled in, plus there was concern that imported rock would not match the aesthetics of the area.

Upstream Site 1 – After completion of the project – March 1999

Fortunately, a neighboring apple orchard had a large stock pile of native rock available from past clearing efforts, and the owner was more than happy to have the rock removed.

Downstream Site 2 – After completion of the project – March 1999

Trees for planting (willows and dogwoods) were donated by the Adams County Chapter of Trout Unlimited, while a local distributor donated half the erosion control matting with the other half sold at cost. In all, material bills totaled approximately $1100 for the entire project.

Following channel protection construction, Trout Unlimited members, Boy Scouts, and local Watershed Association volunteers met on two Saturdays to install erosion matting and plant trees. Trees consisted of both bare root stock and potted stock. The previous Friday, staff from the Adams County Conservation District seeded the bare soil areas with annual grasses. Nearly 800 feet of unstable eroding stream bank was stabilized for $25,000, a much cheaper and more aesthetically pleasing approach compared to the traditional riprap approach. The concept of soil-bioengineering has received very good publicity and has raised the awareness of this restoration technique on even the most extreme cases.

Stream bank erosion rates and instream sedimentation have been greatly reduced with nearly 8000 tons of potential sediment prevented from entering the creek.

Upstream Site 1 – August 2001

Stream bottoms have returned to a clean gravel condition with no evidence of siltation. Native trees from natural successions have returned to the gravel bars on the opposite banks. In addition to stabilizing the streambanks, the rootwads are providing sheltered habitat to native trout that have returned to the restored areas in significant numbers.

Downstream Site 2 – Close up of root wad, August 2001

The Narrows Soil-bioengineering project is an example of a small but critical watershed problem that was quickly and inexpensively solved through the efforts of Federal, State and local agencies along with the valuable input from local organizations, citizens, and volunteers.

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