



**West Virginia Department of Environmental Protection
Division of Water and Waste Management
Watershed Improvement Branch**

**West Virginia §319 Program
2022 Annual Report
March 2023**



The US Environmental Protection Agency (EPA) allocates Clean Water Act §319 funding to states and territories in support of the protection and restoration of waters threatened or impaired by nonpoint pollution.

<https://go.wv.gov/nonpoint>



west virginia department of environmental protection

**Division of Water and Waste Management
Watershed Improvement Branch
Nonpoint Source Program**

Nonpoint Source Program Annual Report
Submitted March 2023

Statement of policy regarding the equal opportunity to use and participate in programs.

It is the policy of the WVDEP to provide its facilities, services, and programs to all persons without regard to sex, race, color, age, religion, national origin, or handicap. Proper licenses/registration and compliance with official rules and regulations are the only sources of restrictions for facility use or program participation. WVDEP is an equal opportunity employer.



West Virginia's NPS Program is funded by a Clean Water Act §319 Grant administered by the EPA.

Report prepared by
Timothy Craddock, §319 Program Coordinator

Cover: Back Creek 2022 stream restoration - photo by Kristen Bisom

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Note: For additional information or for jumping to a certain section of the report, hyperlinks are embedded in the document. To move within the report the link is *blue*. Links to the internet or social media sites are *green*. ALL links are *italicized*.

Introduction

In 2022 West Virginia’s §319 Program provided technical assistance and financial support to 130 projects ranging from general administration, grant management, outreach, planning, monitoring and a wide assortment of implementation. Most of our projects focus on [watershed-based plan](#) (WBP) priority basins; however, implementation also occurred through our [additional grant opportunities](#) (AGOs), and from our statewide partners. These projects were often a smaller scale and timeframe. Many projects compliment the efforts within WBPs while others were standalone projects focusing on local nonpoint source issues. Final reports for AGOs complete in 2022 can be reviewed at the links below and select watershed projects are highlighted later in this report. The finer details are available in the appendices.

1. <https://bit.ly/FY17AGOFR>
2. <https://bit.ly/FY18AGOFR>
3. <https://bit.ly/FY19AGOFR>

Table 1 looks at the numbers for ALL projects.

Table 1. §319 Program/Project summary.

Federal Fiscal years	2017	2018	2019	2020	2021	2022
§319 allocations	\$1,858,810	\$1,850,542	\$1,749,996	\$1,806,000	\$1,855,200	\$1,855,000
§319 funds spent	\$1,767,057	\$1,848,646	\$649,408	\$490,552	\$403,515	\$344,140
Funding	95%	100%	37%	27%	22%	19%
§319 projects	36	25	19	19	16	14
Nonpoint	5	3	4	4	2	5
Nonpoint (AGOs)	19	12	6	6	3	3
Watershed	12	10	9	9	11	6
Completed projects	34	23	8	0	0	0
Projects	94%	92%	42%	0%	0%	0%
Grant expiration	Sep-22	Sep-22	Sep-23	Sep-24	Sep-25	Sep-26
	Extended					
Cancelled projects	3	2	1	1	1	

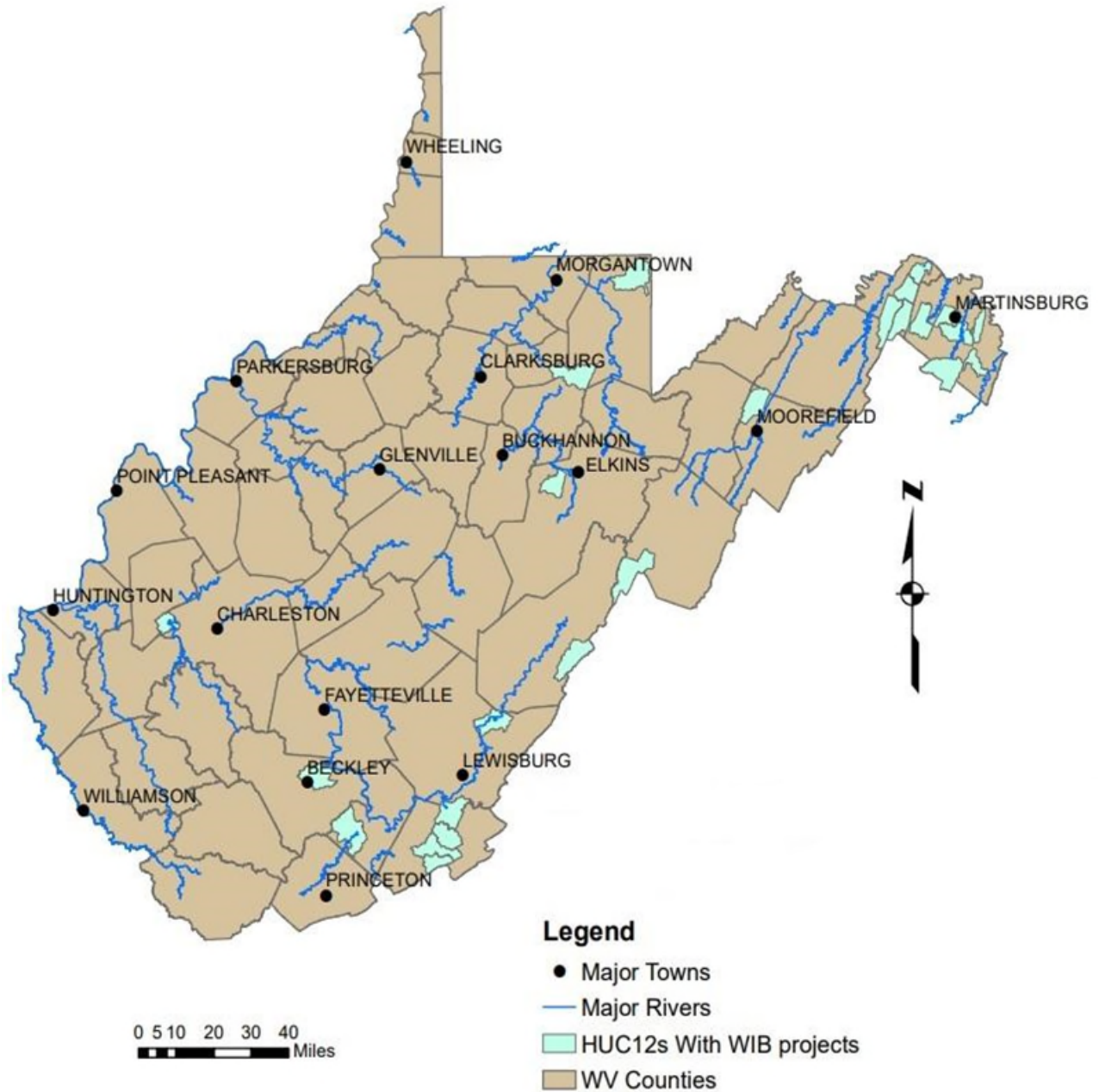
Implementation

Best management practices (BMPs)

The major goal of most §319 projects is the implementation of the best and most effective BMP that will reduce the target pollutants and be easily maintained throughout their lifespan. This maintenance is critical to the project’s success, but unfortunately, there are not sufficient funding to support the necessary upkeep. Partners and program managers must often get creative and leverage funding from a wide variety of non-federal sources. The buy-in to this process is important to long-term success.

In 2022 BMP implementation occurred in 22 HUC12 size basins [Figure 1]. Overall BMP implementation is also represented graphically in Figure 2. Figure 2 compares the major categories using a log(n) calculation. Additional details are provided in the appendix section. Most of the agricultural efforts are a result of implementation through WV Conservation Agency’s (WVCA) [Agricultural Enhancement](#) (AgE) Program as well as their efforts in priority basins. The focus of most of WVCA’s watershed projects are bacteria reduction, while the AgE implementation targets nutrients through nutrient and pasture management practices.

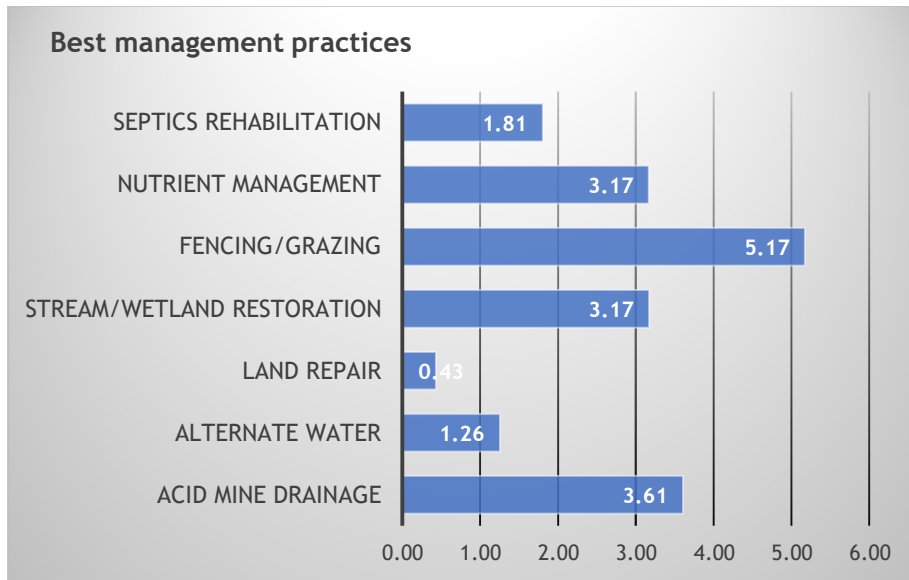
Figure 1. HUC12 sized basins where implementation occurred in 2022.



Map created by - [Megan Maggard](#)
Technical Analyst TMDL Section

Overall BMP implementation has increased slightly as the affects from the pandemic are beginning to lessen. Unfortunately, there are still supply chain issues for certain materials and the work force has dwindled. As projects continue to be implemented and confidence grows, program/project managers believe that implementation levels closer to pre- pandemic will be more common. We are developing internal tools that will hopefully track project progress closer and provide more insights to possible problem areas so that adaptive management can be applied.

Figure 2. \$319 watershed project and AgE Program implementation.



Categories	Total	Log(n)
Acid mine drainage	4047	3.61
Alternate water	18	1.26
Land repair	3	0.43
Stream restoration	1489	3.17
Fencing/grazing	148647	5.17
Nutrient management	1473	3.17
Septic rehabilitation	64	1.81

Units were acres, feet, individual units, square feet etc. See [appendix 2](#) for more details.

Load reductions



Boulder placement to enhance a stream in a watershed protection plan (WPP) priority basin.

Load reduction (LR) details are available in [appendix 3](#), and the LR goals presented from the Management Plan are presented in Table 4.

The largest contributors to nonpoint source (NPS) pollution in West Virginia is bacteria, primarily from failing septic systems and agriculture runoff, and acidity and metals from abandoned minelands. These two together account for approximately 75% of the NPS impairments.

In many parts of the United States (US) nutrient and sediment reduction is the focus, and nationally those are still a major contributor of nonpoint source (NPS) impairments. Although these are not the major focus of most watershed projects in West Virginia, a significant amount of sediment and nutrients are reduced each year through the efforts of our agricultural partners.

We are also seeing an increased interest in green infrastructure (GI) and creative stormwater implementation. About 20% of our AGOs completed in 2022 focused on stormwater BMPs or provided workshops and materials for rain barrels and similar amendments. GI is strong focus in the New River basin as we are coordinating with small (non MS4) communities to develop conceptual designs, and we are beginning to move towards implementation.

In the past, the WVDEP [Clean Water State Revolving Fund](#) (CWSRF) has focused on larger infrastructure projects such as wastewater and water treatment, which is a significant need, but there is an interest and shift to other NPS options - an encouraging development.

Chesapeake Bay Program

West Virginia's Chesapeake Bay (CB) [Tributary Team](#) partners continue to work on nitrogen and phosphorus reductions for the CB TMDL. We implement wastewater and NPS strategies from the [Phase 3 Watershed Implementation Plan](#) (WIP), such as stream restoration, nutrient management plans and GI practices, which achieve local benefits while reducing nutrient loads. In 2022, WVDEP began partnering with Chesapeake Bay Trust to apply federal project funds to the Green Streets, Green Jobs, Green Towns grant program for West Virginia applicants. The new Urban BMP Specialist, Samuel Canfield, conducted a virtual workshop to introduce this program to stakeholders and answer their questions. A quarterly e-newsletter found [here](#), documents the Trib Team's projects and encourages others in similar actions.

[Table 2](#) shows historic, recent and WIP3 (goal) loads of total nitrogen and total phosphorus. Modeled progress during the 2022 progress year (July 2021-June 2022) is still dampened due to the expiration of some practices once they reach their modeled lifespan.

[Table 2.](#) WV's progress toward reducing CB pollutants.

Pollutant	Category	2013 Progress (Baseline)	Progress 2021	Progress 2022	WV WIP3 goal
Nitrogen	Agriculture	3.31	3.38	3.37	not specified
	Urban Runoff	1.20	1.20	1.21	
	Natural+Deposition	2.60	2.57	2.57	
	Septic	0.34	0.35	0.35	
	Wastewater+CSO	0.70	0.42	0.40	
	All Sources	8.15	7.92	7.89	
Phosphorus	Agriculture	0.14	0.13	0.13	not specified
	Urban Runoff	0.06	0.06	0.06	
	Natural+Deposition	0.22	0.21	0.21	
	Septic	0.00	0.00	0.00	
	Wastewater+CSO	0.14	0.04	0.04	
	All Sources	0.56	0.44	0.44	

Units: million lbs/yr

Results are from the CAST 2019 model, available at <http://cast.chesapeakebay.net>

WIB staff, program, and partner highlights

WV Conservation Agency

In 2022 WVCA conservation specialist was the lead project manager and working with local partners successfully completed multiple \$319 projects → Indian Creek, Second Creek, and [Back Creek](#) which is highlighted in this report. WVCA also uses \$319 funding to support their statewide efforts which include significant outreach and education, technical assistance, and even more BMP implementation through their Agricultural Enhancement (AgE) Program. [Table 3](#) shows their statewide work. Additional details are available in their semi-annual reports, which are available upon request.

Table 3. WVCA statewide work in 2022.

BMP	#	N	P	Ac	P#	Lat	Lon	HUC name	HUC12
Nutrient management	2	18,636	18,436	399		39.3064	-78.0971	Upper Sleepy Creek	020700040201
Nutrient management	1	29,988	29,988	417		39.3064	-78.0971	Upper Sleepy Creek	020700040201
Nutrient management	1	121	134	2		39.4679	-78.1106	Elk Branch-Back Creek	020700040407
Nutrient management	1	500	1,585	18		39.2654	-77.9967	Turkey Run-Opequon Creek	020700040904
Nutrient management	1	3,750	3,600	38		39.4232	-77.9665	Evans Run-Opequon Creek	020700040908
Nutrient management	1	1,670	835	26		39.3309	-77.8962	Evitts Run	020700070302
Nutrient management	1	13,993	19,374	175		39.4583	-77.8565	Rockymarsh Run	020700041105
Nutrient management	1	15,708	21,692	187		39.4583	-77.8565	Rockymarsh Run	020700041105
Nutrient management	1	13,400	18,963	211		38.7380	-79.4418	Laurel Fork-North Fork South Branch	020700010101
Total	10	97,766	114,607	1,472					
Outreach/education					6,116			Statewide	
Technical assistance					579			Statewide	
Total					6,695				

Nitrogen N
Phosphorus P
People P#
Acres Ac

WIB Basin Coordinators

Martin Christ - Northern BC

The Northern BC assisted six different citizens groups working on watershed projects to eliminate NPS pollution.

Watershed group	HUC12	Project purpose	NBC activity
Save the Tygart Watershed Association (STTWA)	050200010501	Build road where WVDEP Division of Land Restoration can build a treatment plant for the Left Fork of Little Sandy Creek	Convened and attended meetings, reviewed engineering designs, attend pre-bid and pre-construction meetings
	050200010406	Built Phase 1 of a passive acid mine drainage treatment project.	Monitored water quality, reviewed engineering plans, helped with contract preparation, attended pre-bid and pre-construction meetings performed final inspection.

<u>Friends of Deckers Creek</u> (FODC)	050200030201	Getting ready to build a passive acid mine drainage treatment project.	Reviewed proposals as partners moved the project from NPS program year to another.
<u>Friends of the Cheat</u> (FOC)	050200040604 050200040605 050200040703 050200040705	Sampling 303(d) listed streams to show that they no longer violate water quality standards.	Reviewed sampling plans and data.
<u>Friends of Blackwater</u> (FOB)	050200040202	Working out rights-of-entry (ROE) with landowners for passive acid mine drainage treatment projects.	Participated in project team meetings, advised how to examine the site for next steps.
<u>Guardians of the West Fork</u> (GWF)	050200020602	Monitoring water quality, meeting with landowners to establish Right-of Entry	Monitored water quality, met with partners and landowners, taught the citizens group about the process for completing projects.
<u>Buckhannon River Watershed Association</u> (BRWA)	050200010306	Monitoring, operation, and maintenance of two passive AMD treatment projects.	Led the group in monitoring trips of both the treatment projects and the stream systems. Worked with the group to get site maintenance from the Office of Abandoned Mine Lands and Reclamation

The Northern BC also:

1. Drafted and reviewed QAPPs
2. Provided mapping for §319 reports.
3. Reviewed semiannual and final reports to the NPS program.
4. Submitted a success story through the GRTS portal.
5. Entered data into GRTS and retrieved data through OBI reports.
6. Taught lessons to school and college students about streams, pollution, and nonpoint source pollution.



Left: [WV Water Research Institute](#) (WVWRI), STTWA and BioMost ponder the complexities of acid mine drainage (AMD) treatment.

Tomi Bergstrom - Western BC

The Western BC assisted the [Coalfield Development Corporation](#) in wrapping up Phase I - Design of their West Edge rainwater diversion, storage, and swale garden system. They applied for §319 additional grant opportunity (AGO) funds to support Phase II - Build Out of the hybrid rain catchment

system. The grant was awarded to fund the construction for a three-staged hybrid rain garden and rainwater catchment system from the 14,000 sq. ft West Edge factory roof. It's estimated that the building's roofs shed around 40-thousand gallons of water during a one-inch rain event. The project will dramatically reduce that by capturing, storing, and then slowly releasing the water into the surrounding subsoil and keeping it out of the city's storm sewers. A video highlighting this project and its partners can be viewed here: [Environment Matters - Innovative Project Reduces Stormwater Runoff](#) In addition to supporting this innovative nonprofit, the WBC offered technical support to two watershed groups and their projects to reduce NPS pollution.

BC joint work: All Basin Coordinators served on the [WV Watershed Network](#) committee, which hosts a quarterly newsletter, trainings, and a statewide gathering being planned for 2023. The BCs have been working diligently on executing their tasks as part of the EPA Wetland Program Development Grant.

Watershed group work

[Coal River Group](#) (CRG)

The Western BC facilitated a meeting and field session with WVDEP's Watershed Assessment Branch (WAB), NPS Coordinator, and CRG to learn how to collect flow data and continue fecal coliform monitoring at the nine sample sites of the project area. CRG closed out their Browns Creek septic remediation project by replacing 16 failing septic systems with new traditional absorption field septic systems as recommended by Kanawha County Health Department. CRG's program gained tremendous support and there is a waiting list for the next grant. The Western BC is helping CRG develop a \$319 work plan for FY24.

[Fourpole Creek Watershed Association](#) (FCWA)

The Western BC provided technical assistance and support to FCWA in submitting an AGO work plan to host a rain barrel workshops. The group plans to reach 27 homeowners within the watershed. The workshop will include an extensive presentation on nonpoint source pollution and how homeowners can use rain barrels and other actions to reduce their impacts to the watershed. FCWA has acquired flow data to establish a flow model regime to pair with their fecal data. The Fourpole Creek WBP has been drafted and is being reviewed by the WBC. It will be submitted for review to the NPS Coordinator in the coming months.

The Western BC is also working with six watershed groups in her region that were impacted by the [Freedom Industry Chemical Spill](#) to complete watershed improvement projects with [Cy Pres](#) funds. Each group received \$100,000!

The Buffalo Creek Watershed Association is focused on monitoring and has already started the initial steps of their Cy press project. The Western BC partnered with the WV Save Our Streams (SOS) Coordinator and lead a training day for a youth volunteer monitoring program that is being established at Clay County High School.

Outreach and partnerships

In honor of World Water Day, the Western BC partnered with a WVDEP Geologist and the USGS to create a video highlighting groundwater and NPS pollution. It can be viewed at: [Environment Matters - World Water Day, Part 1](#). The Western BC partnered with WV State University and Jackson Solid Waste Authority to host and lead two stormwater education workshops, which communicate how to reduce NPS pollution and install a rain barrel. Nearly 80 people attended these two events. The summer intern hosted a single-use plastic event with Ice Cream and the Arts in Elk City of Charleston, reaching hundreds of people with stormwater and NPS pollution educational information and discussion. The Western BC organized and supported WVDEP colleagues, volunteers from Master Naturalist Program and area schools to maintain the rain garden at WVDEP's headquarters. The Western BC hosted a virtual gatherings for eight different watershed organizations and communicated the importance of watershed organizations and WIB programs for two groups who are interested in forming a watershed organization.

As part of the Project WET program, the Western BC conducted three week-long water-focused STEM camps across the state. She pulled in partners from multiple state, federal, and county offices as well as watershed organizations and other nonprofits to lead field sessions showing watershed improvement projects and water resource management. The camps were completely focused on water topics such as watersheds, NPS pollution, GI management, water monitoring, wetlands, and climate change. A video highlighting these efforts can be viewed here: [Environment Matters - Wonders of Water Camp](#) The Western BC also utilized the Project WET program to organize, host, support, and present at several in person events, including multiple water festivals, the WV Science Teachers Conference, the Solid Waste Authority (SWA) Conference, and various other programs to reach hundreds of students with hands-on water education.



Western Basin Gathering

Watershed gatherings were held in each basin. These gatherings focused on training and the discussion regionally specific issues.

Jennifer Liddle - Southern BC



Southern Basin Gathering

Unfortunately, Jennifer has accepted a new position and has retired from her successful watershed work. She plans to remain engaged to the extent possible. Here are some highlights from Jennifer before leaving in the latter half of 2022.

Green infrastructure

The Southern BC helped to secure \$319 funds to work with a community in Southern WV using GI. Five communities expressed interest in the program and the City of Hinton was selected for this

project to create a conceptual plan. Tetra Tech was contracted to create a plan with four project sites identified one project with a full conceptual plan. \$319 funds were allocated for a full design that the City of Hinton will need to apply for once the conceptual design is complete. Funding still needs to be acquired for the project to be constructed. Initial discussions have occurred with the WVDEP's CWSRF, but no formal request has been made.

Two GI training and certification efforts were funded with \$319 AGOs. The training was organized by the [New River Clean Water Alliance](#) (NRCWA). NRCWA brought together experts in the field providing multiple weeks of hands-on courses, site visits and technical knowledge that participants can apply directly to their GI future efforts.

Watershed group work

[Piney Creek Watershed Association](#) (PCWA)

PCWA is in Beckley, WV. They have a WBP and have implemented multiple \$319 projects on its behalf. They complete extensive monitoring throughout the watershed taking advantage of several college/university partnerships. PCWA has several committees/boards that meet regularly including outreach, technical advisory, fundraising, monitoring and more. Their partners include the City of Beckley, WVCA, NRCS, Beckley Sanitary Board (BSB), Beckley Area Foundation, WVU Tech/Concord University just to name a few. Jim Fedders was the Ex. Director for many years but has recently resigned. With support from WIB's watershed pilot program (WPP) PCWA expects to fill the position soon.

[Friends of the Tug Fork River](#) (FotTFR)

FotTFR started as a group on Facebook of fishermen/women sharing stories on the river. They began with river clean ups and focused on improving the rivers recreational assets. They have organized many events and regularly work with WVDEP REAP, National Coal Heritage Area Authority, Kentucky's similar NPS staff, attended SOS workshops and Project WET and started sampling for bacteria. This watershed is large with the headwaters in McDowell County. In McDowell County, Mark Kemp has been the point of contact to do sampling, clean ups, and to do outreach with youth.

FotTFR has lofty goals for remediating bacteria and restoring stream reaches. This means identifying, designing, and installing kayak/boat public launches, creating information about the river, and getting people to care about it. In Williamson the Parks and Recreation have donated kayaks that can be used to lead educational tours on the river. In 2023 they will be working with WIB and local partners to develop a WBP.

Alana Hartman - Potomac BC



Cattle crossing Tuscarora Creek at a designated spot during our assessment.

WIB's Potomac BC helped to train the new Urban BMP Specialist, facilitated online meetings for Tuscarora Creek, participated in "Safe Water Harpers Ferry" planning, and helped WVCA staff work with a Keyser resident to explore starting a new North Branch Potomac River watershed group. The Potomac BC participated in planning the annual Eastern Panhandle (EP) watershed gathering and helped to devise and grade the [WV Envirothon](#) Aquatics test.

She helped WVDEP's videographer to produce videos highlighting four wetlands. Her summer intern, Cora Alderman, created fact sheets about those four plus eight additional West Virginia wetlands. Cora also completed the remaining reaches of Tuscarora Creek's streambank assessment. The Potomac BC was a guest lecturer three times for WVU's Engineering classes on the topic of the CB TMDL and the Chesapeake Assessment Scenario Tool (CAST) model. The Potomac BC helped the Town of Wardensville with their [Carla Hardy Project CommuniTree](#) planting

project. She continued to facilitate meetings of West Virginia's CB Tributary Team, helped to coordinate West Virginia's riparian buffer action strategy, and submitted BMP data from multiple sources to the CB Program. She was also a grant reviewer for NFWF and CB Trust.



Outreach events that increased students' knowledge of watershed topics included the Springfield-Greenspring kindergarten field trip, [Cacapon Institute's Stream Scholars Summer Camp](#), Hampshire County 4-H camp, WV School for the Deaf and Blind's environment showcase day, and the Hampshire Highlands Arts & Music Festival.

WV Save Our Streams

In 2022, [WV Save Our Streams](#) (SOS) Coordinator conducted thirteen monitoring workshops serving 150 participants. In addition, the SOS Coordinator attended or hosted thirteen educational outreach events, serving nearly 1,300 participants.

Below are a select workshop highlights:

Kentucky WaterWatch

The 2022 monitoring season kicked off with a joint training with Kentucky WaterWatch held at [Panther State Forest](#) in McDowell County, West Virginia. Coal exploitation and economic decline have severely impacted McDowell and Mingo counties where most of the workshop participants live and work. The FotTFR co-hosted the training, which had twenty-two participants despite snowy weather. These community members are actively engaged in improving water quality for the benefit of the watershed and its residents.

New River Alliance Symposium

The SOS Coordinator attended the [New River Clean Water Alliance](#) Symposium in April and presented a stream monitoring workshop as part of the conference schedule. The New River clean Alliance works across state lines to protect the New River from its headwaters in North Carolina to its confluence with the Gauley River near Glen Ferris, West Virginia, where the two rivers join to form the Kanawha River. West Virginia hosted the 2022 symposium, bringing together water quality monitors from North Carolina, Virginia, and West Virginia.

West Virginia Conservation Agency

The SOS program continued its strong partnership with WVCA in 2022, working with the conservation specialists and training officers to provide monitoring training to WVCA staff. In September of 2022, workshops were offered on the Dry Fork of the Cheat in northern Randolph County and on Anthony Creek in the Greenbrier River watershed in northern Greenbrier County. WVCA staff will use the skills and knowledge they learned at these workshops within their own conservation districts.

Blue Ridge CTC- Sleepy Creek - Glenville State

The SOS Coordinator continued to develop the StreamLAB workshops geared toward students and educators, hosting stream monitoring workshops with high school and college students across the state. Blue Ridge Community and Technical College, Glenville State College, Preston High School, Clay County High School, Alderson Broaddus College, and the West Virginia State Conservation Camp all participated in SOS Streams training and monitoring in their local watersheds

Training and more outreach

The SOS Coordinator attended three watershed gatherings offered by the WVDEP BCs during 2022. The BCs organized the gathering for each of their regions, providing educational sessions for the attending watershed organization representatives. The SOS Coordinator participated in training opportunities, including the Ohio Wetlands Association's Vernal Pool Conference, New River Symposium conference sessions, Michigan Vernal Pool online training, the Chesapeake Monitoring Cooperative (CMC) webinar on regional use of volunteer collected data, West Virginia Water Research Institute (WVWRI) webinars,

EPA Technical Exchange webcasts, and a staff gage training offered by the USGS for WVDEP and National Park Service Staff.

Thoughts from our Assistant Director

Being new to this position, I am amazed at the work our partners have been able to accomplish with the constraints they have faced in the past year including workforce shortages, supply chain disruptions and the increasing cost of materials. Our employees and partners have had to adapt to a virtual form of communication during Covid and now having to slowly adapt back to both in person and virtual options for both outreach and education. Even with the seemingly endless number of roadblocks put in their way they have somehow managed to never miss a beat and continued to reach people of all ages and backgrounds to share their knowledge and the environmental benefits of clean water and healthy ecosystems.

I have recently visited a project constructed in 2021 at Woodrow Wilson High School and was absolutely blown away by the amount of collaboration that took place to make this project such a success. This small impoundment removal and wetland development project brought together local high schools, colleges, 4H clubs, fire departments, Girl scouts, County Government and many more participants and shows how these projects not only provide integral environmental benefits but stimulate community involvement and leadership across a variety groups and individuals. - [Scott Settle](#)

2022 §319 Project Tour

In early November of 2022, §319 and CB Program partners provided EPA project officers from EPA Region III a tour of West Virginia's many [NPS projects in the Eastern Panhandle](#). The two-days especially warm days were fully loaded with a wide variety of projects in various stages of completion, plus we highlighted several projects of the past that are still making improvements to the local streams. Projects included multiple stream restoration and enhancements, tree-planting and riparian development, porous pavers, conservation easements, examples of outreach and more. Below are select summary project reports from our partners, and a link to the photos taken along the way. This was the first in-person tour after a two+ year hiatus due to the pandemic.

Canaan Valley Institute

Tuscarora Creek dam removal and stream restoration - Mill Creek stream restoration - Mill Creek natural stream channel design (pastureland) - 2nd Tuscarora Creek dam removal and stream restoration.

WV Conservation Agency

Tree planting and pet waste control at Elks Run Sam Michaels Park - Porous paver demonstrations at communities and an education center near Berkeley Springs - Stream restoration projects along Back Creek and Sleepy Creek, and conservation easements.

[Map of watershed and project sites](#) - [Tour photos](#). For additional details contact the [§319 Program Coordinator](#).

Management Plan updates

In the 2021 §319 annual report a table was provided that gave insight into the management plan progress thus far. Overall progress this past year is on schedule for most of the objectives. There hasn't been any significant events worth mentioning so this report will not include that same comparison table. Note: We will update the table for the 2023 §319 annual report. [Table 4](#) provides an update of the five-year load reduction goals.

- The next management plan will begin development in the latter part of 2023. This document will provide the framework for West Virginia's §319 Program for the next five years.

Table 4. Load reduction goals of the 2019 management plan.

5-year goal	350	180,000	400,000	300,000	20,000	2.00E+15
units	lbs/yr	lbs/yr	lbs/yr	lb/yr	tons/yr	CFU
Pollutants	Acidity	Total Metals	Nitrogen	Phosphorus	Sediment	Pathogens
2019		12	532,240	185,812		2.84E+14
2020	47	14,921	292,151	276,030	53	2.58E+13
2021	73	23,048	620	448	56	1.07E+13
2022	30,359	3,825	97,766	114,547	448	1.89E+13
Totals	30,479	41,806	922,777	576,837	557	3.394E+14

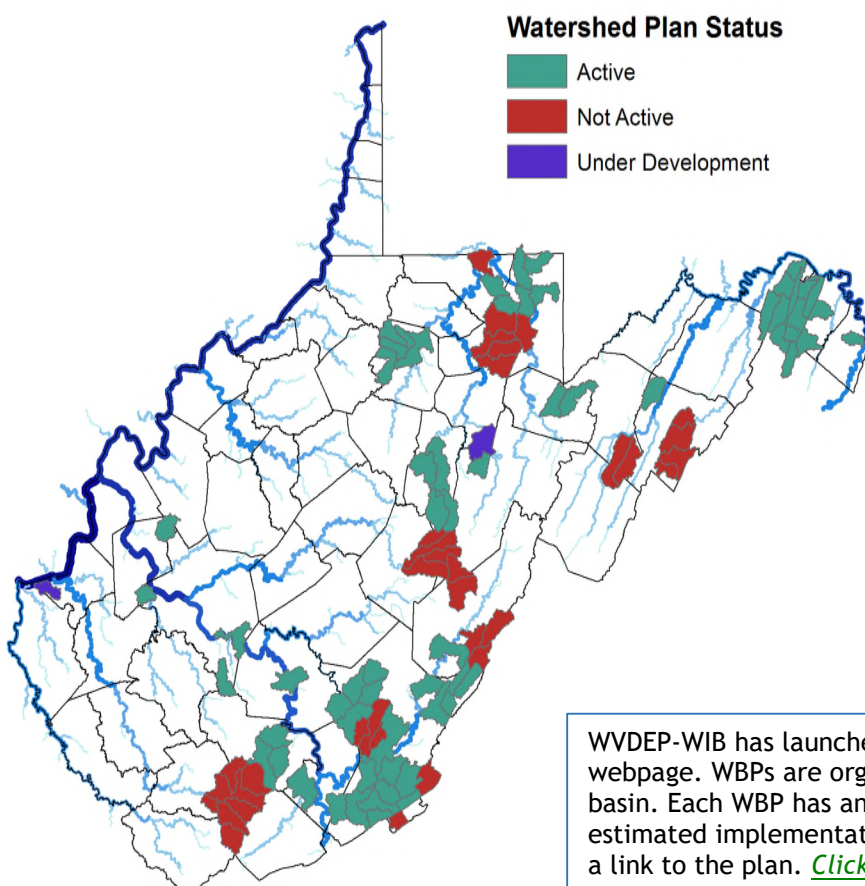
Key: Ahead (orange), On-track (green), Behind (blue)

Projects designed to reduce **metals** and **sediment** have been more difficult during pandemic years due to the types of materials needed, supply chain issues and personnel shortages. Future improvements are likely as pandemic effects become less of a factor.

Unfortunately, we are not likely to meet the goals established for the sediment and metal categories. Moving forward we are confident conditions will become more favorable for these type of projects.

Watershed-based plan highlights

Figure 3. West Virginia 5319 WBPs.

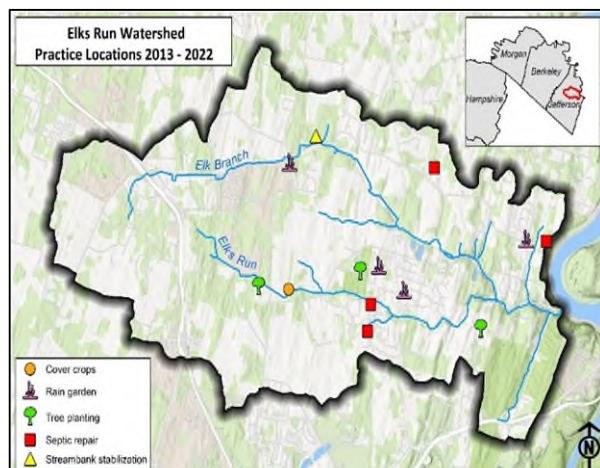


There is a total of 42 WBP with about 80% having recent project implementation or planning activities. No new WBPs were submitted in 2022 but there are several revisions that have been submitted and are under review.

We anticipate two new WBPs in 2023-24, and several stakeholders have expressed interest in other basins, particularly in southern West Virginia. Two WBPs, Elks Run and Big Sandy Creek are highlighted next.

HUC12	Elks Run [020700041107]
Partners	WVCA, WVDEP-WIB, Chesapeake Bay Program, ERWA, local landowners

Elks Run watershed-based plan



Watershed description

The Elks Run watershed, located in Jefferson County, WV, is part of the Potomac Direct Drains and Chesapeake Bay watersheds. It drains 18.7 square miles consisting mostly of grasslands (both agricultural and residential) and forests. Urban pervious and impervious are also significant land uses due to increasing development in the area, and there are scattered areas of high population density within the watershed that rely on private septic systems. Sinkholes and disappearing streams are typical in the watershed due to its karst topography. Elks Run serves as the drinking water source for the towns of Harpers Ferry and Bolivar.

Goals

The 2008 TMDL developed for Elks Run identifies fecal coliform bacteria and biological criteria linked to sedimentation and organic enrichment as the major impairments for Elks Run and its major tributary Elk Branch. Fecal coliform levels serve as a surrogate for organic enrichment. The Elks Run WBP based on the TMDL was approved in 2013. This plan identifies major sources of fecal coliform bacteria and sediment in the watershed and proposes practices that will reduce the levels of these pollutants in Elks Run and Elk Branch.

Partnerships/funding

WVCA and WVDEP have partnered with the [Elks Run Watershed Group](#) (ERWG) for WBP implementation. Another key partner has been the Safe Water Harpers Ferry program managed by WV Rivers Coalition. The Safe Water Harpers Ferry program is designed to help the Harpers Ferry and Bolivar communities protect their drinking water source by implementing the Harpers Ferry source water protection plan (SWPP). Since Elks Run is the drinking water source for these towns, there is significant overlap between this plan and the WBP. Other partners have included the EPCD, Harpers Ferry Water Works, Jefferson County Parks and Recreation Commission, Jefferson County Health Department, WV Department of Health and Human Resources (DHHR), WV Division of Forestry (WVDF), The Downstream Project, Region 9 Planning & Development Council, and private landowners. Funding for WBP implementation has come from the §319 Program, the CB Program, state funds, and local match; details can be found in the table below (match includes state and local funds and in-kind match).

Phase	Funding sources	Federal funds	Match	Total
I (2011-2015)	§319	\$32,326	\$21,551	\$53,877
II (2015 - 2019)	§319	\$64,019	\$48,377	\$112,396
III (2021 - ongoing)	§319	\$96,800	\$64,780	\$161,580
CBIG (2015 - 2016)	CB	\$19,015	\$28,280	\$47,295
Totals		\$212,160	\$162,988	\$375,148

HUC12	Elks Run [020700041107]
Partners	WVCA, WVDEP-WIB, Chesapeake Bay Program, ERWA, local landowners

Project highlights



1-before



2-after

Under the Phase I and Phase II \$319 projects, four septic systems were repaired, an eroding streambank on Elk Branch was stabilized (1,2), 6.9 acres of trees were planted (3), and 100 acres of cover crops were planted. Additional activities under these projects included the refinement of a septic risk model for the watershed and the creation of a septic age map (4), an assessment of streambank erosion for Elks Run and Elk Branch, the purchase of pet waste stations for public areas, a septic installers workshop, the creation of educational signs for installed projects, and water monitoring that included molecular source tracking of bacterial samples.

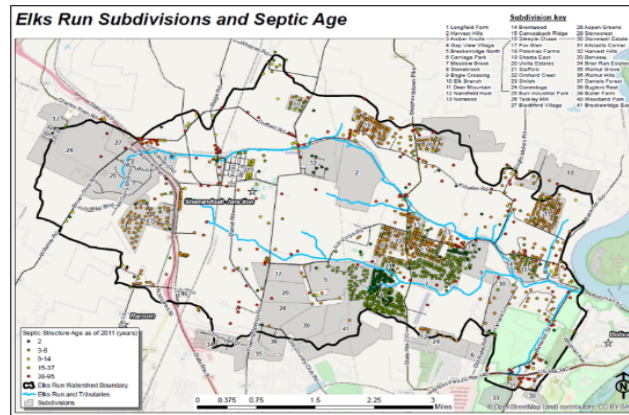
Under the Chesapeake Bay Implementation Grant (CBIG), two demonstration rain gardens and two residential rain gardens treating 4.5 acres were installed. A rain barrel workshop was held and three videos highlighting rain barrels, rain gardens, and septic systems were created to assist with homeowner education.

Ongoing projects include the continuation of the septic repair program and tree plantings as well as the construction of a demonstration rain garden at the large county park Sam Michaels Park during the Phase III \$319 project.

Reductions for all installed practices can be found in the [table 5](#) below.



3



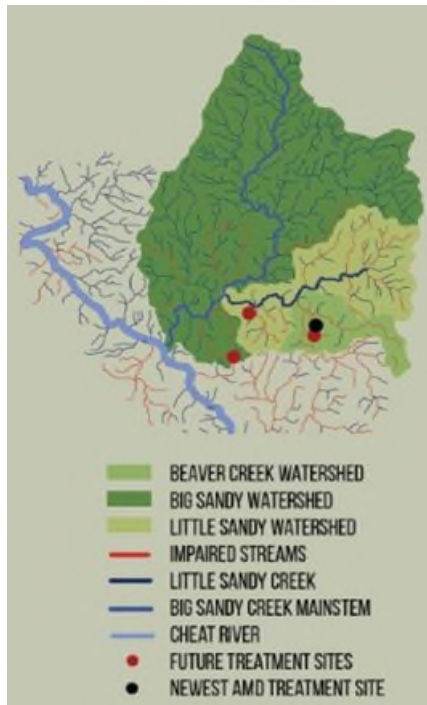
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Table 5. Summary of Elks Run WBP implementation.

Practices	Units	Load reductions	
		Fecal coliform	Sediment
Septic system repair	4 systems	6.56E+12	
Streambank restoration	57 ft		1.5
Forest buffers	2.8 ac	3.80E+10	2.9
Urban tree planting	4.1 ac	5.63E+10	4.3
Cover crops	100 ac		32.6
	Totals	6.65E+12	41.3
	WBP goals	2.75E+15	3,222
	% Achieved	24	1.3

HUCs	Big Sandy Creek [0502000406]
Partners	Friends of the Cheat, WVDEP-WIB, WVDEP-OAML, Office of Surface Mining

Big Sandy Creek watershed-based plan



Watershed description

Big Sandy Creek is a HUC-10 level watershed that begins in southwest Pennsylvania (Fayette County) and northeast West Virginia (Preston County). Big Sandy Creek is 31.3 miles long and one of the larger tributaries to the Cheat River. Its catchment size is approximately 132,521 acres. Major tributaries of the Big Sandy Creek include Little Sandy Creek(s) (one in Pennsylvania, and one in West Virginia), Beaver Creek, and Laurel Run. The towns of Bruceton Mills, Clifton Mills, Hudson, Hazelton in West Virginia, and Gibbon Glade in Pennsylvania are within the watershed boundary.

The watershed is partially forested but is moderately used for agriculture and was extensively mined from the 1940s - 1990s.

Goals

The EPA and WVDEP approved the WBP in 2020. The WBP provides a framework for achieving the goals of restoring the watershed from acid mine drainage (AMD) impairment. The watershed was extensively monitored by FOC staff, who

identified priority pH, iron, and aluminum water quality impairments for remediation. These priority sites were then ranked in order of importance and load reduction. Four priority projects in total have been identified, and two have been implemented.

Partnerships/funding

FOC and WVDEP have partnered with many groups on the project. Volunteer groups from WVU and the community assisted with monitoring and GIS specialists assisted with mapping. Staff from Green Rivers assisted in AMDTreat Software analysis for major sites. Procurement Specialists assisted with procuring conceptual designs for priority sites.

Project highlights

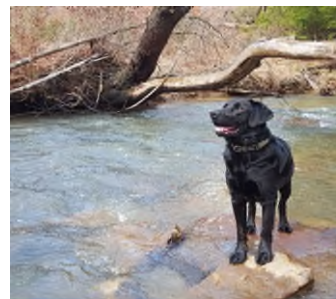
Since WBP approval, two \$319 watershed projects have been completed or are in progress: the Auman Road and the McElroy Seep AMD Treatment Sites in the Beaver Creek subwatershed.



Auman Road: Before



Auman Road: After



Beaver Creek

HUCs	Big Sandy Creek [0502000406]
Partners	Friends of the Cheat, WVDEP-WIB, WVDEP-OAML, Office of Surface Mining



McElroy Seep - Before



McElroy Seep - During Construction



McElroy Seep - Post Construction



Big Sandy Creek at Rockville

The Auman Road Passive AMD Treatment System was constructed in 2020. This system treats water to an unnamed tributary of Beaver Creek (UNT RM 1.68). Since construction, the water quality at the “system out” has met water quality standards for pH, and iron and aluminum concentrations are often non-detect and within water quality standards.

The McElroy Seep Passive AMD Treatment System was constructed in 2021. This system treats a seep upstream of the Auman Road treatment system on UNT RM 1.68 to Beaver Creek. The water quality from “system out” shows that water leaving the treatment site consistently meets water quality standards for pH, iron, and aluminum.

In addition to construction of these treatment systems, Friends of the Cheat has been consistently monitoring the water quality of Beaver Creek and Big Sandy Creek at key locations to track and analyze water quality trends over time. During an intensive monitoring study in 2021 - 2022, Friends of the Cheat staff found that Big Sandy Creek at its confluence with the Cheat River and at a location 5 miles upstream of the confluence (Rockville), consistently met water quality standards for pH, iron, and aluminum across 20 sampling events.

Load reductions

All the priority projects identified in the Big Sandy Creek WBP aim to reduce acidity, aluminum, and iron loadings.

Load reductions from the implementation of these projects are 117,691 pounds per year acidity, 13265 pounds per year aluminum, 170 pounds per year iron, and 126 pounds per year manganese.

Big Sandy WBP funding

Budget categories	S319		FOC/partners		Total	
	Budget	Actual	Budget	Actual	Budget	Actual
Personnel/benefits	\$31,645	\$31,475	\$2,000	\$12,510	\$33,645	\$43,985
Equipment/supplies	\$3,150	\$2,261	\$2,000	\$3,641	\$5,150	\$5,902
Contractual	\$24,955	\$24,955	\$4,000	\$4,411	\$28,955	\$29,366
Travel	\$1,550	\$1,572			\$1,550	\$1,572
Lab fees	\$14,260	\$14,260	\$1,500	\$230	\$15,760	\$14,490
FOC operating cost	\$8,400	\$8,769	\$47,000	\$17,901	\$55,400	\$26,670
Total	\$83,960	\$83,292	\$56,500	\$38,693	\$140,460	\$121,985
	60%	68%	40%	32%	100%	100%

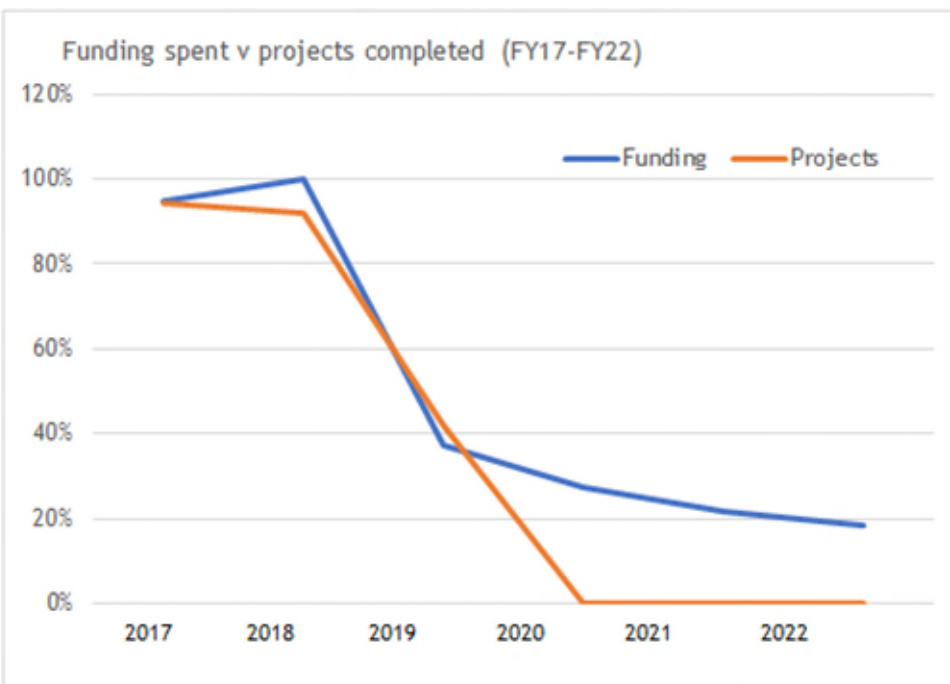
Watershed projects and our success story

2022 completion project completion rate rose slightly from the past several years. Although the effect of the pandemic is still problematic, these issues are becoming less so, which may be why the rate is increasing. Additionally, staff, stakeholder and local project managers are learning to adapt and react quicker to changing situations.

In this section we will highlight three 2022 completed watershed projects and one success story. The watershed projects include one AMD effort with enormous future potential, a watershed protection project and a unique AGO. The 2021 success story tells the story of how the Cheat River's improvements are bringing economic and recreational advantages to its basin.

More than 25 watershed projects and AGOs were completed in 2022. These were funded with \$319 from FY17-19. *Figure 4* graphically represents the progress through each fiscal year cycle.

Figure 4. Project vs funding progress from FY17 - FY22.



On the left side of the graph the lines are close together because funding and implementation are strongly correlated. *The spending closely matches implementation.* As the graph moves right the gap between project spending vs. implementation widens because most implementation and project spending have not yet occurred. As FY 2017-2018 ended our tracking showed a much wider gap. But luckily, close-out of large-scale projects occurred, which narrowed the gap significantly, and EPA extended our time for close-out procedures. The amount of funding returned to the region was reduced significantly.

West Virginia recovered a portion of that funding by submitting a successful proposal for FY23 that focuses on watershed planning in disadvantaged areas of the state.

Back Creek Phase III

This project was intended to promote land conservation through the acquisition of conservation easements on priority agricultural parcels and reduce erosion through the restoration of eroding streambanks. This project was also intended to enable sediment and nutrient reductions through outreach and education by promoting the USDA Farm Service Agency's Conservation Reserve Enhancement Program, which is a federal cost-share program for riparian forest and vegetative buffer establishment, alternative watering, fencing, and stream crossings. Finally, multiple workshop occurred promoting sustainable forestry practices, preserving riparian stream frontage, and other environmentally friendly land management practices.

Problem

Back Creek is one of the few watersheds in the Eastern Panhandle that does not have water quality impairments on the 303(d) list of impaired waters. As a result, the Back Creek watershed protection Plan was developed and approved by EPA in 2014 to focus restoration efforts and enable financial and technical assistance to facilitate improvement strategies and restoration projects in the Back Creek watershed. Protection of forest, wetland, and farmland properties as well as natural stream design (NSD) were identified as priority management actions for the watershed.

Project highlights



Help Protect the Back Creek Watershed!

The Berkeley County Farmland Protection Board has limited funds available to purchase conservation easements on agricultural or forested land within the Back Creek watershed. Parcels must be 10 or more acres in size and the property owners must be willing to enter into a permanent conservation easement on their land. Applications are being accepted until 30 April 2019.

For more information:

Web: Berkeley.wvfp.org
Email: Berkeley@wvfp.org
Call: (304) 260-3770

Write: Berkeley County Farmland Protection Board
P. O. Box 1243
Martinsburg, WV 25402



Conservation easements

A postcard was distributed to the entire Back Creek watershed to promote the conservation easement program. Berkeley County Farmland Protection Board (BCFPB) received five applications and ranked the properties according to the criteria detailed in the work plan. Three properties ranked high, in large part because these properties contain or border 5,770 of Back Creek and a major tributary - Tilhance Creek. The properties consisted of mostly

agricultural land; however, project funding only covered a portion of the easement. To obtain the remaining acreage, WVCA applied for and received a Chesapeake Bay Local Implementation Funding grant. BCFPB also contributed to the match required for \$319 and the Chesapeake Bay grant. A total of 94.3 acres were placed into conservation easement.

Stream restoration

The stream restoration is located on Back Creek near Tuscarora Pike outside the community of Shanghai, WV, and about one mile downstream of the stream restoration that was completed in the Back Creek Phase II. The east side of the creek had previously been placed into conservation easement. The west side of the creek consists of two different properties with forested riparian buffer and agricultural fields used for hay and crop production. One of these has also been placed into conservation easement.

This area was targeted due to the severe erosion of streambank that was clearly visible in aerial imagery. The erosion throughout this stretch resulted in bare banks that reached 10-12 ft high. The streambank was eroding so rapidly that in an 11-month period, WVCA technicians recorded a loss of 6 ft of streambank horizontally in some places.

The design included 585 ft of toe wood with associated soil lifts, four boulder vanes, one boulder j-hook, point bar grading, channel grading, and tree planting. In total, the project area stretched 936'

along Back Creek. Live stakes were installed upon completion of construction in September 2022 but planting of trees will along the streambank and in the toe wood source area will take place in spring of 2023 to ensure maximum survivability of the trees. A series of before - during - after photos are shown in [Figure 5](#).

Figure 5. Back Creek Phase III stream restoration

Before



During



After

Results

Three parcels consisting of 94.3 acres placed into conservation easement in partnership with the Chesapeake Bay Local Implementation Funding grant; 50 of those acres were the direct result of this grant’s funding. The stream restoration that was completed targeted 936 linear feet of streambank and will reduce an estimated 415.3 tons/year of sediment from entering Back Creek. This exceeds the project’s original goals of 826 linear feet and a reduction of 45.58 tons/year. The workshops educated 50+ Back Creek landowners on responsibly land management, which ensures continued protection of Back Creek and its tributaries. An initial water quality monitoring event took place, and additional water quality monitoring will continue in future project phases.

Partners and funding

WV Conservation Agency	EP Conservation District
WV Dept of Env Protection	Berkeley County Farmland Pro
WV Div of Forestry	Blue Heron Env Network
USDA-NRCS Programs	Berkeley County Extension

Sources	Original budget	Spent
\$319	\$216,515	\$263,071
Match/other	\$144,343	\$176,732
Totals	\$360,858	\$439,803

Roof Runoff Management Program

The [Eastern Panhandle Conservation District](#) (EPCD) successfully acquired \$5,000 from WVDEP-WIB's AGOs to supplement their local Roof Runoff Management Program. The program is a local effort to reduce sediment and nutrients from agricultural properties. It provides cost share opportunities and technical assistance, with the goal of installing gutter systems and other roof/runoff measures that will improve drainage and reduce runoff from agricultural lands. The EPCD works closely with NRCS on the design and implementation of the systems.

The goal and objective of this project is to reduce nitrogen, phosphorus, and sediment loads as stated in the Chesapeake Bay Quick Reference Guide for Best Management Practices. The efficiencies were estimated at 20 - 40 percent depending on the types of practices installed.

Results

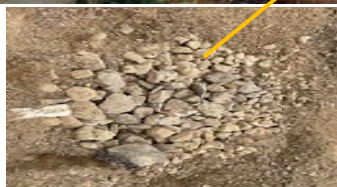
Three projects were completed in July of 2022. Completed components included 302 ft of gutter with fascia board and downspout, 518 ft of underground outlet, 48 sq. ft. of gravel splash pads, and a 64 sq. ft. concrete pad. All these buildings are part of cattle operations ranging from 20 to 100 head. Two of these buildings are part of their winter feeding routine.

Figure 6. EPCD roof runoff BMPs.

Before



After



Close-up of the new drainage way that directs flow from the roof, and slowly seeps water into the ground.

Table 5. Roof management load reductions

<u>Units installed</u>	<u>Pollutants</u>	<u>Reduction</u>
Three barnyard runoff control systems	Nitrogen	6.2 lbs/yr
	Phosphorus	0.4 lbs/yr
	TSS	245 lbs/yr
	Total	251.6 lbs/yr

Information obtained from Quick Reference Guide for Best Management Practices, Page 49, and CAST Source Data

Funding/partners

A total of \$5,000 from \$319 AGO were spent on the efforts, and the three projects contributed \$10,685 in match. Partners involved were WVCA's conservation specialist, EPCD, NRCS and local landowners.

WALD Passive Treatment Phase II

North Fork Active Treatment System

The North Fork of Blackwater watershed is a high restoration priority because it maximizes watershed-scale restorability of the receiving watersheds. In other words, it is surrounded by high quality streams, yet the egregious AMD pollution from the North Fork impairs the receiving streams dramatically impacting ecological integrity.

Restoring the water quality of the North Fork will improve the ecology and abundance of organisms throughout the area as well as further downstream.

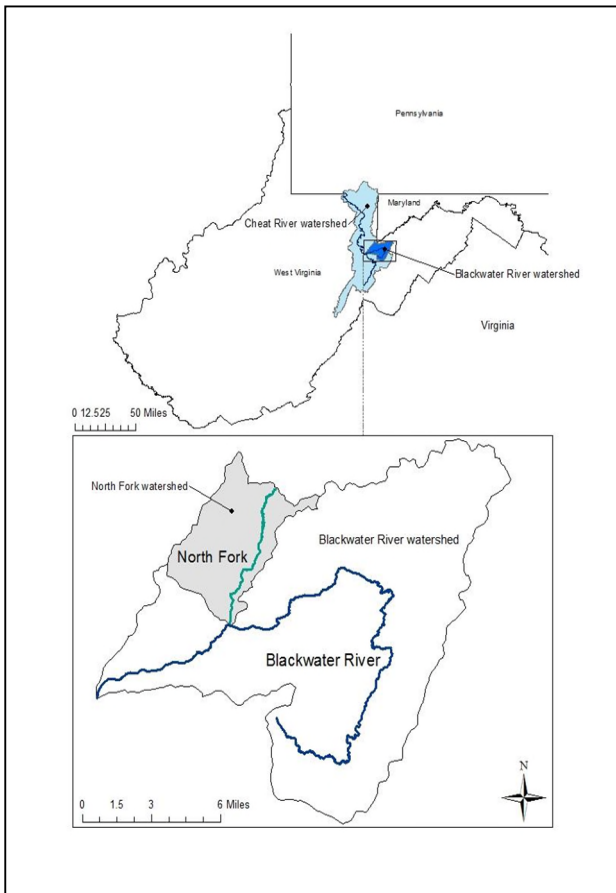


Figure 7. North Fork watershed location.

Read this [Muddy Creek article](#) to learn more about the first treatment system. The AMD treatment system would capture and treat all the Mine 29 discharge, Long Run, Burns blowout and more. FOB's project manager had to switch gears in mid project so that the OAMLR could move forward with their plan.

FOB worked closely with WIB and WVDEP's [Division Land Restoration](#) (DLR), Office of Special Reclamation (OSR) and OAMLR to modify the work plan so that the money available could be more effective and speed up the construction of the active treatment system. The first step was to find an engineering firm capable of understanding the complexities of the situation. FOB created the request

Problem

The North Fork is polluted by AMD. The sources come from three impaired tributaries and more than 20 known seeps. The area drains abandoned mine-lands from underground and surface mines that were mined for nearly 100 years beginning in the late 1880's. The Upper Freeport Coketon mine pool lies beneath most of the North Fork watershed.

Originally, this proposal would address the outlet discharging into Middle Fork - Mine 29. This is the site of a wetland/anoxic limestone drain, known as the WALD, which passively treats the Mine 29 discharge.

This treatment system no longer effectively reduced AMD and is dire need of an overall, or even a new passive treatment approach.

Project highlights

The design work on Phase I of the WALD was proceeding as planned until the WVDEP [Office of Abandoned Minelands and Reclamation](#) (OAMLR) announced in August 2019 intentions to design and construct an active treatment system on the North Fork.

for proposals (RFP), which was shared with five engineering firms. Three of these attended a site visit and after the proposals were submitted, the team selected BioMost Inc.

In-house engineers from DLR, OAML, WIB and FOB personnel provided BioMost with some basic conceptual designs and extensive water quality data. FOB has been collecting data in the North Fork of the Blackwater for more than 10 years. The data collection will continue at monthly intervals for at least 1-2 more years. FOB is funding the monitoring effort through the [WV Stream Partners Program](#), a portion of their \$319 awards and through local support.



Site characterization work is now complete. Piezometer installation was completed in May 2022 at three different locations. The data and video footage will help BioMost better characterize the levels and behavior of the mine pool.

Plan design is well underway, and progress is ahead of schedule for the collection systems, flow measurement devised, mix tanks, clarifiers, outlet tank, outlet flow measurement and more. BioMost maintains regular contact with WVDEP regarding the various aspects of the design and is working to incorporate all the suggested components to create the most effective system.

Results

Table 6. Representative water quality from the water bodies that will be captured by the treatment system.

Discharges	Representative water quality					
	pH	Acidity (mg/L)	Fe (mg/L)	Al (mg/L)	Mn (mg/L)	SO ₄ (mg/L)
Mine 29	3.5	81	2.4	10.7	3.1	372
Burns blowout	3.3	185	4.3	26.2	9.0	725
Long Run	2.9	144	9.7	9.8	0.3	150
Coketon	3.4	105	3.1	12.3	3.7	441
Blackwater	3.3	113	4.4	12.4	3.0	317

Note: All metal concentrations are dissolved values. Acidity was calculated from laboratory data. The Long Run data, collected by BioMost, is a composite sample of the major Long Run discharges. The Blackwater data is a composite of Coketon and Long Run. The Coketon data is a composite from Mine 29 and Burns blowout. These composite collocations were necessary due to the interconnectivity of the underground and surface mining.

\$319 funds were used for much of site characterization work, initial engineering services, FOB administration, monitoring and laboratory fees. No \$319 monies were used to support any necessary current or future permits.

Funding/partners

Table 7. WALD II project summary budget

	\$319	Match (OAML)	Total
Budgeted	\$134,000	\$89,500	\$223,500
Spent	\$134,000	\$110,163	\$244,163
Difference	\$0	\$20,663	\$20,663

A treatment system of this magnitude can have enormous impacts on the water quality and ecological integrity of the entire Blackwater River basin.

Thus far, as the word seeps-out the outdoor recreation, tourism and local businesses are very excited. This area is already a destination for many and improving the water conditions adds another positive benefit to an already popular area. Partnerships thus far have been primarily sections and offices within WVDEP.



NONPOINT SOURCE SUCCESS STORY

West Virginia

Improving the Cheat River Restores a Biological and Recreational Treasure

Waterbody Improved

Friends of the Cheat (FOC) was formed after a mine illegally discharged pollution into Muddy Creek, a Cheat River tributary. FOC organized partners from corporations, foundations, citizens, and local, state, and federal government to undertake projects necessary to restore water quality and transform the Cheat River into a recreational resource for Preston and Tucker counties and the international whitewater paddling community. After decades of severe impairment by acid mine drainage (AMD), the Cheat River and many of its tributaries now provide clean water and support diverse communities of fish and other aquatic species due to the efforts of FOC. The river is becoming an economic resource as the growing recreation industry creates new jobs in Preston and Tucker counties. Although waters in the Cheat River watershed do not yet consistently attain water quality standards, data show improvements.

Problem

The Cheat River is in a coal-rich area of West Virginia. Most local coal contains pyrite, which reacts with air and water to form acid mine drainage (AMD)—a chemical soup made of sulfuric acid, dissolved iron, and more. AMD eliminates aquatic life by making the water toxic and clogging streambeds with sludge. There was no federal law against discharging AMD to surface water until the 1977 Surface Mine Drainage Control and Reclamation Act, which required stricter regulation of mine discharges. Some companies abandoned mines where they could not or would not treat the pollution. The AMD leaking from abandoned mines is considered to be nonpoint source pollution. In the Cheat River watershed, one of the mines diverted its drainage into another mine that had shut down before the 1977 cut-off date. The polluted drainage water leaked out, appearing to be abandoned mine drainage—until a 1994 storm caused flooding that led to a blowout of polluted water through a hillside into Muddy Creek and the Cheat River. Although the Cheat River was the first West Virginia river to support a commercial whitewater industry (Figure 1), many of the boating companies took their business elsewhere after the 1994 blowout event.

Thousands of stream miles remain on West Virginia's list of impaired streams due to AMD. Many large streams and some rivers have no fish or only pollution-tolerant fish. In some streams, stones are stained orange and stream-bed gravel is filled in with mine drainage sludge.



Figure 1. Whitewater boaters enjoy running the Cheat River Canyon.

Story Highlights

Residents and whitewater boaters formed FOC after the 1994 blowout event. FOC established the River of Promise partnership, through which government agencies, businesses, foundations, and individuals cooperate to secure resources for restoration projects. FOC also established "CheatFest," an annual festival bringing together people who love the river, including residents, boaters from all over the world, musicians, and visitors.

Since 2003, FOC has built 20 AMD treatment projects, including passive-treatment practices, such as limestone leach beds, steel slag leach beds, and compost and limestone beds, as well as active-treatment projects, which rely on machines that dispense small amounts of limestone and other materials according to how much water is flowing through the river segment (Figure 2). As a result of passive treatment alone, area residents began to see the return of fish to Sovereign



Figure 2. The North Fork Greens Run Railroad Refuse project passively treats AMD.

Run, a Cheat River tributary (see [2013 Success Story](#)). In 2019, FOC and the West Virginia Department of Environmental Protection (WVDEP) dedicated a large, active AMD treatment plant (see [2021 Success Story](#)) treating pollution from a variety of abandoned and forfeited mines in one of the tributaries.

FOC has grown into an organization that can manage all aspects of the treatment projects. The organization uses donations and modest disbursements from operating funds to employ a staff of six who maintain projects, track water quality in the watershed, and ensure quality assurance project plans are followed. FOC has recently expanded its work from AMD issues to include other conservation projects, such as planting trees to restore streambanks, monitoring and posting *Escherichia coli* bacteria counts in stretches of the river most popular for casual boaters, and working to remove a dam once used by the now-retired Albright Power Station. Long-term monitoring confirms continuing water quality improvements.

Results

As a result of restoration efforts undertaken by FOC and its partners, fish and other aquatic species are returning to the Cheat River. Walleye are being caught further upstream where AMD previously prevented their migration, and DNA from a rare species, the Eastern Hellbender, has been detected in the river. Measurements of pH, aluminum, and iron, all of which indicate mine drainage, show decreasing trends over the decades since the 1994 blowout. Regular measurements from the 1970s to 2022 demonstrate decreasing iron concentrations and increasing alkalinity (Figures 3 and 4).

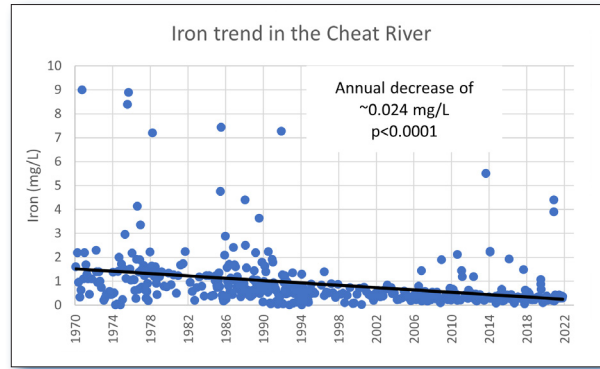


Figure 3. Long-term iron concentrations are decreasing in the Cheat River watershed.

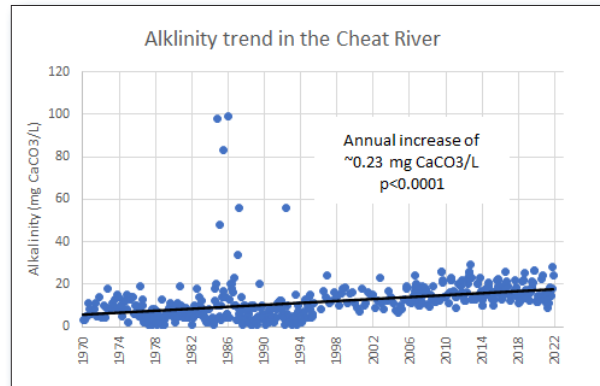


Figure 4. Long-term alkalinity levels are improving in the Cheat River watershed.

Preston County leaders are realizing they have a world-class outdoor recreation (swimming, fishing, boating, and biking) nexus and an opportunity for economic development in the tourism industry. FOC is developing two rail-trail corridors, and FOC and partners have assembled a Master Trail Plan to market water trails, hiking trails, and bike trails in the county and across the northern part of the state. The Cheat River's environmental success is also becoming a recreational and economic success.

Partners and Funding

Major funders include the WVDEP Nonpoint Source Program (\$4.2 million), the Office of Surface Mining Reclamation and Enforcement (\$1.8 million), the WVDEP Office of Abandoned Mine Lands and Reclamation (\$1.3 million). Patriot Mining Company (now a subsidiary of Arch Coal) and Southwest Energy also made major contributions to water treatment projects.



U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA #
July 2022

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Appendices

Appendix 1. Project status FY17-FY22

Org	FY 17	NPS#	Available
NPS Program			\$713,531
WVDE P	WVDEP Statewide NPS Program		
WVCA	WVCA Statewide NPS Program	1605	
EPA	Watershed Plan Tracking EPA in-kind		
WVRC	WBP/SWPP integration	1610	
FOB	Beaver Creek WBP	1647	
WVRC	AGO - Building capacity for WSAs	1668	
WVRC	AGO -WVRC/TU water quality monitoring	1669	
FOB	AGO - Analysis of Beaver Creek	1670	
GWF	AGO - Modification of AMD treatment Site 7	1671	
WVU	AGO - Fisheries in treated AMD trib	1672	
PCWA	AGO - Piney Creek monitoring/education	1673	
MCWA	AGO - Morris Creek Lavender Patch	1674	
FODC	AGO - Evaluating coliform	1675	
FOB	AGO - Planting/streambank stabilization	1777	
FOC	AGO - Sonde deployment and WQ	1770	
FODC	AGO - Kanes Creek repair/remediation	1769	
PCWA	AGO - Expanded stream monitoring	1771	
STTW A	AGO - Expanded watershed monitoring	1772	
BRWA	AGO - Swamp Run upgrade	1773	
WVCA	AGO - Roof runoff management program	1774	
CDC	AGO - West Edge rain garden design	1775	
WVCA	AGO - GI training and certification	1776	
WVRC	AGO - WVRC Warm Springs monitoring	1778	
FOC	AGO - State of the watershed 2018	1676	
Watershed Projects			\$1,145,279
PAN	Summerlee AMD Monitoring	1611	
PCWA	New River Drive Soil Erosion	1612	
MCWA	Morris Creek Rd and Stream Restoration	1613	
FOC	Beaver Creel Addition	1725	
FOC	Muddy Creek Dream Mountain Improvements	1633	
FODC	Hartman Run AMD	1641	
FOB	WALD treatment - Phase I	1632	
WVU	Cane Fork Treatment - Phase I	1642	
WVCA	Second Creek V	1791	
WVCA	Spring Creek - Phase I	1643	
FOC	FY16 Beaver Creek AMD Addition	1725	
WVU	Swamp Run #2	1589	
TOTAL			\$1,858,810

Cancelled	Complete

30-Sep-22

Org	FY 18	NPS #	Available
NPS Program			\$513,417
WVDE P	WVDEP Statewide NPS Program		
WVCA	WVCA Statewide NPS Program	1646	
EPA	Watershed Plan Tracking EPA in-kind		
FODC	AGO - O&M for AMD treatment	1714	
WVRC	AGO - Capacity for Watershed Groups	1715	
EL	AGO - App WS & Stream Monitors	1716	
FOB	AGO - Sand Run Investigation	1717	
PCWA	AGO - Piney Ck WSA data loggers	1718	
WVRC	AGO - WVRC/TU WQ monitoring	1719	
WVRC	AGO - Source water	1604	
FOC	AGO - Capacity Expansion	1720	
FODC	AGO - Using GIS to improve services	1721	
STTW A	AGO - Beaver Creek load refinement	1758	
FOB	AGO - Outreach/State of the watershed	1759	
EL	AGO - App WS & Stream Monitors	1757	
Watershed Projects			\$1,337,125
FOB	WALD Passive Treatment II	1680	
FOC	Sovern Tom Clark AMD	1701	
FOC	Beaver Creek McElroy Seep	1681	
FODC	Dillan Creek Remediation	1682	
WVU	Barlow Portal I	1684	
PCWA	Woodrow Wilson Stream Restoration	1685	
WVCA	Upper Indian Creek	1650	
WVCA	Second Creek IV	1686	
WVCA	Back Creek Protection	1687	
CRG	Browns Creek Phase II	1724	
TOTAL			\$1,850,542
			30-Sep-22

Org	FY 19	NPS#	Available
NPS Program			\$559,932
WVDE P	WVDEP Statewide NPS Program		
WVCA	WVCA Statewide NPS Program	1709	
EPA	Watershed Plan Tracking EPA in-kind		
WVRC	WVRC Integrating SW and WBP II	1723	
FOC	AGO - Monitoring and maintenance	1751	
FODC	AGO - Stream data loggers	1752	
TU	AGO - Increasing riparian delivery	1753	
WVRC	AGO - WV Watershed Network	1755	
WVRC	AGO - WVRC/TU monitoring program	1754	
PCWA	AGO - Piney Creek SWS planning	1756	
Watershed Projects			\$1,190,064
FOC	Muddy Creek Dream Mountain II	1789	
FODC	Marilla Park Restoration	1702	

FODC	Dillan Creek Remediation Phase 1	1823	
FODC	Slabcamp Run AMD Phase I	1703	
WVU	Roaring Creek N. Portal	1704	
PCWA	Crescent Elementary SW	1705	
WVCA	Burnside Branch Indian Creek	1706	
WVCA	Mill Creek Meadow River	1707	
WVCA	Second Creek III	1708	
TOTAL			\$1,749,996

30-Sep-23

Org	FY 20	NPS#	Available
NPS Program			\$546,612
WVDE P	WVDEP Statewide NPS Program		
WVCA WVDE P	WVCA Statewide NPS Program Rain garden	1729	
WVDE P STTW A	GI in southern WV Beaver Creek WBP Development	1730	
EL	AGO - Appalachian Watershed Stream Monitors	1809	
FCWA	AGO - Rain barrel workshop	1816	
NRC	AGO - Green infrastructure training	1812	
PCWA	AGO - Rain barrel/nonpoint education	1808	
WSWA	AGO - Warm Springs Run monitoring/weather	1814	
WVRN	AGO - WVWN/Capacity	1806	
Watershed Projects			\$1,259,388
FOB	Beaver Creek Seep 100-02	1731	
FOC	Sovern Tom Clark Passive Treatment	1732	
FOC	Sovern 62 Improvements	1792	
FODC	Dillan Creek Phase II	1733	
WVU	Lambert Site 7 Passive Treatment	1734	
WVCA	Sleepy Creek VI	1735	
PCWA	Little League Convention Center II	1736	
WVCA	Anthony Creek Ag BMPs	1737	
WVCA	Pipestem Creek Ag BMPs	1738	
WVCA	Cherry Fork Ag BMPs	1739	
TOTAL			\$1,806,000

30-Sep-24

Org	FY 21	NPS#	Available
NPS Program			\$554,390
WVDE P	WVDEP Statewide NPS Program		
WVCA	WVCA Statewide NPS Program	1788	
FOC	Roaring Creek - Cheat WBP	1818	
EPA	EPA Watershed Tracker support		
BRWA	AGO - Septic pumping	1813	
BRWC	AGO - Bacteria source tracking	1815	
FODC	AGO - Richard mine monitoring	1807	
Watershed Projects			\$1,300,810
CVI	Tuscarora Creek Phase III	1783	

FOB	Beaver Creek AMD	1784	
FOC	Sovern Tom Clark Phase III	1785	
FODC	Slabcamp OLC-650 Phase III	1786	
FODC	Richard mine - Deckers Creek monitoring	1819	
WVCA	Back Creek Phase IV	1779	
WVCA	Elks Run Phase III	1780	
WVCA	Indian Creek III	1781	
WVCA	Indian Creek IV	1820	
WVCA	Second Creek VI	1817	
WVCA	Mudlick Run of Anderson Run I	1782	
WVU	Lambert Run Site 2	1787	
TOTAL			\$1,855,200
30-Sep-25			

Org	FY 22	NPS#	Available
NPS Program			\$870,349
WVDEP	WVDEP Statewide NPS Program		
WVDEP	GI implementation		
WVCA	WVCA Statewide NPS Program	1795	
WVRC	SWP and WBP integration	1796	
EPA	EPA Watershed Tracker support		
MRVA	AGO - Bio-swale at the park	1811	
CDC	AGO - West Edge rain garden	1805	
FOC	AGO - Cheat River monitoring	1804	
WVRC	AGO - WVRC volunteer monitoring	1810	
Watershed Projects			\$984,651
FOC	Dinkenburg improvements	1797	
WVWRI/GWF	Lambert Site 7 - Phase II	1799	
WVWRI/STTW			
A	North Portals - Phase II	1800	
WVWRI/BRWA	Swamp Run - Phase II	1801	
FODC	Beulah Chapel upgrades	1798	
PCWA	Piney Creek wastewater treatment	1802	
TOTAL			\$1,855,000
30-Sep-26			

Appendix 2. BMPs implemented in 2022.

Subgrantee	Project	BMPs	#	Unit	HUC	Drainage
WV Conservation Agency	Pipestem Creek Ag BMPs	Alternate water sources	4	IU	050500020909	Little Bluestone River
WV Conservation Agency	Spring Creek Phase I	Alternate water sources	9	IU	050500030408	Slabcamp Run-Greenbrier River
WV Conservation Agency	Second Creek V	Alternate water sources	4	IU	050500030703	Lower Second Creek
WV Conservation Agency	Second Creek IV	Alternate water sources	1	IU	050500030703	Lower Second Creek
WV Water Research Institute	Barlow Portal Project-1	AMD - Access Road	1,350	FT	050200010502	Left Fork-Sandy Creek
WV Water Research Institute	Roaring Creek - North Portal	AMD - Limestone leachbed	300	TONS	050200010406	Roaring Creek
WV Water Research Institute	Roaring Creek - North Portal	AMD - Pond	2,397	CUYRD	050200010406	Roaring Creek
Piney Creek Watershed Association	New River Drive	Critical area planting	1	AC	050500040103	Outlet Piney Creek
WV Conservation Agency	Burnside Branch	Fence	46,706	FT	050500020701	Burnside Branch
WV Conservation Agency	Burnside Branch	Fence	8,469	FT	050500020701	Burnside Branch
WV Conservation Agency	Pipestem Creek Ag BMPs	Fence	2,703	FT	050500020909	Little Bluestone River
WV Conservation Agency	Pipestem Creek Ag BMPs	Fence	4,565	FT	050500020909	Little Bluestone River
WV Rivers Coalition	SWP-WBP integration Phase II	Fence	4,277	FT	050500030202	Headwaters Knapp Creek
WV Conservation Agency	Spring Creek Phase I	Fence	25,355	FT	050500030408	Slabcamp Run-Greenbrier River
WV Conservation Agency	Second Creek V	Fence	11,304	FT	050500030703	Lower Second Creek
WV Conservation Agency	Second Creek IV	Fence	43,673	FT	050500030703	Lower Second Creek
WV Conservation Agency	Second Creek Karst III	Fence	1,591	FT	050500030703	Lower Second Creek
WV Conservation Agency	Second Creek V	Grazing systems	4	IU	050500030703	Lower Second Creek
WV Conservation Agency	Spring Creek Phase I	Irrigation pipe	6,450	FT	050500030408	Slabcamp Run-Greenbrier River
Piney Creek Watershed Association	New River Drive	Land grading	1	AC	050500040103	Outlet Piney Creek
Piney Creek Watershed Association	New River Drive	Land smoothing	1	AC	050500040103	Outlet Piney Creek
WV Conservation Agency	Back Creek Protection Plan	Natural channel restoration	936	FT	020700040407	Elk Branch-Back Creek
Piney Creek Watershed Association	Woodrow Wilson Restoration	Natural channel restoration	552	FT	050500040103	Outlet Piney Creek
Piney Creek Watershed Association	Woodrow Wilson Restoration	Wetland creation	1	AC	050500040103	Outlet Piney Creek
WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	211	AC	020700010101	Laurel Fork-North Fork South Branch
WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	816	AC	020700040201	Upper Sleepy Creek
WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	2	AC	020700040407	Elk Branch-Back Creek
WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	18	AC	020700040904	Turkey Run-Opequon Creek

WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	38	AC	020700040908	Evans Run-Opequon Creek
WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	362	AC	020700041105	Rocky Marsh Run
WV Conservation Agency	Ag Enhancement Program	Nutrient Management Plan	26	AC	020700070302	Evitts Run
WV Conservation Agency	Mudlick Run	Septic pumping	3	IU	020700010602	Anderson Run
WV Conservation Agency	Sleepy Creek VI	Septic pumping	1	IU	020700040202	Middle Fork-Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Septic pumping	1	IU	020700040202	Middle Fork-Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Septic pumping	3	IU	020700040202	Middle Fork-Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Septic pumping	1	IU	020700040205	Lower Sleepy Creek
Canaan Valley Institute	Tuscarora Creek Phase III	Septic pumping	13	IU	020700040907	Tuscarora Creek
WV Conservation Agency	Burnside Branch	Septic pumping	7	IU	050500020701	Burnside Branch
WV Conservation Agency	Burnside Branch	Septic pumping	2	IU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Septic pumping	2	IU	050500020702	Rock Camp Branch
WV Conservation Agency	Indian Creek Phase III	Septic pumping	2	IU	050500020703	Upper Indian Creek
Coal River Group	Browns Creek Phase II	Septic pumping	2	IU	050500090608	Browns Creek-Coal River
WV Conservation Agency	Burnside Branch	Septic repair	6	IU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Septic repair	1	IU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Septic repair	2	IU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Septic repair	3	IU	050500020702	Rock Camp Branch
WV Conservation Agency	Sleepy Creek VI	Septic replacement	2	IU	020700040203	Middle Sleepy Creek
Coal River Group	Browns Creek Phase II	Septic replacement	13	IU	050500090608	Browns Creek-Coal River

Appendix 3. Load reductions achieved in 2022.

Subgrantee	Project	Pollutant	Reduction	Unit	HUC	Drainage
Friends of the Cheat	Beaver Creek - McElroy Seep	Acidity	30,359	LBS/YR	050200040603	Beaver Creek-Little Sandy Creek
Friends of the Cheat	Beaver Creek - McElroy Seep	Metals (Aluminum)	3,152	LBS/YR	050200040603	Beaver Creek-Little Sandy Creek
Friends of the Cheat	Beaver Creek - McElroy Seep	Metals (Iron)	174	LBS/YR	050200040603	Beaver Creek-Little Sandy Creek
Piney Creek Watershed Association	New River Drive	Metals (Iron)	373	LBS/YR	050500040103	Outlet Piney Creek
Friends of the Cheat	Beaver Creek - McElroy Seep	Metals (Manganese)	126	LBS/YR	050200040603	Beaver Creek-Little Sandy Creek
WV Conservation Agency	Ag Enhancement Program	Nitrogen	13,400	LBS/YR	020700010101	Laurel Fork-North Fork South Branch
WV Conservation Agency	Ag Enhancement Program	Nitrogen	48,624	LBS/YR	020700040201	Upper Sleepy Creek
WV Conservation Agency	Ag Enhancement Program	Nitrogen	121	LBS/YR	020700040407	Elk Branch-Back Creek
WV Conservation Agency	Ag Enhancement Program	Nitrogen	500	LBS/YR	020700040904	Turkey Run-Opequon Creek
WV Conservation Agency	Ag Enhancement Program	Nitrogen	3,750	LBS/YR	020700040908	Evans Run-Opequon Creek
WV Conservation Agency	Ag Enhancement Program	Nitrogen	29,701	LBS/YR	020700041105	Rocky Marsh Run
WV Conservation Agency	Ag Enhancement Program	Nitrogen	1,670	LBS/YR	020700070302	Evitts Run
WV Conservation Agency	Mudlick Run	Pathogens (Coliform)	1.19E+09	CFU	020700010602	Anderson Run
WV Conservation Agency	Sleepy Creek VI	Pathogens (Coliform)	1.64E+10	CFU	020700040201	Upper Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Pathogens (Coliform)	4.15E+9	CFU	020700040202	Middle Fork-Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Pathogens (Coliform)	3.28E+10	CFU	020700040203	Middle Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Pathogens (Coliform)	4.15E+09	CFU	020700040205	Lower Sleepy Creek
WV Conservation Agency	Sleepy Creek VI	Pathogens (Coliform)	8.29E+09	CFU	020700040205	Lower Sleepy Creek
Canaan Valley Institute	Tuscarora Creek Phase III	Pathogens (Coliform)	5.39E+10	CFU	020700040907	Tuscarora Creek
WV Conservation Agency	Burnside Branch	Pathogens (Coliform)	1.19E+12	CFU	050500020701	Burnside Branch
WV Conservation Agency	Burnside Branch	Pathogens (Coliform)	1.87E+07	CFU	050500020701	Burnside Branch
WV Conservation Agency	Burnside Branch	Pathogens (Coliform)	1.89E+07	CFU	050500020701	Burnside Branch
WV Conservation Agency	Burnside Branch	Pathogens (Coliform)	1.62E+12	CFU	050500020701	Burnside Branch
WV Conservation Agency	Burnside Branch	Pathogens (Coliform)	5.92E+11	CFU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Pathogens (Coliform)	3.78E+07	CFU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Pathogens (Coliform)	1.89E+07	CFU	050500020701	Burnside Branch
WV Conservation Agency	Indian Creek Phase III	Pathogens (Coliform)	7.56E+07	CFU	050500020702	Rock Camp Branch
WV Conservation Agency	Indian Creek Phase III	Pathogens (Coliform)	1.89E+07	CFU	050500020703	Upper Indian Creek

WV Conservation Agency	Pipestem Creek Ag BMPs	Pathogens (Coliform)	3.85E+11	CFU	050500020909	Little Bluestone River
WV Conservation Agency	Spring Creek Phase I	Pathogens (Coliform)	4.22E+12	CFU	050500030408	Slabcamp Run-Greenbrier River
WV Conservation Agency	Second Creek V	Pathogens (Coliform)	6.04E+12	CFU	050500030703	Lower Second Creek
WV Conservation Agency	Second Creek IV	Pathogens (Coliform)	1.43E+12	CFU	050500030703	Lower Second Creek
WV Conservation Agency	Second Creek Karst III	Pathogens (Coliform)	1.88E+12	CFU	050500030703	Lower Second Creek
Coal River Group	Browns Creek Phase II	Pathogens (Coliform)	2.30E+11	CFU	050500090608	Browns Creek-Coal River
Piney Creek Watershed Association	Woodrow Wilson Restoration	Pathogens (Coliform)	1.21E+12	CFU	050500040103	Outlet Piney Creek
WV Conservation Agency	Ag Enhancement Program	Phosphorus	18,963	LBS/YR	020700010101	Laurel Fork-North Fork South Branch
WV Conservation Agency	Ag Enhancement Program	Phosphorus	48,424	LBS/YR	020700040201	Upper Sleepy Creek
WV Conservation Agency	Ag Enhancement Program	Phosphorus	134	LBS/YR	020700040407	Elk Branch-Back Creek
WV Conservation Agency	Ag Enhancement Program	Phosphorus	1,585	LBS/YR	020700040904	Turkey Run-Opequon Creek
WV Conservation Agency	Ag Enhancement Program	Phosphorus	3,600	LBS/YR	020700040908	Evans Run-Opequon Creek
WV Conservation Agency	Ag Enhancement Program	Phosphorus	41,006	LBS/YR	020700041105	Rocky Marsh Run
WV Conservation Agency	Ag Enhancement Program	Phosphorus	835	LBS/YR	020700070302	Evitts Run
Piney Creek Watershed Association	Woodrow Wilson Restoration	Sediment-Siltation	33	LBS/YR	050500040103	Outlet Piney Creek
WV Conservation Agency	Back Creek Protection Plan	Sediment-Siltation	415	LBS/YR	020700040407	Elk Branch-Back Creek

Appendix 4. FY23 \$319 grant request

<u>Sub-grantees</u>	<u>Nonpoint Funds</u>	<u>\$319</u>	<u>Match</u>	<u>Total</u>
1 WVDEP - Watershed Improvement Branch	WVDEP \$319 Statewide Program	\$513,779	\$414,466	\$928,245
2 Friends of the Cheat	Shavers Fork WPP	\$60,500	\$42,000	\$102,500
3 WV Conservation Agency	WVCA \$319 Statewide Program	\$100,500	\$67,500	\$168,000
4 Friends of the Tug Fork River	Tug Fork River WBP development	\$60,500	\$24,625	\$85,125
5 Environmental Protection Agency	EPA Watershed Tracker (in-kind)	\$10,000		\$10,000
	Total Nonpoint	\$745,279	\$548,591	\$1,293,870
	<u>Watershed Project Funds</u>			
6 WV Conservation Agency	Anthony Creek II	\$150,000	\$100,000	\$250,000
7 WV Conservation Agency	Spring Creek II	\$145,000	\$111,000	\$256,000
8 WV Water Research Institute	Lambert Site 8 - Phase II	\$242,073	\$175,000	\$417,073
9 WV Water Research Institute	Mars Portals Phase III	\$300,000	\$200,000	\$500,000
10 WV Water Research Institute	Smooth Rock Lick Phase III	\$224,753	\$155,000	\$379,753
11 Canaan Valley Institute	Mill Creek restoration design/survey	\$51,463	\$33,710	\$85,173
12 Piney Creek Watershed Assoc.	Piney Creek Wastewater Phase II	\$52,250	\$34,833	\$87,083
	Total Watershed	\$1,165,539	\$809,543	\$1,975,082
	Total Grant request	\$1,910,818	\$1,358,134	\$3,268,952

Other noteworthy partners: (8) Guardians of the West Fork, (9) Save the Tygart Watershed Association, (10) Buckhannon River Watershed Association. The section of WVWRI that focuses on AMD is the [National Minelands Reclamation Center](#) (NMLRC).



<https://go.wv.gov/nonpoint>