

Section 319 Incremental Project Proposal for Elks Run Watershed

West Virginia Stream Code:WVP-1

in the Potomac Direct Drains Watershed
Jefferson County, WV



2010

Anticipated need for 319 funding \$55,000

Matching funds \$45,700

Total project cost \$100,700

Photo: May 3, 2008 Chesapeake Bay Foundation, state and federal partners, and volunteers plant native trees and shrubs at Gap View Farm, headwaters of Elks Run.

Project Summary

This project is intended to reduce fecal coliform and sediment loads in Elks Run watershed, Jefferson County, WV. The fecal coliform reduction goal is 7.03×10^{13} counts/year, through repair or replacement of 12 onsite sewage systems (septic systems). This project will also provide funding for The Conservation Fund-Freshwater Institute (TCF-FI) to continue using the GIS and septic risk model it has developed to help us determine where to implement these and other Best Management Practices (BMPs) with the most success. We will survey the streambanks of Elks Run, and a small streambank stabilization project will also provide partners with better information about load reductions that can be expected from future streambank restoration projects in the watershed. *A Watershed Based Plan is required for Elks Run Watershed and will be completed soon.*

Background

This project is located in Elks Run watershed (WVP-1) a direct drain of the Potomac River, in TMDL SWS #1001-1011. Elks Run (WVP-1) drains approximately 18 square miles (11,598 acres), flows into the Potomac River, and is approximately 5.8 miles long. Its major tributary, Elk Branch, is 5.2 miles long. Elks Run watershed is relatively flat; it lies in a low area of the Ridge and Valley physiographic province. It is characterized by karst terrain.

Elks Run is a source of drinking water for the towns of Harpers Ferry and Bolivar. As such, it is the only surface water in Jefferson County that serves a municipal water supply. In 2006 the Harpers Ferry Water Works received a Source Water Assessment and Protection Plan (SWAP), outlining among other things, sources of potential contamination, assessment of possible threats, a management plan and recommendations for contingency planning. The management plan included at least six recommended management “strategies” for addressing nonpoint source pollution, including that from septic systems. However, no physical on-the-ground best management practices were specifically prescribed. The buffer zones surrounding the springs, sinkholes and surface streams as delineated in the SWAP could be considered priority areas for nonpoint source pollution reduction projects.

This watershed is a priority area for West Virginia’s efforts to reduce nutrients and sediment delivered to the Chesapeake Bay. It is part of the fourth priority watershed (out of 24) identified in West Virginia Potomac Tributary Strategy’s Implementation Plan, which was termed Rockymarsh Run-Potomac River (HUC 0207000412).

Finally, Elks Run and its major tributary, Elk Branch, were listed on the 303(d) list as impaired for biological criteria and fecal coliform bacteria. The Total Maximum Daily Load (TMDL) for Selected Streams in the Potomac Direct Drains Watershed, West Virginia (January 2008) addressed these impairments for Elks Run and Elk Branch (Table 1). It linked the biological

impairment to organic enrichment and sedimentation, and it listed the prescribed fecal coliform and sediment load reductions from various sources in each of the 11 subwatersheds.

Table 1: From Tables A-4-3 and A-4-4 of the TMDL, Fecal coliform and Biological TMDLs for the Elks Run watersheds

<u>Major watershed</u>	<u>Stream/Stream code</u>	<u>Parameter</u>	<u>Load Allocation</u>	<u>Wasteload Allocation</u>	<u>Margin of Safety</u>	<u>TMDL</u>	<u>Units</u>
Elks Run	Elks Run/WVP-1	Fecal coliform	6.44x10 ¹⁰	1.36x10 ⁰⁸	3.40x10 ⁰⁹	6.80x10 ¹⁰	counts/day
Elks Run	Elks Run/WVP-1	Sediment	75.56	1.10	4.03	80.70	tons/day
Elks Run	Elk Branch/WVP-1-A	Fecal coliform	2.15x10 ¹⁰	1.36x10 ⁰⁸	1.14x10 ⁰⁹	2.28x10 ¹⁰	counts/day
Elks Run	Elk Branch/WVP-1-A	Sediment	17.48	0.82	0.96	19.26	tons/day

“Scientific notation” is a method of writing or displaying numbers in terms of a decimal number between 1 and 10 multiplied by a power of 10. The scientific notation of 10,492, for example, is 1.0492 × 10⁴.

In 2009 the Eastern Panhandle Conservation District decided to conduct the “Elks Run Watershed Water Quality Improvement Project,” (ERWWQIP) using \$250,000 to address agricultural and residential sources of pollution as well as malfunctioning septic tanks. The ERWWQIP was designed to complement any proposed 319 Incremental project(s).

Since the publication of the TMDL report, an extensive buffer was planted at the headwaters of Elks Run: On Saturday, May 3, 2008, 40 volunteers participated in planting 1,040 trees and shrubs on Gap View Farm, a 330-acre cattle farm in Jefferson County. The partners of this project include: the landowners, USDA Farm Service Agency, USDA-Natural Resource Conservation Service, West Virginia Conservation Agency, West Virginia Division of Forestry, Chesapeake Bay Foundation and West Virginia Department of Environmental Protection. The local agencies partnered with the Chesapeake Bay Foundation to plant 234 trees, 726 shrubs and 80 wetland species trees and shrubs, along 6000’ of stream. Through the Conservation Reserve Enhancement Program (CREP), the stream has been protected by 15 acres of riparian & wetland restoration. Cows have been fenced out of the stream with water troughs and a stabilized stream crossing was installed.

<http://www.wv.nrcs.usda.gov/news/success/08success/gapviewCREP.html>. In addition, the single dairy pasture, located elsewhere in the Elks Run watershed, listed as high runoff potential during source tracking now has excluded livestock from Elks Run in 2008 (Fig. 1).



Figure 1. Dairy operation on Elks Run that now has livestock exclusion fencing along the stream

Goals and Objectives

Upgrading 11 septic systems in the Elks Run watershed is estimated to reduce fecal coliform by approximately 7.03×10^{13} counts/year. Enhancing the septic risk model and GIS developed by TCF-FI will ensure better success with each BMP implemented in the future. Documenting the dimensions and severity of erosion along the Elks Run mainstem will enhance the Watershed Based Plan and prepare the project partners for future streambank restoration funding opportunities. Meanwhile, this grant will give local partners experience in streambank restoration projects by funding a small project to stabilize less than 500 ft of a low (1'-4' high) streambank using coir matting or logs, or other stabilization materials, plus vegetative plantings.

Project Description

Onsite sewer systems: Elks Run watershed includes scattered areas of high population density without access to public sewers. Human sources of fecal coliform bacteria in these areas include sewage discharges from failing septic systems, and possible direct discharges of sewage from residences (straight pipes). An analysis of 911 emergency response addressable structure data combined with WVDEP source-tracking information yielded an estimate of 1,273 unsewered homes in the Elks Run watershed (TMDL p. A4-4). A septic risk analysis performed by The Conservation Fund – Freshwater Institute (TCF-FI) yielded a total of 1155 unsewered homes (Fig. 2), which is within 10% of the number used for the TMDL (Table 2). The decrease is likely due to better definition of the area served by a wastewater treatment facility in Shenandoah Junction.

An overlay index of intrinsic septic system risk for impairment of surface water quality was developed that incorporated typical, and easily identified, hazards and threats associated with septic systems. The index incorporated density of septic systems weighted by building age; distance to surface water, septic system suitability from the Natural Resources Conservation Service (NRCS) Jefferson County Soil Survey, and whether the system was located in the floodplain. Using GIS software, the attributes of the four layers were ranked from high to low

relative to their potential impact on water quality, and combined into an overall risk value. This combined value was then classified into three classes to approximate the three septic zones identified in the Elks Run watershed by WV DEP in the TMDL. Values developed by the WV DEP for complete and seasonal septic system failure were then transferred to these three classes, representing a finer spatial representation of potential septic failure than delineated in the TMDL.

Table 2. Estimated annual load allocations and reductions needed from nonpoint sources to achieve fecal coliform TMDL.

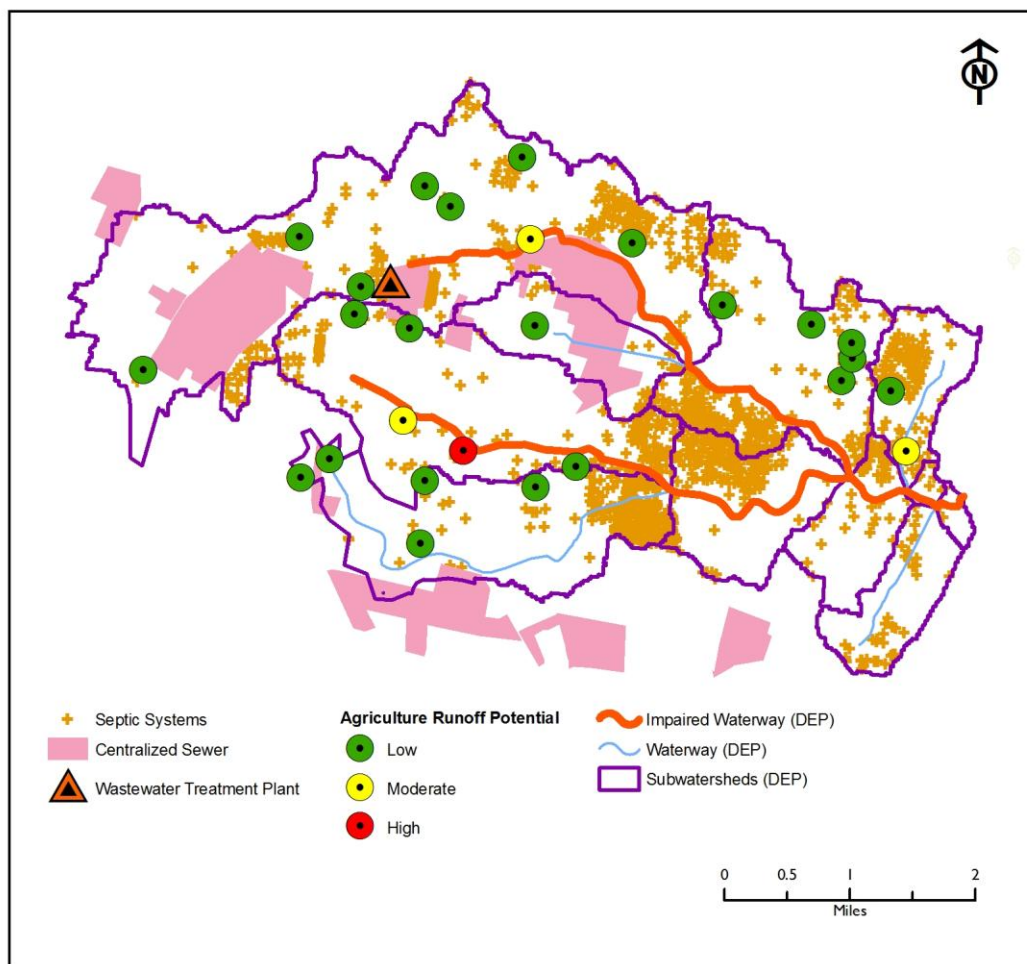
Source	Total amount of this source	Amount contributing to the load that must be reduced	Baseline load (counts/year)	Allocated load (counts/year)	Reduction needed (counts/year)	Percent reduction needed
Background & other nonpoint sources	5705 acres	n/a	4.30×10^{12}	4.30×10^{12}	0	0
Residential/urban	1726 acres	not estimated	1.78×10^{13}	6.81×10^{12}	1.10×10^{13}	61.9
Cropland	1859 acres	not estimated	6.44×10^{12}	2.73×10^{12}	3.71×10^{12}	57.6
Pasture	2309 acres	616 ^A	8.46×10^{13}	9.68×10^{12}	7.49×10^{13}	88.6
Onsite sewer systems	1273 ^B	416 ^B	2.66×10^{15}	0	2.66×10^{15}	100.0

^Aestimated by adding acreage of pastures recorded by WV DEP during source tracking, with high and moderate erosion potential rating

^Bas estimated during the TMDL process for modeling purposes

The number of systems needing improvement estimated for the TMDL modeling effort was 416. **Using the total reduction required (2.66×10^{15} from Table 2) divided by 416, we estimate 6.39×10^{12} counts/year can be removed from the creek by repairing or replacing one of these failing systems.** The TMDL prescribes 100% reductions from failing septic systems. Failing systems will need to be identified and inspected to determine adequate solutions: pumping, repair, or replacement with an appropriate system. The upgrade might include drainfield rehabilitation, a new tank and/or drainfield, or the addition of treatment before the drainfield.

Figure 2. Fecal coliform sources in Elks Run watershed



Sediment

Future volunteer assessments performed as part of this project will provide estimates of the lengths and severity of each erosion site. Meanwhile, this grant will give local partners experience in coordinating streambank restoration projects by funding a small project to stabilize less than 500 ft of a low (1'-4' high) streambank using coir matting or logs, or other stabilization materials, plus vegetative plantings. Partners have begun documenting opportunities for such a project. If possible, priority will be given to a site with high visibility to passing traffic or other visitors. Technical expertise from partners and vendors will be leveraged to design the project, which will not involve rock or wood structures that extend into the stream channel.

Partner involvement

The West Virginia Conservation Agency (WVCA) will be the state agency coordinating the implementation of BMPs, reporting, and the management of the 319-Incremental Grant. The Eastern Panhandle Conservation District will administer funds for this 319-Incremental Grant. Its role in outreach and education is outlined below. These organizations will work together to oversee project installation as well as work with the

partnering organizations to ensure success of the project. They are conducting a separate but complementary water quality improvement project in Elks Run watershed, which will give it an enhanced ability to recruit participants for projects included in this Watershed Based Plan. The WVCA has a proven track record of providing technical expertise for the design and coordination of streambank stabilization projects.

West Virginia Department of Environmental Protection (DEP) will oversee the reporting for this project. The Potomac Basin Coordinator will provide support in the form of outreach, contacts, and familiarity with the TMDL.

The Jefferson County Health Department will inform citizens of septic pumping, repair or replacement programs when citizens are in eligible areas. Health Department staff will also inform citizens of West Virginia's Onsite Loan program to help them pay for the cost of these activities. Staff will also provide technical support to residents with septic system problems and will facilitate the use of additional technical support from outside service providers.

The Conservation Fund-Freshwater Institute will use its Elks Run watershed GIS and Elks Run watershed septic risk model to further target areas for projects and to help calculate load reductions achieved by projects completed.

Outreach and education

The Elks Run Study Committee (ERSC) will perform outreach and coordinate education efforts regarding this Watershed Based Plan. The ERSC meets monthly, and is comprised of citizens from the towns of Bolivar and Harpers Ferry. These communities are actually outside Elks Run watershed, but the residents' drinking water comes from Elks Run via the Harpers Ferry Water Works. Members of ERSC are appointed by the councils of Harpers Ferry and Bolivar. The purpose of ERSC is to study the needs of the water supply of the Harpers Ferry Water Works and make recommendations to the water works manager; to provide advice to the mayors and town councils of the Towns of Harpers Ferry and Bolivar on protecting the quality and quantity of the Elks Run water supply; and to implement recommendations outlined in the 2006 West Virginia Source Water Assessment and Protection Plan. This committee began its outreach with a stream walk in fall 2008 and developed a website (www.elksrunwatershed.org) shortly thereafter. The website shows a map of the watershed boundaries, emphasizes many sources of poor water quality including failing septic systems, and contains advice about good practices to promote safe drinking water, e.g. "Install rain gardens, rain barrels, permeable surfaces [instructive links follow]".

The Eastern Panhandle Conservation District (EPCD) is committed to promoting nonpoint source pollution reduction in Elks Run watershed. It is currently initiating the water quality improvement project mentioned above, and will maintain a database of contacts acquired in meetings and through programs like septic pumping assistance. Using these contacts and building on these outreach and educational efforts, the staff and supervisors of EPCD will be experienced and ready to promote the activities in this proposal. Its outreach specialist is

available to demonstrate watershed and groundwater models and other activities in classrooms and camp settings.

Maintenance of effort

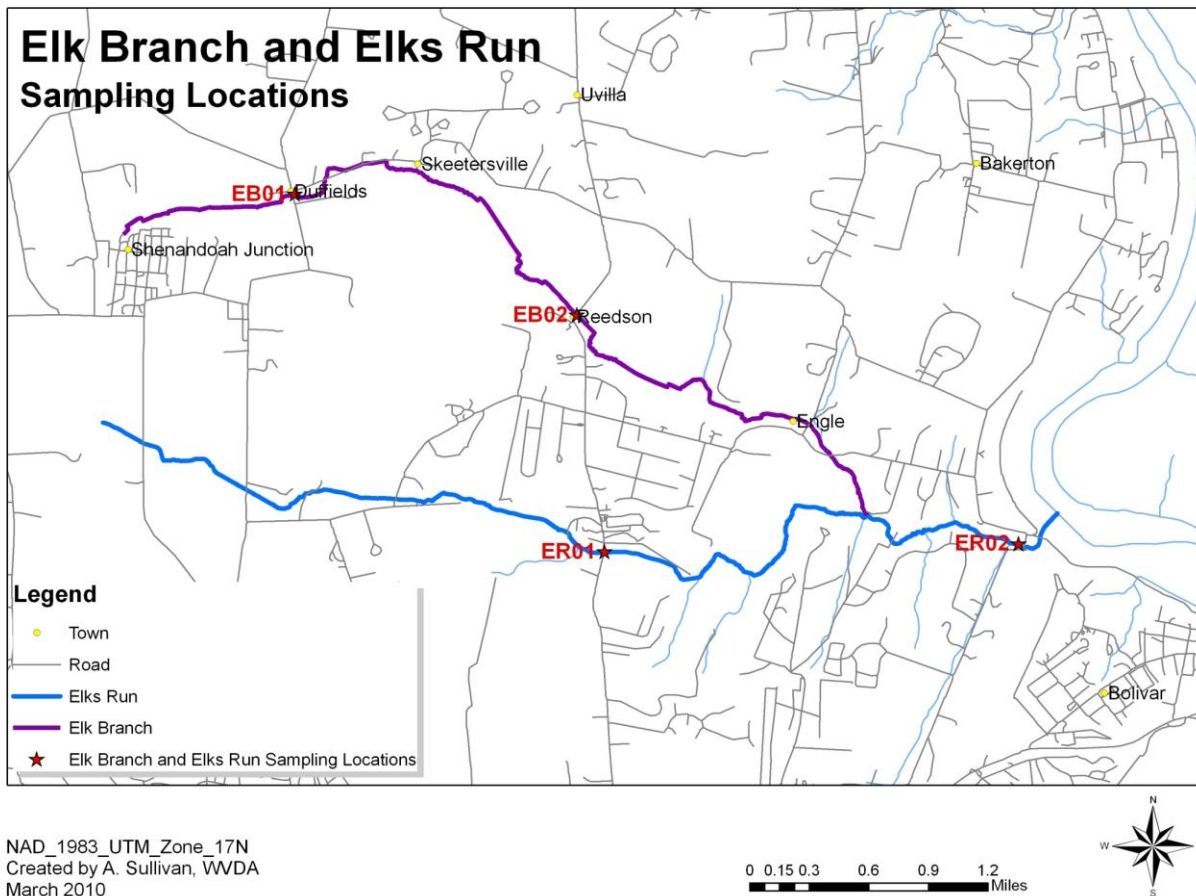
The WV Conservation Agency, the Jefferson County Health Department, The Conservation Fund - Freshwater Institute and WVDEP's Potomac Basin Coordinator will ensure effectiveness and sustainability of practices installed through this project by providing technical assistance and coordination to landowners who participate. The contracts for septic system upgrades (excluding septic pumping) will be 5-year contracts, ensuring BMPs will be maintained throughout the life of the contract. With West Virginia's participation in the Chesapeake Bay TMDL implementation 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 2013. At that time, the two sites from the 2003-04 pre-TMDL sampling in Elks Run watershed will likely be re-tested. Parameters will include fecal coliform, nutrients, TSS, and possibly benthic macroinvertebrates. Occasionally, sites within the watershed may also be monitored as part of WV DEP's random sampling program.

The WV Dept. of Agriculture conducts monthly water quality testing on four sites in the Elks Run watershed, as part of its support of Potomac Tributary Strategy priority watersheds (see Figure 3). Two of these sites (ER01 and ER02) are the same as WV DEP's pre-TMDL monitoring sites. Parameters include pH, temperature, conductivity, dissolved oxygen, nitrate-N, ammonia-N, total phosphorus, turbidity, TSS, and fecal coliform bacteria.

Figure 3. Department of Agriculture's monthly sampling sites in Elks Run watershed.



Some volunteer sampling of benthic macroinvertebrates will also occur, using West Virginia's Save Our Streams protocol. Harpers Ferry Middle School teachers plan to guide students in water quality monitoring, as well.

Jefferson County Water Advisory Committee, in partnership with Jefferson County Watersheds Coalition, is currently conducting a monitoring program in several watersheds including Elks Run, as well. They measure chloride, sulfate, nitrate, *E. coli* bacteria, and physical parameters at irregular intervals. One site near the mouth of Elks Run and a spring near the headwaters of Elks Run are sampled.

Schedule of Milestones

Upgrade/fix failing septic systems

Begin summer 2011 or on receipt of funds

Assessment of streambanks on Elks Run mainstem

July 2010 begin

Assessment of streambanks on Elk Branch

Spring 2011 begin

Site identification and design of streambank stabilization project
Summer 2011 begin

Streambank stabilization project
Fall or winter 2011

Refinement of GIS and septic suitability model
Summer 2011 or when funds are received

Budget

Item	Request to 319 program	Non-federal match	Total
<i>Staff</i>			
Health Dept. staff for site inspection and tech. support	\$0	\$800	\$800
<i>Contractor to refine GIS and septic suitability model</i>			
	\$2500	\$0	\$2500
<i>Septic systems</i>			
12 Upgrade/fix failing septic systems ^a	\$42,000	\$42,000	\$84,000
<i>Streambank projects</i>			
Volunteer streambank survey work	\$0	\$400	\$400
Streambank stabilization, ~500 ft.	\$10,000	\$2000	\$12,000
<i>Monitoring</i>			
	\$500	\$500	\$1000
Total	\$55,000	\$45,700	\$100,700

^aAssuming approximately half of the systems will require standard upgrades at \$6000 each, and half will require Class II systems at \$8000 each (estimates from Berkeley and Jefferson County Health Depts., pers. comm.), the average of both figures, \$7000 is used. Homeowners are expected to pay 50% of the cost.