

Mill Creek (Opequon) Project Proposal

for Clean Water Act Section 319(h) Incremental Funds

West Virginia Stream Code: WVP-4-M

A Tributary of Opequon Creek, in the Potomac Direct Drains Watershed
Berkeley County, WV



Canaan Valley Institute
in cooperation with
West Virginia Department of Environmental Protection

June 2008

Budget:
319 Funding: \$448,082
Non-federal Match: \$279,052
Total: \$727,133

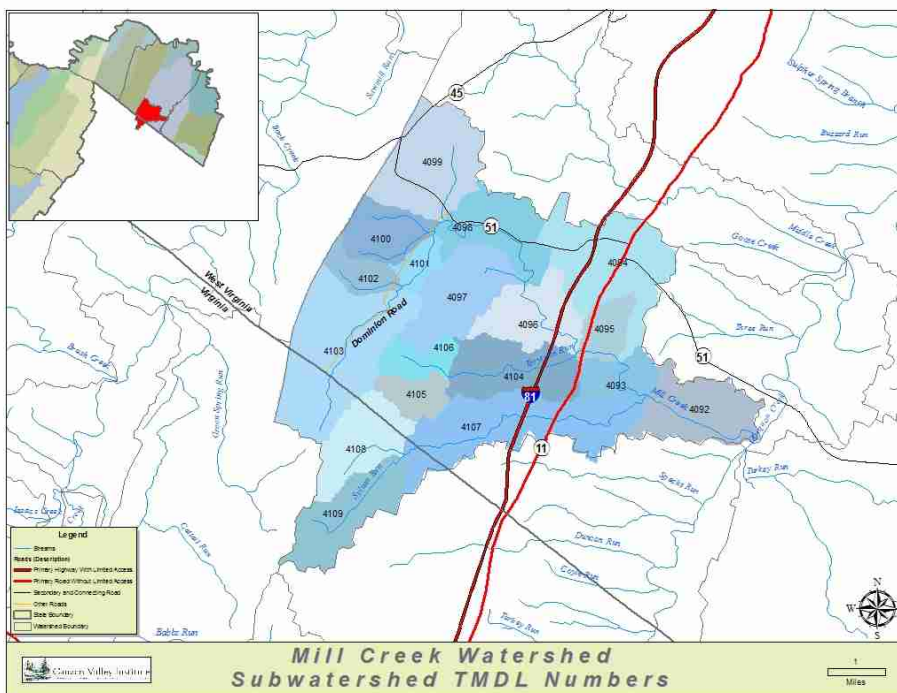
Project Summary

This project is intended to reduce fecal coliform and sediment loads in Mill Creek of the Opequon Creek watershed, Berkeley County, WV. The fecal coliform reduction goal is 2.8×10^{14} cfu, primarily through septic system upgrades and incentives for pumping septic systems. An additional 7.2×10^{12} cfu is expected to be reduced through agricultural Best Management Practices, including providing assistance for nutrient management planning. The sediment reduction goal is 85 lbs/year, to be achieved primarily through a single natural stream restoration project near the headwaters of Mill Creek. Residential practices will also be employed to achieve reductions of both pollutants. Two workshops in the watershed regarding septic systems will serve to educate residents and professionals about proper function and maintenance of septic systems. Rain barrel workshops and pet waste outreach efforts will educate residents about stormwater management. Nonpoint source projects planned (excluding agricultural practices covered under existing cost-share programs) include 51 upgrades of septic systems, 25 coupons for 50% off the cost of pumping a septic system, 3 acres residential vegetative buffers, 2 rain garden demonstrations, 1 culvert improvement demonstration, 1000 feet of natural stream restoration, 4 public workshops, 1 pet waste reduction campaign, and agricultural nutrient management planning.

Background

The Mill Creek watershed comprises subwatersheds #4092-4018 in the TMDL for Selected Streams in the Potomac Direct Drains. The headwaters are in Virginia, but most of Mill Creek is located in the southeastern part of Berkeley County in the Shenandoah Valley, also called the Great Valley. It is 14.5 miles long (one mile of which is in Virginia), and its watershed covers 29.75 square miles. It flows north to Gerrardstown, WV, then bends toward the east and flows through orchards, new developments, older residential areas, the town of Bunker Hill, and on to Opequon Creek. South of the mainstem are situated two major tributaries, Torytown Run (3.5 miles) and Sylvan Run (7.7 miles, 2.7 of which are in Virginia).

Figure 1. Location of the Mill Creek watershed, Berkeley Co., West Virginia. In the inset, the red area is the Mill Creek watershed, and the gray area surrounding and including it is the Opequon Creek watershed.



The bedrock geology that Mill Creek flows through is mainly composed of limestones and shale. The watershed contains several mill sites and springs of historical significance. Currently, LeFevre Spring in Bunker Hill, near the confluence of Torytown Run and Mill Creek, is a significant source of drinking water for Berkeley County. The Berkeley County Public Service Water District also has a wellfield at Springdale Farm, near the headwaters of an unnamed tributary of Mill Creek.

The watershed includes diverse land uses, with forest, grassland, urban pervious, and pasture comprising over 80% of the total area. Orchards (4%) and quarries are also present (1%). A transportation corridor consisting of Interstate-81, a railroad, and Route 11 runs in a north-south direction through the eastern 1/3 of the watershed. The most urban portion is around the Inwood exit of the Interstate, at the northern edge of the watershed. The watershed has seen a rapid increase in residential use since the TMDL development effort in 2003-2004 (Fig. 4). In addition, a large portion of the orchard acreage in the watershed has recently been sold and could be converted to residential use. Yet another significant land use change could result from the recent purchase of forest acreage by a local brick company on the east side of North Mountain, which is the western edge of watershed, if the company begins to conduct shale mining there.

Several schools, including a high school, are located in the Mill Creek watershed. School students, teachers and programs are potential targets and partners for outreach opportunities proceeding from this TMDL implementation effort. Three public meetings in the watershed occurred during the development of the Watershed Based Plan and this project proposal. Residents were knowledgeable about groundwater and stormwater issues, and are expected to remain involved in outreach and other projects.

Mill Creek and Torytown Run are on the 303(d) list for biological impairment, with organic enrichment and sedimentation determined to be the biological stressors. These two streams are listed for fecal coliform impairment as well. Therefore, Mill Creek and Torytown Run received total maximum daily load (TMDL) allocations for sediment and fecal coliform. Sylvan Run is listed for biological impairment only, and the biological stressor is sedimentation. Therefore, Sylvan Run received a sediment TMDL.

Nonpoint sources of fecal coliform addressed in the TMDL and Mill Creek Watershed Based Plan include failing septic systems, pasture, cropland, and residential/urban land. The largest reductions prescribed by the TMDL are from failing septic systems. Nonpoint sources of sediment in this watershed include streambank erosion and upland sources such as cropland, pasture, and residential/urban/roads areas. Residential and urban landuses can also be indirect sources of sedimentation, because increased impervious area associated with those landuses can increase the volume and velocity of stormwater runoff and accelerate streambank erosion.

The Opequon Creek watershed is the number one priority in West Virginia's Chesapeake Bay cleanup effort. Therefore, nitrogen, phosphorus, and sediment loads in Opequon Creek and its tributaries need to be reduced. Reducing excess nitrogen and phosphorus should have the added benefit of decreasing the organic enrichment of these streams, thereby promoting abundance and diversity of the benthic community. Nonpoint sources of excess nitrogen and phosphorus are likely those already mentioned above: failing septic systems, agricultural lands, and residential/urban areas.

The "Mill Creek (Opequon) Project Proposal" consists of septic system upgrade projects and pumping incentives to address inadequate on-site wastewater treatment, agricultural and residential projects

intended to restore vegetation and stability to riparian areas, agricultural nutrient management planning, demonstrations and outreach to promote better management of residential/urban runoff, and natural stream design (NSD) projects to improve hydrology and habitat of streams.

Canaan Valley Institute (CVI) is the lead agency for this proposal. CVI is a nonprofit, non-advocacy organization that helps people identify, solve, and implement solutions to serious water issues impacting their daily lives. Our organization's technical capabilities and human resources come together to help community organizations, government agency partners, and businesses solve critical water quality problems. Over our 12 year history, CVI has provided services to over 350 community groups and local government entities. Our core service area is the Mid-Atlantic Highlands, encompassing the mountain regions of Maryland, Pennsylvania, Virginia, and West Virginia. CVI's headquarters is in Thomas, West Virginia, and we have field offices in Charleston and Morgantown, West Virginia. CVI also has staff stationed in Abingdon, Virginia, and Hagerstown, Maryland.

CVI has worked closely with West Virginia Department of Environmental Protection (DEP) for more than ten years, supporting the development of watershed associations, community based assessments of water quality issues, and community-led planning for identifying and developing wastewater and stream restoration projects. CVI is also a regional leader in providing education on stream restoration and decentralized wastewater treatment to community groups, regulators and agency staff, and professionals. CVI focuses on improvements to wastewater treatment systems to reduce pollution to the region's rivers and streams caused by inadequate wastewater treatment. With considerable experience in the development of regional comprehensive wastewater plans, CVI typically focuses on four components: community engagement; assessment; identifying options; and assisting and coordinating design and implementation. CVI staff also design and oversee the construction of NSD stream restoration projects. CVI is nearing completion on a large-scale watershed restoration project in Tucker County, West Virginia that serves as a model and education resource for this type of work in the region.

CVI also has a model quality assurance program with existing EPA approved organization quality management plan, stream restoration quality assurance project plan, and quality assurance statements for all education activities. CVI also uses an industry standard quality assurance statement for wastewater engineering work.

Kristin Mielcarek, watershed circuit rider will be the lead staff for this project and she can be reached via email at kristin.mielcarek@canaanvi.org, by phone at 304/678-3446. She will be supported by a variety of technical and administrative staff and CVI's headquarters. These staff can be reached at 800/922-3601 and the headquarters' mailing address is PO Box 673, Davis, WV, 26260.

Goals and Objectives

Upgrading 50 failing septic systems in the western tier of the Mill Creek watershed is estimated to **reduce fecal coliform by approximately 2.8×10^{14} cfu**, which is 50/212 or ~24% of the Phase I septic system load reductions described in the Watershed Based Plan. Excluding livestock from streams on pasture land and minimizing runoff from manure applied to cropland (including using nutrient management planning) can be expected to achieve **reductions of approximately 7.2×10^{12} cfu**, or about half of the agricultural reduction described for Phase I. A single natural stream design project on approximately 1000 feet of Mill Creek is estimated to **reduce the sediment load entering the creek by 85.2 tons/year**. Additional sediment reductions will be achieved with the agricultural and residential practices proposed. Prioritization schema described in the Watershed Based Plan will be

used when there are opportunities to choose between more than one of a given type of project. In general, siting as many projects as are feasible in the western tier will achieve water quality standards in this most upstream section of Mill Creek as quickly as possible.

Goals for the educational components of the Mill Creek (Opequon) Project Proposal include two rain barrel workshops, one public workshop regarding septic systems in the western tier of the watershed, and one workshop for septic installers and related professionals. In addition, a pet waste reduction campaign will be initiated.

Project Description

Project Plan

Nonpoint source projects planned include:

- **Fifty-one upgrades of septic systems** will be focused in the western tier of the watershed, which was identified as the first priority in the Watershed Based Plan. Upgrades will likely include pre-treatment because of poor soils in many cases; landowners will be required to pay part of the cost of any upgrade. One demonstration of a nitrogen-reducing system is also included.
- **Twenty-five coupons will be offered for 50% off the cost of pumping a septic system** up to \$150 per system. The western tier will be primarily targeted for this effort, to increase the likelihood that the coupons will be used on failing systems.
- **Three acres residential vegetative buffers will be planted or enhanced** along Mill Creek or its tributaries. Approximately 3700 feet of buffers 35 feet wide would comprise 3 acres. Volunteer or staff outreach efforts to streamside landowners is expected to result in some cessation of regular mowing, meaning that some herbaceous buffers can be developed at no cost to this project. Tree and shrub buffer planting projects will be matched by the landowner or outside contributions 50%.
- **Nutrient management planning assistance** in the form of two temporary staff people, reporting to the Martinsburg office of the Natural Resources Conservation Service, will be offered to Mill Creek landowners.
- **Two rain garden demonstrations** will be carried out, including a smaller one at a single residence, and a larger, more technically-designed one in a commercial or public setting. The smaller one will serve as a pilot project for the Opequon Creek Project Team and its partners to gain experience with planning, budgeting, and executing a homeowner-sized bioretention structure. The larger one will be a chance for OCPT and its partners to repeat a type of project with which they have now gained experience, in a different area of Berkeley County. The combination of these two rain gardens and the publicity they are expected to generate will demonstrate to other Mill Creek residents the benefits of installing these stormwater practices.
- **One culvert will be improved** to demonstrate the low cost and simplicity of using a floodplain culvert system to reduce erosion around road and driveway crossings. There are many opportunities for this project in the western tier of Mill Creek watershed, where a county road parallels the upper reach of Mill Creek and connects to many private driveways and roads.
- **Natural stream restoration will be used to stabilize approximately 1000 feet of the Mill Creek mainstem**, just upstream of Gerrardstown and in the midst of the area targeted for septic system improvements. This project will also stabilize the mouth of an unnamed tributary whose >12-foot-high bank and many upstream pollution sources make it an important target for restoration. This project (Webber property) is described in Appendix A of the Watershed Based Plan.

- **Four public workshops and one pet waste reduction campaign** will be conducted in the watershed. These are described in the *Education and Outreach* section, below.
 - To reduce fecal coliform and sediment runoff from agricultural lands, practices included in the Environmental Quality Incentives Program (EQIP) and Conservation Reserve Enhancement Program (CREP) will be encouraged, including:
 - **Vegetative buffer establishment** (approx. 3 acres)
 - **Livestock exclusion fencing** (approx. 2400 feet) and alternative watering systems (approx. 3 systems)
 - **Armored stream crossings** (approximately 2)
- Funding secured through this project proposal will not be used for the above practices because they are covered by federal cost-share programs.

Partner Involvement

- *Canaan Valley Institute (CVI)*: will administer grant funding, design and coordinate programs to install individual onsite systems and provide homeowners instruction on proper septic maintenance and will provide training to local public service districts and similar organizations.
- *West Virginia Department of Environmental Protection*: will administer grant funding and collection of milestones; assist with education and outreach and monitoring of the Mill Creek Watershed. The Potomac Basin Coordinator will assist CVI with project implementation and management.
- *Eastern Panhandle Conservation District*: will implement education and outreach within the watershed, and might provide matching funds.
- *USDA-NRCS*: will provide technical assistance for installation of BMP's and assistance with Farm Bill Practices, as well as communicating the goals of this project to agricultural landowners.
- *USDA-FSA*: will provide assistance with Farm Bill Practices and communicating the goals of this project to agricultural landowners.
- *Opequon Creek Project Team*: will provide assistance with monitoring, and educational opportunities.
- *Berkeley County Health Department*: will provide training to the septic installers and similar professionals, and communicate the goals and plans of the project to residents; will assist with identifying project opportunities in the priority area.
- *West Virginia Department of Health and Human Resources*: will assist with maintenance and operation of public cluster systems.

Education and Outreach

Working with consultants and technical providers, Canaan Valley Institute will provide education and technical assistance for the public and the administrators in Berkeley County. CVI focuses on improvements to wastewater treatment systems to reduce pollution to the region's rivers and streams caused by inadequate wastewater treatment, and has extensive experience in hosting public workshops on wastewater issues. One public workshop will be held to inform local citizens on: the effects of

wastewater pollution on a watershed, proper maintenance and care of an onsite wastewater (septic) system, alternative options to traditional wastewater systems, and available financial assistance programs. CVI will also provide consultation and training for public service and wastewater management personnel to enhance septic system reliability and performance. This will include one workshop for wastewater professionals on: the effects of wastewater pollution on a watershed, proper maintenance and care of an onsite wastewater (septic) system, alternative options to traditional wastewater systems, and enhancing Individual Sewer System reliability and performance.

Two workshops will also be offered to Mill Creek residents to explain the benefits and operations of rain barrels, and to provide the opportunity to purchase barrels and spout set-ups for a reduced cost (targeting a total of 30 new rain barrels installed). Opequon Creek Project Team has extensive experience with organizing such workshops, but none have yet been conducted in this southern part of Berkeley County.

In addition, a pet waste reduction campaign will be initiated to increase awareness of the pollution caused by pet waste deposited in areas that drain to Mill Creek. This will include identification of sites where pet-walking is a potential source of fecal coliform pollution near surface waters, and the subsequent implementation of measures to reduce this source. For example, waste bag stations like the one pictured here can be purchased, installed, and maintained at strategic locations. Finally, many more residents of the watershed will be reached with the message of nonpoint source pollution prevention through signs posted during construction of any of the above-listed projects and through conversations during the septic upgrade site identification process.



Maintenance of Effort

Canaan Valley Institute, the Berkeley County Health Department, and WV DEP's Potomac Basin Coordinator will ensure effectiveness and sustainability of practices installed through this project by providing technical assistance and coordination to landowners who participate. The contracts for septic system upgrades, residential forest buffers, and NSD will be 5-year contracts, ensuring BMPs will be maintained through the life of the contract. Agricultural projects contracted through Natural Resources Conservation Service and Farm Service Agency will be maintained through the life of those contracts, e.g. the Conservation Reserve Enhancement Program has a 10-year contract. With West Virginia's participation in the Chesapeake Bay Tributary Strategy effort, support will be provided for BMPs following the completion of the 319 grant. Financial support will be given as funding allows.

Monitoring

The WV DEP will conduct its regular 5-year-cycle sampling in the Potomac Direct Drains watershed in 2008. Any sites repeated in Mill Creek from the pre-TMDL sampling in 2003-2004 will provide

new baseline data before Section 319 implementation begins. Parameters will include fecal coliform, nutrients, TSS, and in some cases benthic invertebrates.

Opequon Creek Project Team and WV DEP's Potomac Basin Coordinator will oversee volunteer water sampling of regular sites within Mill Creek watershed. Some sites will be chosen based on their potential to show downstream differences before and after groupings of project implementation (e.g. downstream of a community where several septic systems are scheduled to be upgraded, and again after upgrades). Volunteer travel and time may be in-kind, but funding will be necessary for fecal coliform testing at a local certified laboratory, and chemical testing, to include nutrients, at the Friends of Shenandoah River's laboratory at Shenandoah University. Canaan Valley Institute will complete post-construction monitoring on the NSD project using its existing stream restoration effectiveness monitoring protocol.

Some volunteer sampling of benthic macro-invertebrates will also occur, using West Virginia's Save Our Streams protocol.

A Quality Assurance Project Plan will be submitted for EPA's approval. The monitoring plan will be designed to evaluate progress from groups of projects and overall.

Schedule of Milestones

Hold Public workshop on Septic System Care and Maintenance	September 2009
Launch 50% off pumping coupon campaign	September 2009
Hold professional workshop on Septic System Maintenance	October 2009
Upgrade/fix failing septic systems (ongoing)	November 2009
Launch nutrient management planning (ongoing)	January 2010
Launch pet waste runoff reduction campaign (ongoing)	February 2010
Provide additional treatment for denitrification	March 2010
Provide additional treatment for poor soils (ongoing)	March 2010
Hold rain barrel workshop	April 2010
Establish agricultural forest buffer	April 2010
Establish residential grass buffer	May 2010
NSD project design	June 2010
NSD Construction	August 2010
Establish residential forest buffer	September 2010

Install 1200 feet of fence	October 2010
Design for culvert improvements	November 2010
Install alternative watering system	December 2010
Culvert improvement construction	February 2011
Hold rain barrel workshop	March 2011
Establish agricultural grass buffer	April 2011
Rain garden demonstration	April 2011
Residential rain garden	May 2011
Install stream crossing	June 2011
Install alternative watering system	August 2011
Install 1200 feet of fence	October 2011
Install alternative watering system	November 2011
Install stream crossing	June 2012
Begin twice monthly monitoring	August 2012

Budget

See accompanying spreadsheet.