



CANAAN VALLEY INSTITUTE

Ensuring our region has healthy streams — a critical economic engine for rural communities.

Proposed WV Tour Sites – 2022 EPA Tour

Canaan Valley Institute (CVI) has received CWA §319, Chesapeake Bay and other grant funds to undertake a number of stream restoration projects to reduce the level of sediment pollution in the Opequon Creek watershed. The Opequon Creek watershed is the number one priority in West Virginia's Chesapeake Bay cleanup effort. Projects sites include:

- 1) Tuscarora Creek Dam Removal & Stream Restoration Site – Roach (Martinsburg, 2016)
- 2) Mill Creek Stream Restoration Project – Webber (Gerrardstown, 2013)
- 3) Tuscarora Creek Stream Restoration Site - Campbell (Martinsburg, currently underway)
- 4) Mill Creek Natural Stream Design - Probst (Bunker Hill, 2019)
- 5) Mill Creek Natural Stream Design - Conley (Gerrardstown, 2009)



Photos above: Eroding banks and dam at the Natural Stream Restoration project site (Roach) prior to construction

Site 1: Tuscarora Creek Dam Removal and Stream Restoration (Roach Site, 2016)

Project Summary: Tuscarora Creek, a tributary of Opequon Creek, is located in Berkeley County in the Potomac Direct Drains Watershed of West Virginia. This project entailed natural stream design of a 448-foot section of the stream experiencing high levels of erosion. Project goals included: 1) removing a fish passage barrier; 2) restoring eroding streambanks to reduce sediment pollution; and 3) restoring riparian buffers to improve wildlife habitat and water quality. Construction activities included removing the dam, realigning the stream channel to increase sinuosity, creation of appropriate pool sizes and pool to riffle spacing, instream structures for stream and bank stability using logs and boulders, and bioengineering practices including brush mattresses, live stakes, and fascines. Trees and shrubs were planted along the stream. The project is located within the Tuscarora Creek Historical District in close proximity to known archaeological sites, thus requiring an in-depth study of the site's archaeological and architectural resources. As a requirement of NFWF funding, CVI developed a Quality Assurance Project Plan (QAPP) for the data collection activities.

Project Outcome: Reduced sediment loads to the creek by 8.3 tons/year

Timeline: Project completed in 2016

Location: Horizon Way (near intersection with Tuscarora Pike), Martinsburg, 25403 (Note: This site is located upstream of the Campbell site, #3 below.)



Photo left: Webber streambank stabilization project. Area was graded to a less steep bank angle and protected with brush mattress, live fascines, and live stakes. No excavation was done due to limited access, and impacts by mobilization were avoided.

Site 2: Natural Stream Design Project on Mill Creek (Webber Site, 2012-13)

Project Summary: A single natural stream design project near the headwaters of Mill Creek was implemented as part of a larger program including septic system improvements to reduce fecal coliform and sediment loads in Mill Creek. Mill Creek

is a tributary of Opequon Creek, in the Potomac Direct Drains Watershed in Berkeley County, WV. The site was impacted by debris blockages and vertical stream banks that disconnected the stream from the floodplain and prevented bank-stabilizing vegetation from becoming established. Overly high (12') banks were cut back to a less erosive bank angle and protected with bio-engineering comprised of brush mattress, live fascines, and live stakes. The riparian corridor was planted with a wide variety of trees and shrubs to increase the diversity of current species, which include a large number of green ash. Additional program elements included residential practices employed to achieve reductions of both pollutants and stormwater, septic system upgrades, septic pumping coupons, riparian buffer plantings, raingarden demonstrations and more.

Project Outcomes: The focus was streambank stabilization but other NCS D techniques were implemented. Also, the riparian corridor was improved with new planting and invasive removal. Sediment reduction was 8.5 tons/yr.

Timeline: Project activities occurred 2012-2013

Location: 571 Dominion Road, Gerrardstown, 25420 (near the road and easily accessible)



Photo left: Bank erosion on Tuscarora Creek project site in the Opequon Creek watershed, the number one priority in West Virginia's Chesapeake Bay cleanup effort.

Site 3: Tuscarora Dam Removal (deferred) and Bank Stabilization (Campbell, 2022-23)

Project Summary: The project is located on Tuscarora Creek, a tributary of Opequon Creek. The site is comprised of multiple (5) landowners experiencing severe bank erosion caused by a low head dam spanning and impounding Tuscarora Creek. The ideal restoration practice would be to remove the dam and reestablish a stable channel using instream structures to provide grade control and stabilize banks using toe wood, bio engineering, and riparian plantings. However, due to pending land sells and lack of contact (despite multiple attempts) with the landowner to the right of Tuscarora Creek, funding to provide bank stabilization alone rather than a dam removal

was identified. Grants were submitted to WV DEP-319 Grant Program and National Fish and Wildlife Foundation – Nutrient and Sediment Reduction Grant Program.

Project Outcome: Stabilize banks on two properties (Campbell and Giles) using natural streambank stabilization methods. Collectively, stabilizing banks at these two sites will reduce pollutant loads by 844.23 lbs/yr TSS, 17.03 lbs/yr TN and 0.39 lbs/yr TP.

Timeline: Construction on the Campbell site will take place in the spring of 2023. Survey of a related project (Giles site) will begin in November of 2022 and be completed by December 31, 2022.

Location: 50 Babbling Brook Lane, Martinsburg, 25403



Photo left: Bank erosion on Tuscarora Creek project site in the Opequon Creek watershed, the number one priority in West Virginia's Chesapeake Bay cleanup effort.

Site 4: Natural Stream Design (Probst 2019)

Project Summary: Natural stream design was used to stabilize approximately 300 feet of the Mill Creek mainstem, near Bunker Hill, WV. Mill Creek is a tributary of Opequon Creek. Design & permitting were funded by 319; construction from CBIG. Natural stream design and bioengineering materials were used to lay back unstable banks to a more stable angle, and protect eroding streambanks. Bioengineering materials included livestakes, brush mattresses and live fascines. The riparian corridor was enhanced by planting other species rather than the more common green ash currently dominating and included a mix of native trees and shrubs.

Project Outcome: Reduced sediment pollutant loads by 50 tons/year

Timeline: Project completed in 2019

Location: 846 Currency Drive, Bunker Hill, WV 25413

Owner Contact: Crystal Probst

Photo below: A single natural stream design project on approximately 1225 feet of Mill Creek near the headwaters.



Site 5: Natural Stream Design (Conley 2009)

Project Summary: The Conley project involved the restoration or enhancement of appropriate pattern with longer riffle sections and less tortuous meanders, dimension which included an inner berm feature, and profile which stabilized the headcut working through the reach. This new channel morphology allowed the channel to be reconnected with the floodplain. Prior to the project, cattle were allowed full access to the stream. As part of the project, a cattle crossing was installed to allow the farmer to rotate the cattle, and cattle exclusion fencing has been installed to restrict cattle from entering the stream as well as the buffer zone. Nine structures were installed to stabilize the channel restoration until vegetation becomes established. Three rock structures and six log combination structures were installed at the outer bends of the restoration reach.

Project Outcome: Reduced the total sediment load entering the creek by 205.3 tons/year

Timeline: Project completed in 2009. Repairs and updates were completed in 2015.

Location: Gerrardstown, WV 25420

About CVI

CVI works to create resilient communities with vibrant local economies and clean watersheds across central Appalachia. We achieve this through a practical, science-based approach to wastewater treatment, stream restoration, habitat protection, stormwater management using green infrastructure, and environmental workforce development in partnership with local governments, community organizations, schools, restoration professionals and private individuals. Our experience includes administering county-wide wastewater improvement programs to reduce pollution to the region's rivers and streams caused by inadequate wastewater treatment.

Since its founding in 1995, CVI has helped more than 350 community groups and local government entities solve water quality problems. We recognize that strong partnerships, which pool resources and diversify expertise, are the most effective means for finding solutions to problems that threaten economic and environmental resources. Funding for CVI's programs comes from individual donors, Chesapeake Bay foundations, state and federal agencies, and local and regional community development programs. With our partners, we leverage funding sources to restore natural stream corridors, bring vital financial and technical resources to rural communities, and foster a restoration economy across the region.