

WEST VIRGINIA'S NONPOINT SOURCE PROGRAM Annual Report



2017



West Virginia Department of Environmental Protection

Nonpoint Source Program Annual Report March 2018

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West Virginia's Nonpoint Source (NPS) Program is funded by a Clean Water Act (CWA) §319 Grant administered by the U.S. Environmental Protection Agency (EPA).

Acknowledgements: The [Watershed Improvement Branch](#) (WIB) §319 Program acknowledges the efforts of all staff, partners and multiple stakeholders that contributed information in this report, and those who have played roles in projects, monitoring, outreach etc. The names and organizations are too numerous to mention but if you would like to know more about organizations in your area contact the [§319 Coordinator](#). Additionally, I would like to acknowledge the hard work of Teresa Koon, Matthew Thompson and Martin Christ. These individuals worked on and submitted this report in my absence.

EDITED/REVISED JULY 2018 BY: TIMOTHY CRADDOCK

www.dep.wv.gov/nonpoint

WEST VIRGINIA'S NPS PROGRAM ANNUAL REPORT 2017

EXECUTIVE SUMMARY

West Virginia's Nonpoint Source (NPS) Program is a partnership program administered by WVDEP's WIB. The major sources of impairment to West Virginia's streams and rivers include biological impacts, fecal coliform and iron. These pollutants come from acid mine drainage, agriculture, failing septic systems, urban and rural stormwater from development, logging and oil and gas extraction, and streambank erosion.

A variety of partnerships including federal, state and local agencies, universities and colleges, watershed associations and nonprofits work cooperatively to address West Virginia's nonpoint source impacts. In federal fiscal year 2017 (FY17), a total of \$3,419,757 in federal funds matched by \$4,367,936 of state and local funds are instrumental in the implementation of more than 70 nonpoint source projects across West Virginia. Projects fully completed in 2017 include four agriculture projects focused on fecal coliform and sedimentation and three acid mine drainage projects focused on metals and pH.



Aerial (drone) photo of Friends of the Cheat (FOC) North Fork Greens Run passive acid mine drainage treatment system.

Photo by: David Petry, FOC

Note: Additional program summary information is provided in the sections that follow.

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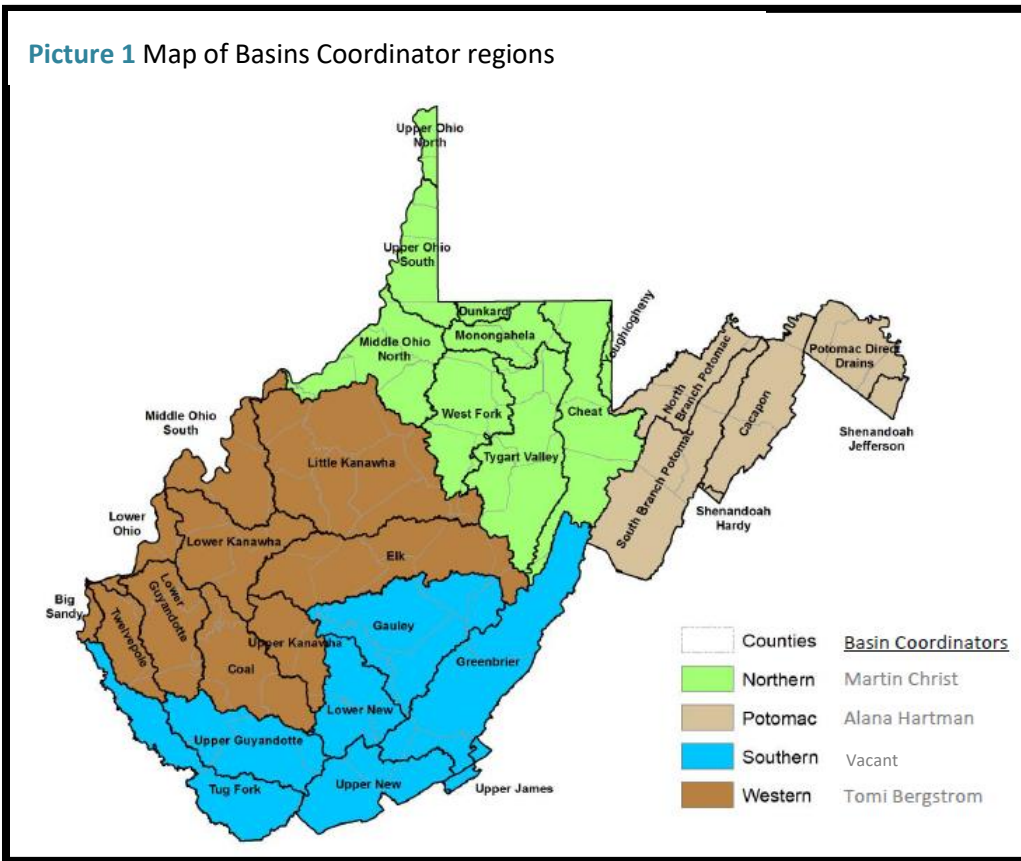
INTRODUCTION

West Virginia's NPS Program is a partnership program administered by WVDEP's WIB. WIB's mission is "To inspire and empower people to value and work for clean water". West Virginia's NPS Program coordinates multi-agency and non-government organization efforts to address nonpoint pollution by:

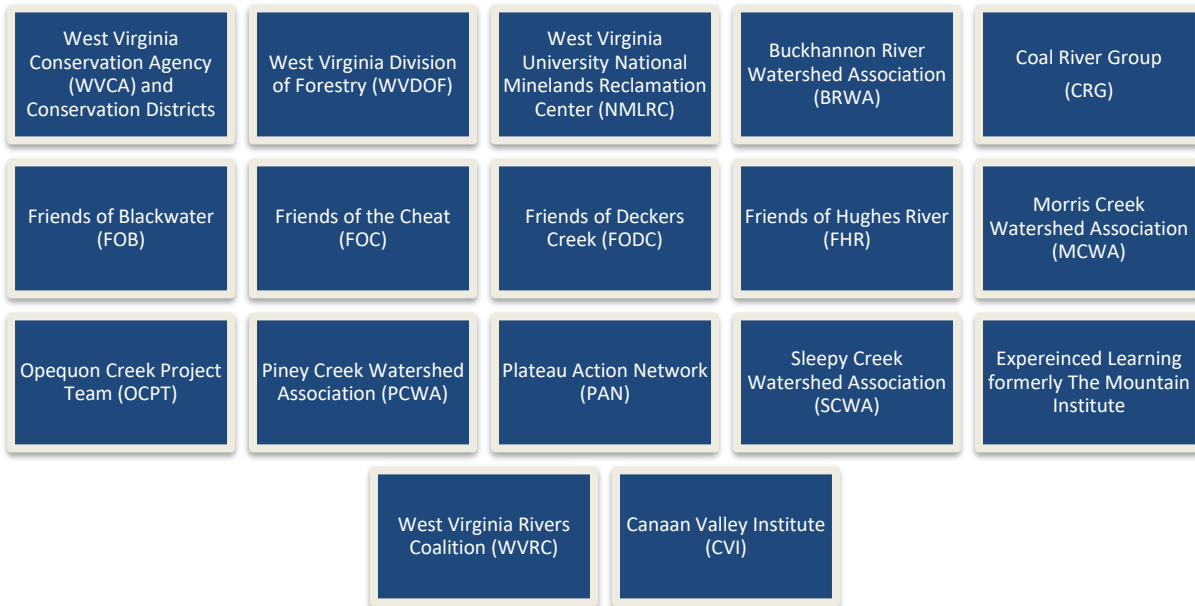
- Educating individuals on nonpoint source pollution;
- Aiding in the proper installation and maintenance of best management practices (BMPs);
- Supporting citizen based watershed organizations;
- Supporting partners whose activities relate to nonpoint issues; and
- Restoring impaired watersheds with nonpoint abatement projects

PROGRAM STRUCTURE

The WVDEP's NPS Program includes 3.8 Clean Water Act Section §319 funded staff members and six additional staff funded through other sources who also focus on nonpoint source pollution. Four staff are located regionally across the state to provide local assistance, two staff conduct outreach, Project WET, and Save Our Streams and remaining staff are located at WVDEP headquarters and provide supervisory, administrative and program support.

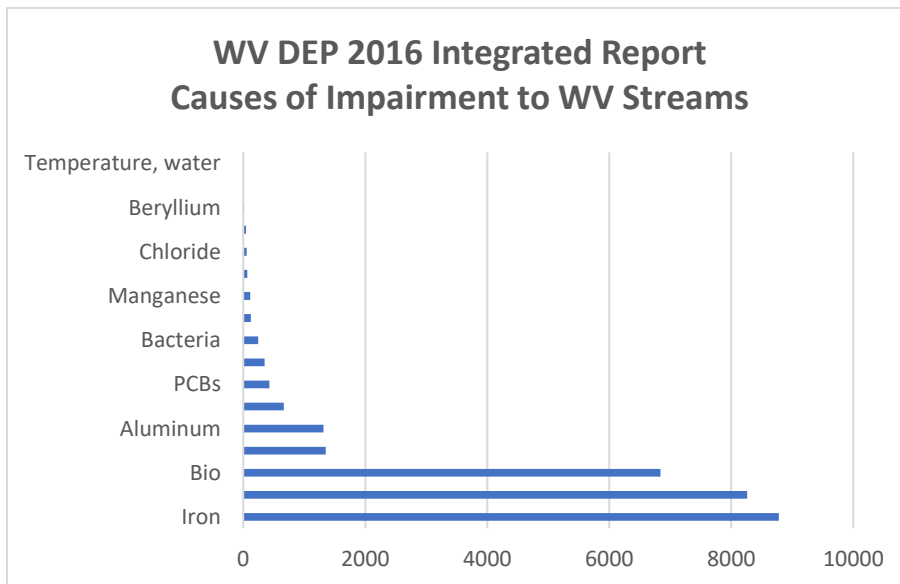


WVDEP works with a variety of partner agencies and organizations to implement the nonpoint source program. Major partner agencies and organizations include:



SOURCES OF IMPAIRMENT

According to West Virginia’s 2016 Integrated Report the primary impairments to West Virginia’s streams and rivers are biological (sediment and nutrients), fecal coliform and iron.



The 2016 NPS Annual Report provided a statewide water quality (WQ) summary. Since that time no major changes have occurred.

<http://bit.ly/WV319-2016>

West Virginia’s NPS Program has made WQ improvements, some of which are highlighted in the watershed and project section. Ourselves and /or our partners have not de-listed any streams or stream segments this past year.

Figure 1 Causes of Impairment to WV Streams

Typical nonpoint sources of these impairments in West Virginia include:

1. Acid mine drainage (AMD)
2. Agriculture
3. Failing septic systems
4. Urban and rural stormwater from development, logging and oil and gas extraction
5. Streambank erosion



Picture 2 AMD on Morris Creek



Picture 3 Agriculture nonpoint pollution example

FUNDING AND PROJECTS

To address these impairments, the WVDEP NPS Program offers CWA §319 grants and other state resources for the development of plans and projects that target nonpoint pollution. These grants are used for NPS Program and watershed projects. Watershed project grants attempt to restore waters impaired by nonpoint pollution and are driven by 303(d) listings, TMDL development and priorities within the NPS Program's Management Plan. Smaller announcements of grant opportunities or AGOs are provided from NPS program dollars for planning, education and outreach, monitoring, research, and BMP implementation outside of areas with watershed based plans (WBPs). Additional state resources such as the West Virginia Stream Partners (SP) Program which provides mini grants to volunteer watershed associations, and West Virginia Conservation Agency's (WVCA) Agriculture Enhancement Program (AgEP) which provides funds to farmers to implement BMP's are brought to the table to assist with NPS outreach and pollutant reductions.

The following charts show West Virginia's NPS Program expenditures for FY17 and the types, number and funds obligated for ongoing NPS projects. West Virginia uses federally provided §319, Chesapeake Bay (CB) Program and 106 Water Pollution Control grants to support the NPS Program.

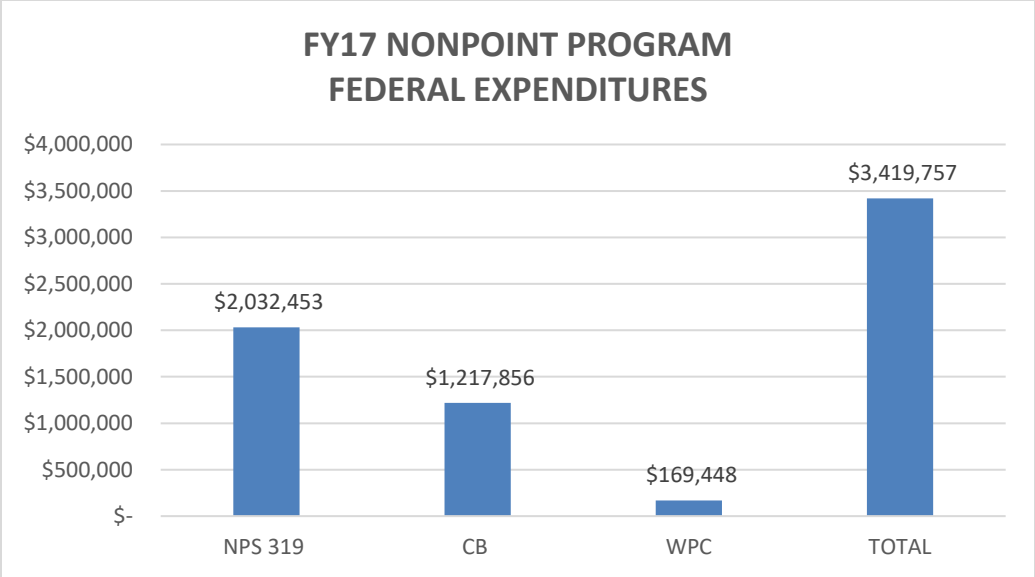


Figure 2 Federal expenditures

Other federal funds such as USDA Natural Resources Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP), Farm Service Agency (FSA) Conservation Reserve Enhancement Program (CREP), US Fish and Wildlife Service Partners for Wildlife (USFWS), US Department of Interior Office of Surface Mining (OSM) Watershed Cooperative Agreement Program (WCAP) and WVDEP’s Abandoned Mine Land (AML) dollars are also instrumental in funding nonpoint source BMP’s across the state.

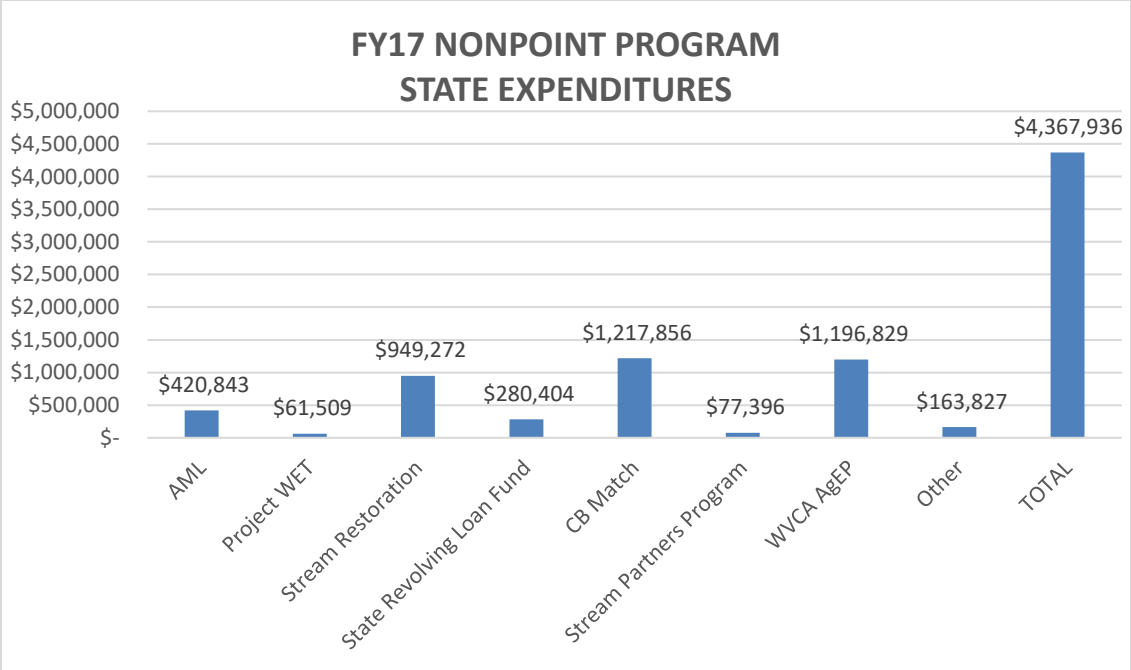


Figure 3 State expenditures

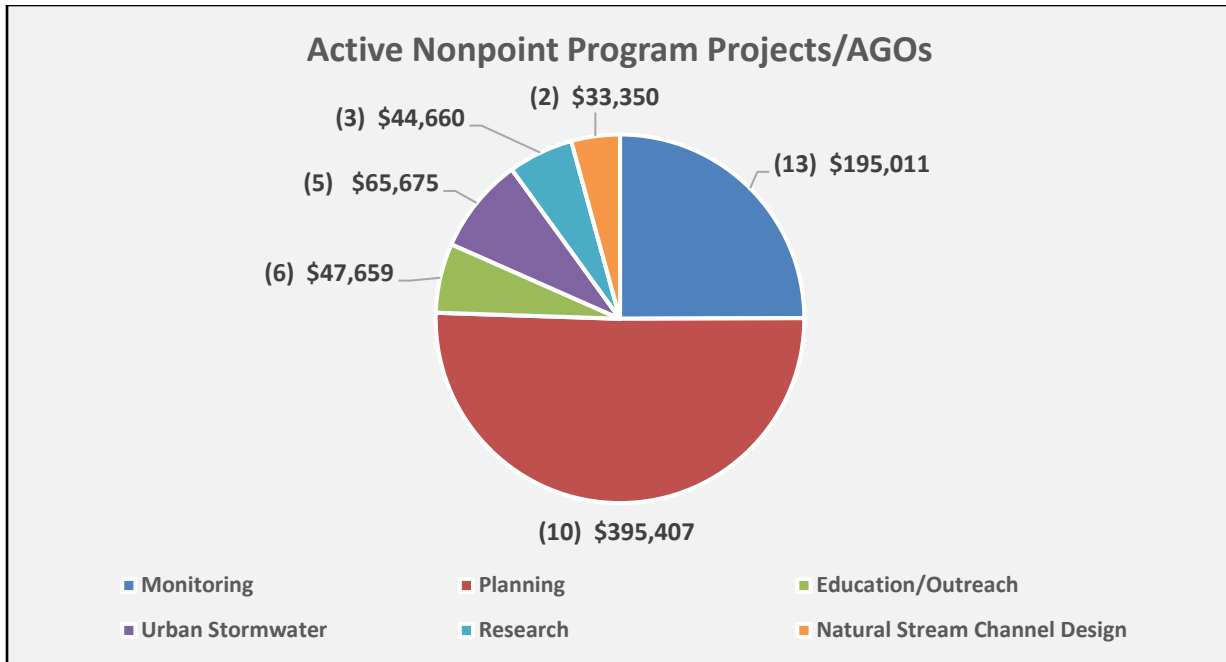


Figure 4 Active Nonpoint Program projects/AGOs

\$319 funds committed to NPS program projects. Committed and anticipated match to these projects totals a minimum of \$521,175.

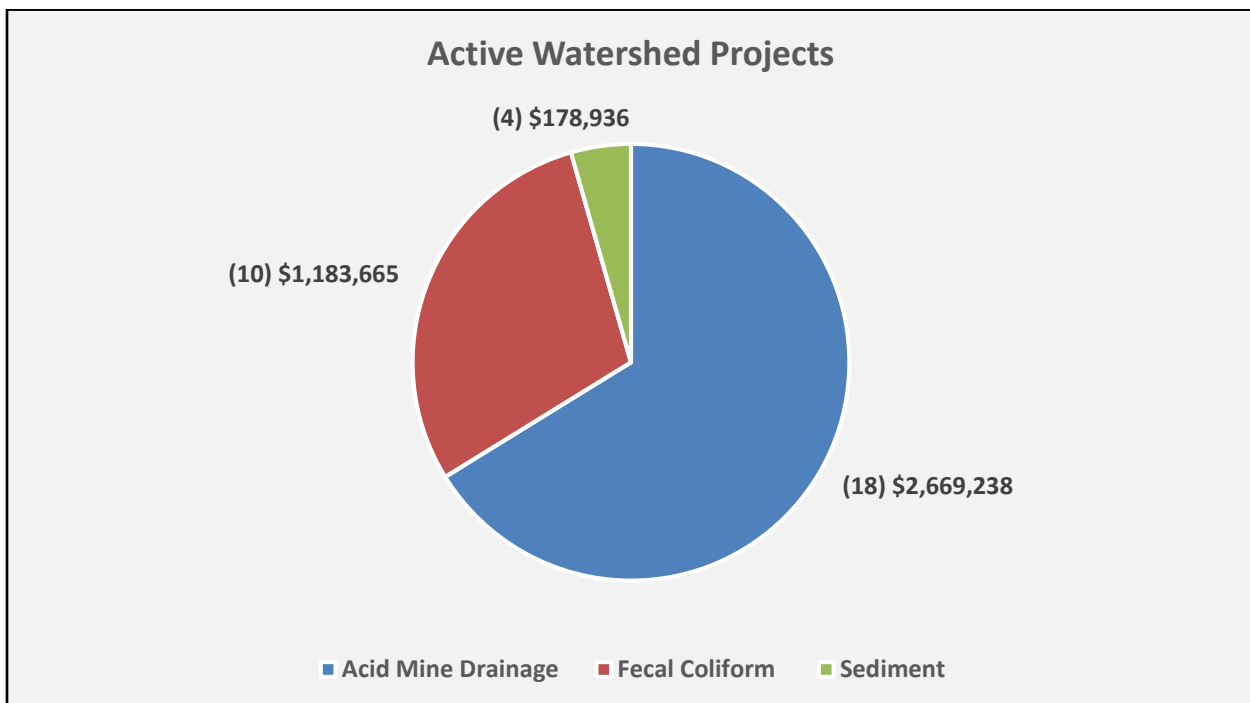


Figure 5 Active watershed projects

\$319 funds committed to NPS watershed projects. Committed and anticipated match to these projects totals a minimum of \$2,687,893.

LOAD REDUCTIONS

CWA §319 projects fully completed in 2017 include four agriculture projects in the Greenbrier River watershed focused on fecal coliform and sedimentation and three AMD projects in the Cheat, Buckhannon and Wolf Creek of the New River focused on aluminum, iron and pH. Agriculture and urban stormwater best management practices were also implemented through CB Program funding in the Potomac headwaters. The following load reductions occurred as the result of §319 NPS and CB Program BMP installation in FY17.

Pollutant	Load Reduction	Units
Fecal Coliform	1.071E+13	cfu
Acidity	55,554	lbs/yr
Sediment	2,963	tons/yr
Metals	20,689	lbs/yr
Nitrogen	141,217	lbs/yr
Phosphorus	17,654	lbs/yr

Figure 6 Load reductions by pollutants

EDUCATION AND OUTREACH

Education and outreach are staples of the NPS Program. While it is impossible to identify and count all the outreach activities that occurred in FY17. Highlights are provided below.

The WV Save Our Streams (SOS) Program held 11 volunteer monitoring workshops for 210 people and nine outdoor classrooms that educated over 1,200 people. Through Project WET (Water Education for Teachers) five educator workshops were held certifying 121 educators, and one Wonders of Wetlands workshop certifying 21 teachers. Fourteen (14) Water Festivals were also conducted for more than 2,700 students across the state.

The West Virginia Conservation Agency educated over 2,000 students, teachers and adults on nonpoint source and water quality issues and 700 agriculture producers through field days and demonstrations. The Watershed Resource Center developed educational materials and supported workshops through the West Virginia Watershed Network's annual Watershed Celebration Day event and the West Virginia Construction and Design EXPO. Newsletters were also produced for the West Virginia Watershed Network and West Virginia CB Program.

The NPS Program Basin Coordinators (BC's) play a critical role in the NPS Program's success. These individuals help their regional stakeholders with project implementation, they are active in promoting nonpoint issues through a variety of education and outreach events, they assist with monitoring and are very aware of not only NPS activities but the wide variety of environmental concerns in their region. BC's are often the first contact for the public. Program manager's activities, and administrative support is also critical for the NPS Programs continued success.

BASIN COORDINATORS

Western Basin

The WBC has three watershed projects in full swing, the Browns Creek Septic Remediation Project with CRG and two projects with MCWA - Upper Mainstem AMD Restoration Project and Road/Stream Restoration Project. Since August, CRG has had a new project manager, the WBC worked with WIB to get him up to speed on reporting, sampling schedules, outreach, and SOPs and updating their QAPP. Sampling results are steering CRG's attention to high priority homes. Several homes have new septic systems, and more are scheduled for system replacement. Ten participants have contacted the KCHD's sanitarian to uncover the issues of their failing septic systems. WBC worked closely with MCWA's new project manager to catch them up on the projects, reporting, and sampling for each. Upper Mainstem AMD Restoration Project is near completion, with the system fully installed and operating. To wrap up the project, WVDEP's SOS worked with the project manager to collect the required benthic data over the summer. Once this data is analyzed a final report will be produced and load reductions will be calculated. WBC is involved in many outreach components including presenting at or helping to organize the following events: WVDEP Earth Day, Black Diamond Girl Scouts summer camp, Marshall University Water Festival, Coal River Group Water Festival, Point Harmony Outdoor Day, Mill Creek Adventure Day, Discover Forks of Coal Day, Morris Creek Water Outing, Grandview Water Festival, St. Albans Water Festival, and presenting at the River Rally Conference with Coal River Group. Partnering with the City of Charleston Stormwater Department, the WBC hosted five rain barrel workshops, sharing stormwater education with over 120 citizens of the Kanawha Valley. A two-day stormwater exhibit was also hosted and planned at the Charleston's FestivALL event.

Northern Basin

In the Northern Basin, FOC completed their upgrade of the Pase Active Treatment project, which mixes calcium oxide with water using air compressed by the power of falling water. FODC completed their upgrade of the Valley Point #12 project. BRWA, working with NMLRC, completed the Harrods Run project in the Upper Buckhannon River watershed. WQ from all three projects are now approaching standards.

Potomac Basin

The Potomac Basin Coordinator (PBC) assisted partners and stakeholders with revising Sleepy Creek's WBP and developing a WBP for Anderson Run. She participated in the Safe Water Harpers Ferry project to identify tasks that will achieve goals in both the Elks Run WBP and the Source Water Protection Plan for the town's drinking water intake on Elks Run. The PBC continued to co-facilitate Tuscarora Creek §319 project meetings and began to update the Tuscarora Creek streambank assessment, which led to site visits with several landowners who have not participated in watershed programs before. She compiled and shared Opequon, Tuscarora and Mill Creek streambank erosion threats and project opportunities with staff from the Army Corps of Engineers, who have included Opequon Creek as a special subwatershed planning effort in their Chesapeake Bay Comprehensive Plan. She served as a project liaison for native tree planting projects at Keyser High School and the Mill Creek Ruritan Club. The PBC facilitated bi-monthly meetings of [CB Tributary Team](#) and coordinated the annual submittal of nonpoint source BMP data to the Chesapeake Bay Program. She hosted a training for West Virginia stream restoration practitioners regarding methods required by the CB Program to verify that projects receive nutrient and sediment reduction credits in the CB Watershed Model.

The **Southern Basin** position is currently vacant, and a summary like the above is not included. WIB's Program managers and WVCA continue to support activities in the region. Multiple projects in the Greenbrier and Upper/Lower New River HUC8 basins have been completed and/or are on-going. The primary local stakeholders serving as project managers are WVCA and PCWA. Indian Creek Watershed Association (ICWA) is involved in the recently approved Indian Creek WBP, playing roles in monitoring and outreach. ICWA is also one of many watchdogs regarding Mountain Valley Pipeline (MVP) activities. PAN was recently funded for additional AMD work, which will be supported by the Northern BC.



Picture 4 City of Charleston stormwater outreach



Picture 5 Students with groundwater model



Picture 6 WVDOF riparian buffer education



A recent visitor at one of FODC's AMD treatment projects

AREAS OF CONCERN/RECOMMENDATIONS/FUTURE ACTIONS

West Virginia faces several challenges related to nonpoint source pollution. There are seven 20”- 42” gas distribution pipelines scheduled for construction across the state. Pipeline construction on West Virginia’s steep and rugged terrain can cause sediment impacts to streams and rivers. In response to the increasing number of pipelines, WVDEP has instituted the following to minimize those impacts:

- State/WVDEP construction stormwater permitting requirements
- Increased requirements: West Virginia Special Conditions for stream crossings under the US Army Corps of Engineers Nationwide 12 Permit
- Increased WVDEP staffing for construction stormwater enforcement

Currently three major pipelines have been permitted and are being constructed. WVDEP has recently provided a web-portal for pipeline updates. The site provides important public information on the status of the major lines. - <https://dep.wv.gov/pio/Pages/Major-Pipelines-In-West-Virginia.aspx>

The NPS Program has been providing support to volunteer watershed associations and other nonprofits in the form of training and subgrants for monitoring pipeline construction. Pre and post construction water quality monitoring will be conducted by volunteers across the state and in many sensitive areas of pipeline construction. In addition, the NPS Program has been conducting oil and gas and sediment related workshops at the WV Construction and Design EXPO since 2016.



Picture 7 Oil and gas pipeline construction



Picture 8 Oil and gas Pipeline Slip

Post construction stormwater controls are virtually nonexistent outside of MS4 areas in West Virginia. Some counties have limited regulations. This has been a challenge for many years and one we have been unable to fully overcome. Education and outreach will continue. More headway has been made in the Potomac drainage where local ordinances have been voluntarily adopted in response to the Chesapeake Bay TMDL.

WIB’s watershed staffing pilot project is coming to the end of its third year. This pilot project provided three watershed associations with state dollars to support staff with the responsibility of implementing their WBPs. The hope was to encourage future funding from other sources to maintain the staffing after the first three years. While turnover was high in some cases, many activities were completed that would not have been otherwise. Future funding in most cases has not been obtained. The NPS Program will evaluate the program, make modifications based on lessons learned and solicit all watershed associations across the state for applications for a new three year-round.

The NPS Program will investigate opportunities for identifying healthy watersheds. Using the Potomac drainage as a pilot area and EPA’s Preliminary Healthy Watersheds Project, WVDEP’s NPS Program will work with the WVDEP’s Watershed Assessment Branch (WAB) to identify potential criteria for healthy watersheds and propose options to WVDEP leadership.

Finally, West Virginia will update and submit the Chesapeake Bay TMDL Phase 3 Watershed Implementation Plan (WIP). This plan will outline the nonpoint source reductions that will be put in place between 2018-2025 to meet West Virginia’s nitrogen and phosphorus allocations. With point source wastewater upgrades virtually complete, all remaining reductions will come from urban stormwater and agriculture.

MANAGEMENT PLAN GOALS AND OBJECTIVES

CWA [§319 guidelines](#) require that all State NPS Programs revise their management plans (MP). West Virginia’s NPS revised MP was approved in September 2014 one of the first to be approved in the Mid-Atlantic region. The MP includes short-term (annual) and long-term (5-10-15 years), objectives, and strategies to protect and restore water quality, strengthen partnerships, and establish a balanced approach that emphasizes statewide and watershed restoration opportunities. Updates regarding pollution reduction targets were provided in the [2016 NPS Annual Report](#). West Virginia’s NPS Program partners have exceeded the nutrients and sediment five-year target goal, due largely to WVCA’s statewide agricultural enhancement programs. Significant progress has also been made towards reduction in metals and acidity.

This year we highlight the goals and objectives regarding administration, watershed management, agriculture and other major program areas described in the MP.

MP progress legend

Status		Comments
Complete		In some cases, complete may refer to on-going particularly if the milestone is an annual goal. Other comments on progress will be provided as needed.
Some progress		
No progress		

Administration	Status	Comments
Provide leadership in managing the NPS Program		These are annual goals that are consistent with each §319 workplan. Each of these goals are either complete or progress is satisfactory.
Represent the DWWM in multi-agency and stakeholder organizations		
Project management of all watershed projects; includes tasks such as technical guidance, support, and oversight and compliance management.		
Coordinate and oversee NPS Program grant projects relating to nonpoint source issues in non-priority watersheds to foster a better understanding of NPS pollution, as well as more recognition for the NPS Program.		
Participate and coordinate in the development of work plans and grant proposals in priority watersheds.		
Maximize the use of all funds to achieve water quality standards in NPS impaired streams		
Establish a targeted monitoring approach for NPS Program projects including baseline, pre-and post-project to better evaluate the effectiveness of BMPs. Work with WAB and local partners to coordinate monitoring efforts.		
Participate in and coordinate with the WVWN.		
Coordinate with appropriate agencies, watershed associations and Public Service Districts to address failing on-site wastewater systems.		
Coordinate with project teams to propose additional funding opportunities and activities to conduct streambank stabilization projects in priority watersheds.		
Participate in the Cheat and Monongahela River TMDL implementation plans		
Develop guidelines for an urban runoff management program that promotes low impact development practices		
Coordinate with WVCA and NRCS to implement CREP/EQIP programs in priority watersheds		
Provide conservation education and information to educators, youth and the public		
Increase capacity for watershed associations to actively participate in and provide leadership for NPS watershed projects		

Watershed Management	Status	Comments
Conduct restoration activities and BMP implementation in priority watersheds with the goal of achieving load reductions that will meet their designated uses by 2025.		
By 2020 develop two-four new WBPs in priority areas as designated by the Watershed Management Framework and TMDL processes.		WBP activity is on-going driven by local stakeholders, agency and NGO support. Three new WBPs have been approved and we are working on two source water, WBP integration efforts. New and revised plans are being developed in the Potomac and Cheat watersheds. We anticipate completion of three
Every two years evaluate the progress and revise existing active WBPs as needed.		
By 2020 complete the proposed watershed projects and achieve the required load reductions (LRs) that will meet the designated uses in three existing WBPs.		
Every two-year's or more frequently when needed or requested by EPA, report on active WBPs in accordance with the milestones established in approved plans		

By 2020 target priority basins in the Little Kanawha, Upper, Middle and Lower Ohio for the development of two new WBPs		Cheat WBPs by late 2018 early 2019. No WBPs have been developed in the Ohio basins. This area historically has been challenging and the trend continues.
Support and encourage the remediation of watersheds impacted by wastewater in priority watershed and on a statewide basis by promoting the statewide efforts of the CWSRF and Agricultural Loan Programs.		
Support provide funding and technical assistance within priority watersheds and on a statewide basis to stream restoration projects that restore the streams natural hydrologic conditions and reduce sedimentation		
Support and encourage the protection of healthy watersheds and work with local stakeholders to educate their communities on their importance. This includes waters identified as high quality and outstanding national resources, as well as those that remain high quality but may be threatened by NPS pollutants.		
If there is local stakeholder interest, funding and agency support, a Watershed Protection Plan (WPP) will be developed to protect high value water bodies identified as Tier 3. The goal is to develop one WPP within the next five years		WPP is a priority, particularly in WV's Chesapeake Bay counties, which is discussed on pg. 13. WV currently has two WPPs, one is active (Back Creek) the other has been challenging (Upper Elk). An ILF project in the Upper Elk is underway. There appears to be future WPP opportunities in several Greenbrier drainages.
If there is local stakeholder interest, funding and agency support efforts will be made to protect high priority wetland and riparian areas and other high value watershed resources, including water quality reference streams, in priority restoration and protection watersheds. The goal is to engage land trust, local landowners and others to implement conservation easement protection (CEP). The goal is to develop two-four CEPs within each of the approved WPPs within the next five years		
Support the development of the WVVAPP tool and encourage WVDEP to develop statewide criteria to define healthy waters that will ensure better protection of high quality watersheds		

Agriculture	Status	Comments
Target statewide opportunities and priority watersheds promote the conservation of cropland, pastureland and other land within the agriculture community through technical assistance, BMP implementation, conservation planning, nutrient management, monitoring and education.		
Every two-years develop 10 Conservation Plans under the Farm Bill Programs		Nearly all goals have been exceeded or nearly so. Where numbers are lower the goal is expected to be met soon. The Ag WQLP hasn't been promoted but has recently gained some attention in publications etc. WVDEP's CWSRLF and WVCA plans to put additional emphasis on the program.
Every five years 25 nutrient management plans will be written or reviewed managing the estimates provided in Table 7 for pounds/year of nitrogen and phosphorus through the implementation of BMPs		
Every five-years provide technical assistance to 25 agriculture producers with the development, protection, stabilization and/or maintenance of riparian areas or with resource management advice that protects surface water		
Provide estimated reduction of sediment from stabilization/restoration of failing streambank, etc.		
Provide estimated sediment reductions due in part to change in management schemes; rotational grazing, exclusion, etc.		
Provide information on the Agriculture Water Quality Loan Program to 10 agricultural landowners on an annual basis.		

Manage pesticides to protect surface and groundwater.		
Every two-years coordinate pesticide collection to protect surface and ground water in cooperation with WVDA	Red	Although still existing these efforts have been delayed due to turnover and budget restraints. Click-here for groundwater updates.
By 2020 organize a minimum two pesticide collection pickup by in cooperation with WVU Extension and the WVDA.		
Support monitoring programs in priority watersheds impaired by agricultural nonpoint pollutants.		
WVCA staff will assists landowners, watershed associations and partner agencies with stream monitoring activities in priority watersheds as needed.	Green	On-going

Stormwater	Status	Comments
Improve and protect West Virginia’s soil and water resources by reducing the amount of erosion from earthwork sites through education and technical assistance.		
Provide technical assistance and/or information to 2,500 attendees at the WV Construction & Design Exposition over the course of five years through an informational display booth with technicians on hand to answer questions	Green	Estimated numbers are down slightly. The average is > 20 ECPs/yr but it depends on client interest.
Every two-years review and/or provide advice with writing 40 construction erosion and sediment control plans with estimates of soil saved	Yellow	
Provide education and technical assistance on stormwater BMPs.		
From 2015-2020 provide five stormwater workshops or demonstration projects	Green	These goals have been exceeded.
By 2018 present 20 stormwater management workshops across the state	Green	
By 2016 provide technical advice regarding stormwater management quality and/or quantity issues to 20 clients	Green	

Resource Extraction	Status	Comments
If funding allows, the NPS Program will coordinate to the extent possible with DEP’s OAML, OSR, OO&G and WVDOF on future project opportunities in watersheds impaired by resource extraction activities.		
Where projects align with current WBPs, or where TMDLs and other sources of information suggest alternate WBPs could be developed to fully restore smaller impacted watersheds; the NPS Program will partner with local stakeholders, our agency and partner agencies to develop restoration projects.	Yellow	NPS projects continue to receive support from OSM-WCAP; however, AML funds have been limited. The most significant contribution is the investment in the Muddy Creek watershed. Click-Here to learn more.
If funding allows, the NPS Program will partner with DEP’s mining program and the federal OSM to provide support for long-term operation and maintenance of passive and active AMD treatment	Yellow	
Support the WVDOF in their administration of the Logging and Sediment Control Act (LSCA), which reduces the potential impacts to water quality from forestry operations. The NPS Program will work with the WVDOF to support LSCA activities, the objectives listed below as well as other activities that promote the protection of water quality from NPS pollution; however, WVDOF is the primary agency for implementing all forestry management activities.		
Every three-years participate in the Forestry BMP Committee that updates and revises the WVDOF BMP Manual	Yellow	WVDOF layoffs have impacted NPS inspections related to LSCA and other incentives. NPS remains committed and is still a partner. <u>Note</u> : Recent AGO
Increase community/landowner involvement with Urban Forestry Program, Stewardship Incentive Program (SIP) and Forest Incentive Program	Yellow	

Encourage proper forestry management on all forest lands, which will ensure a productive forest and enhance water quality		funding supported a WVU/WVDOF study.
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Chesapeake Bay Program	Status	Comments
WV is a headwater state for the Chesapeake Bay watershed and the NPS Program will support the goals of the CB Agreement by serving on committees, participating in regular meetings and calls and providing input to the future development of the Bay TMDL and models. The NPS Program will also work on specific objectives that support the general goals of the CB Program.		
Implement local TMDL WBPs and CB WIP to reduce nutrients, sediment and fecal coliform to local waters and the Chesapeake Bay		WVDEP staff continue to participate in project teams to implement WBPs and identify CB funding opportunities.
Participate in the development of local TMDLs in Warm Springs Run and Rocky Marsh Run to enhance TMDL/NP coordination by identifying opportunities to incorporate information needed for WBP development		Progress is good, and on-going. Targets have been met to date. Several towns in the region have implemented voluntary ordinances.
Continue to work with local governments to incorporate post construction stormwater requirements in local ordinances		
Continue implementation of agriculture BMPs and WV NPDES CAFO permitting and enforcement consistent with the WIP and WBPs		

WATERSHED REPORTS

This section provides updates on WBP progress. Highlights includes AMD remediation efforts in the North Fork of Greens Run and Lambert Run watersheds, agricultural BMPs targeting bacteria reductions in Milligan Creek, NWQI and other agricultural BMPs to reduce bacteria in Knapp Creek, and an update on Back Creek, our active Watershed Protection Plan (WPP).

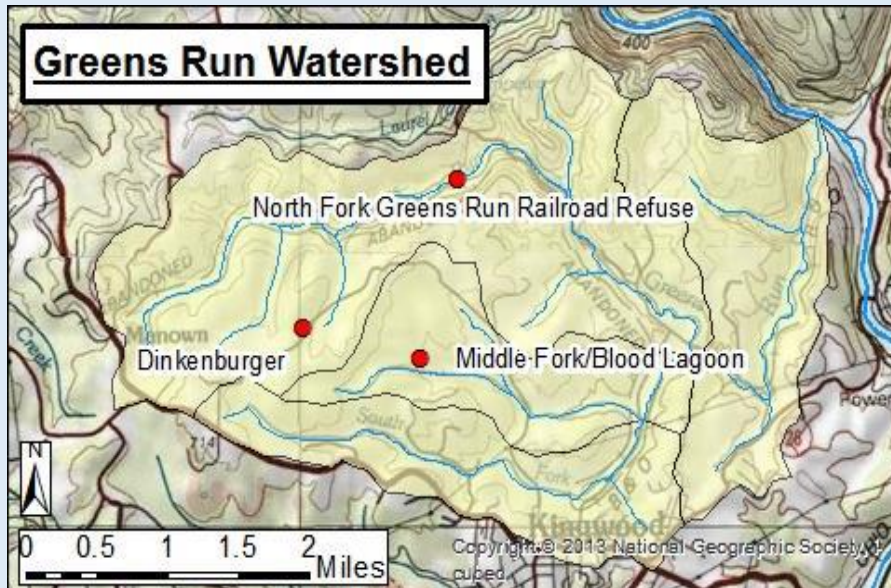
For additional project information search EPAs Grant Records Tracking System (GRTS) [public access portal](#), the NPS project highlight section at the link below; and, look for a future Success Story from the Tuscarora Creek watershed – coming in late summer or early fall 2018.

<https://dep.wv.gov/WWE/Programs/nonptsource/Pages/Projects.aspx>



Watershed description

The Greens Run subwatershed, located in the lower Cheat River watershed, is comprised of three main forks: The North Fork, the Middle Fork, and the South Fork. The South Fork and Middle Fork of Greens Run are severely impacted by AMD. The North Fork is also impaired by AMD. Multiple AMD treatment projects implemented by FOC have improved water quality. A WBP is now being developed for the North Fork (NF). It is expected to be completed by late 2018 early 2019.



Goals

The most recent TMDL for the entire Greens Run watershed lists allowable loads of 8,154 lbs/yr of aluminum and 57,093 lbs/yr of iron. The goal is of the NF Greens Run WBP is to design and construct enough passive treatment systems that will discharge neutral pH water and reduce toxic metal concentrations at or below WQ-standards.

Ultimately the watershed will improve to the point where re-colonization by fish and aquatic invertebrates is possible.

Partnerships

Local landowners are key to the success of FOC's efforts. Much of the problem areas are on private property, which makes access challenging at times. Thus far FOC has been successful, with only minor set-backs, working with and satisfying the needs of landowners. The primary funding resources for most of these projects have been provided by §319 and WCAP, so OSM and WVDEP are important partners and play a role in oversight, as well as technical and financial assistance.

WVDEP's Abandoned Mine Lands (AML) provided funding the earlier years through their stream restoration fund (SRF) program. SRF was monies collected in part through bonds and enforcement activities. This funding source is no longer available. AML also completed land reclamation projects at many sites, thus stabilizing the site making it more suitable for passive treatment projects.

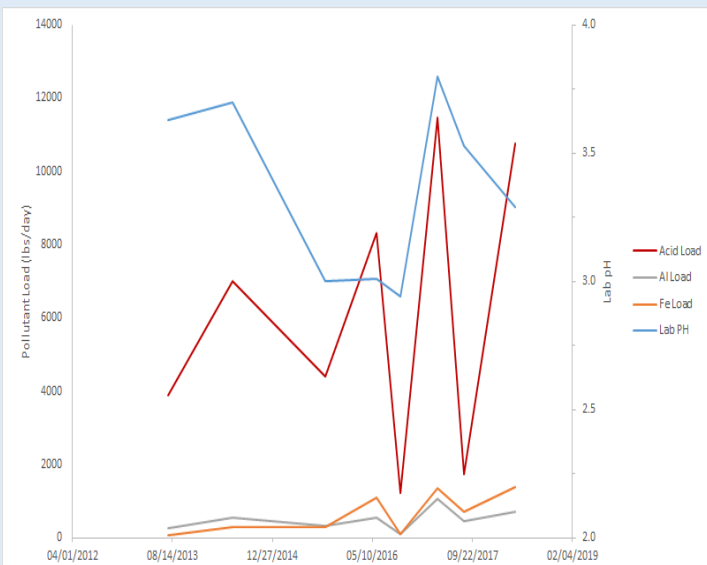
Project highlights

All projects in the watershed were passive and somewhat similar in design with limestone channels, leachbeds and constructed wetlands. The variables were site specific and in many cases the site



lacked adequate space to build large treatment systems. Another hurdle was the limited funding available, thus projects were complete in phases and often the life of the project from start to finish was greater than eight years. The exception was the most recent project. Three projects have been completed in the watershed. Summary construction cost, descriptions and results are provided below.

Blood Lagoon	Dinkenburger	Railroad Refuse
1995 2002 2007	2003 2011	2015
\$250k \$62.8k \$224k	(unknown) \$113.6k	\$271.5k
Very little improvement in pH but metals (Al and Fe) decreased by 11.7 and 15.3% to concentrations of < 1 mg/L.	Very little pH improvements but metals (Al and Fe) were reduced 69 and 96% but average metal concentrations are > 7 mg/L.	pH improved from 3 to > 7. Metals (Al and Fe) decreased nearly 98% and their average concentration is 3 mg/L.



Recent WQ analysis at the mouth of Greens Run continue to show low pH with an increasing trend in metal loadings.

Blood Lagoon: In 1995 anoxic limestone drains (ALDs) were installed to treat AMD at the seep; these clogged in one-year. In 2002 a steel slag pond was added but filled with sludge within five-years. Additional components such as leachbeds and setting ponds were added and the system is operational.

Dinkenburger: FOC added a small dike to improve the portal that AML added during a previous landscape restoration. The portal discharges into a leachbed and limestone channel. A large 2005 storm caused damage and clogged the system, which was improved in 2011. It is performing as expected.

Railroad Refuse: Site was reclaimed by AML in 2003. FOC recently added limestone and oxidation channels, auto-flushing leachbed, settling ponds and a constructed wetland. The system is performing much better than anticipated.

The most recent WQ results (system out) for all three projects are provided below:

Project sites	pH	Acid load lbs/day	Al load lbs/day	Fe load lbs/day
Blood Lagoon WQ: 09/2017	2.7	59.7	4.4	5.8
Dinkenburger WQ: 06/2017	3.0	15.6	1.7	0.43
Railroad Refuse WQ: 06/2018	7.9	-4.3	0	0.01

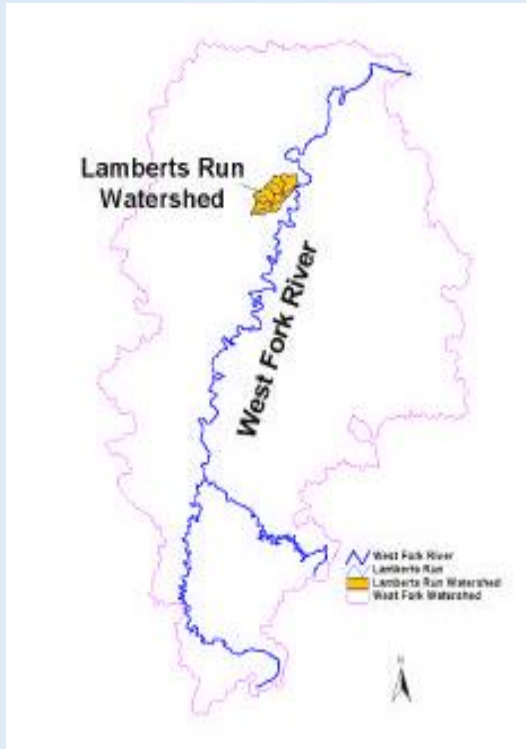
Contacts

David Petry, FOC Restoration Manager
1343 N Preston Highway, Kingwood
Email: david@cheat.org
Martin Christ, Northern BC
WVDEP's WIB-NPS Program
Email: Martin.J.Christ@wv.gov





Watershed description



Lambert Run is a small tributary to the West Fork River north of (downstream from) Clarksburg, WV. It drains an eight square-mile, mostly forested watershed in Harrison County. For decades, its water ran muddy red with iron from abandoned coal mines. In 2004, WVDEP, West Virginia University (WVU), and the GWF prepared a watershed based plan (WBP) for Lambert Run. The WBP identified nine sources of mine drainage and calculated that if the pollution from most of them were eliminated, Lambert Run would look better and would meet water quality standards for iron, aluminum, and manganese.

The WBP was based on the TMDL analysis for the West Fork River from 2002, which broke the Lambert Run watershed into five subwatersheds, and set goals for reducing the pollution loads in each of them.

Goals

The WBP found sources of pollution that far exceeded the amount of pollution that had to be eliminated to make the streams meet standards, except for subwatershed 1901. This SWS is the farthest downstream, and is immediately downstream from SWS 1902, where site #7 adds 70% of the iron pollution for the entire watershed. If there were sources of pollution to be found there, they would become clear once the other sites were addressed.

Partnerships/funding

Projects were funded through CWA's §319 funds through WVDEP's WIB, matched with funds from OSM's WCAP. In some cases, WVDEP paid additional funds. One project was funded as a compensatory mitigation project. A citizens' group, GWF, contributed many hours of labor developing and overseeing each of the projects.

Site	FY	§319	Match	Matching source
3	2004	\$106,654	\$78,489	OSM
5	2004	\$146,334	\$97,614	OSM
8	2004	\$142,024	\$99,159	OSM
9	2004	\$233,043	\$425,703	Mitigation agreement
6	2009	\$149,721	\$100,000	OSM
7	2011	\$384,376	\$256,622	State funds, OSM

Partners for the project included WVU, NMLRC, OSM-WCAP, WVDEP, through its Stream Restoration Program, GWF and a compensatory mitigation agreement with High Tech Corridor Development, LLC.



Project highlights

Sub-watershed (SWS)	1901	Site	1902	Site	1903	Site	1904	Site	1905
Fe reduction needed (lbs/yr)	8,900		1,400		7,300		2,000		2,500
Project loads (lbs/yr)		#7	303,400	#5	17,700	#8	8,440	#1	8,400
				#6	23,000	#9	69,000	#2	8,500
								#3	1,400
Totals			-302,000		-33,400		-75,440		-15,800

Site #4 produces visible acid mine drainage, but its load could not be measured because it often dries out.

The table above provides a snapshot of the iron load reductions. Although it appears reductions are much greater than TMDL allocations, there is still more work to do. Further analysis of the biological response and additional WQ sampling is planned for the near future. Expectations are high because the results from recent measurements throughout the watershed are at or near WQ standards.



Mouth of Lambert Run 2007



Mouth of Lambert Run 2016

Site #7, by far the largest source of pollution, was completed late in 2015. The partners overcame many obstacles to complete the project, including several weeks of heavy rain and inaccurate utility surveys. The project relies on wetland plants to remove iron from the water, and those plants are growing. During the summer, the system has removed up to 95% of the iron it has received. During the dormant season, it has performed less well. If continued plant growth does not improve its winter performance, additional measures will be taken.

Note: The mouth of Lambert Run now runs clear.

Contacts

Martin Christ, Northern BC

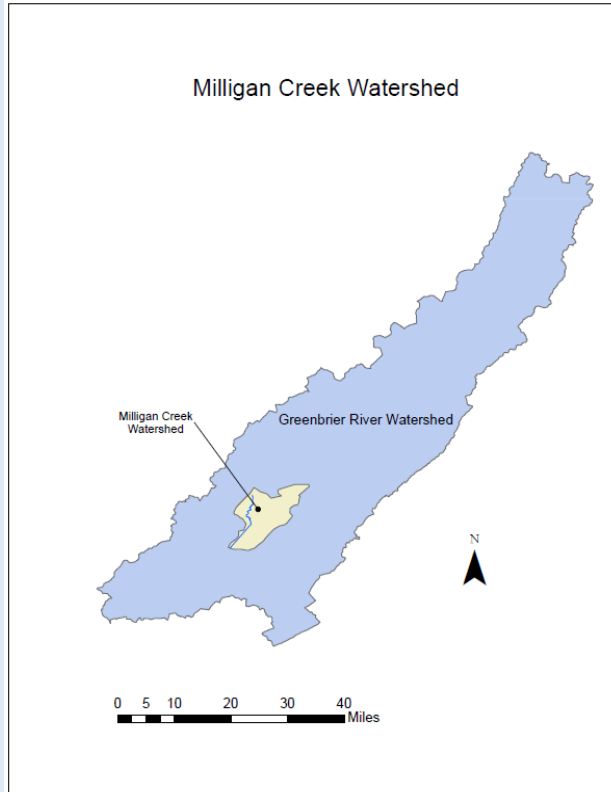
WVDEP’s WIB-NPS Program
2301 Pleasant Valley Rd., Fairmont WV
Email: Martin.J.Christ@wv.gov

The Lambert Run WBP is currently under revision with an expected completion date of fall or winter 2018. For more information contact: Melissa.O'Neal@mail.wvu.edu.





Watershed description



The Milligan Creek Watershed lies within the Greenbrier River Watershed of Greenbrier County, West Virginia. The watershed is 12 miles long with a combination of surface water flow and karst ground water flow throughout the watershed. This area consists mostly of grassland pasture used for livestock production.

Milligan Creek was placed on the 303(d) list in 1996 due to fecal coliform bacteria contamination due to undetermined sources. A TMDL was developed for the creek in 2008, which allocated fecal coliform loads to agricultural land uses, and recommended reductions in fecal coliform loading.

Goals

The goal for the WBP is a reduction in bacteria loads from agriculture by excluding livestock access to streams, installing alternative livestock grazing and watering systems, and protecting riparian areas.

To meet reductions, specific farms will be targeted to exclude livestock from the waterways both directly adjacent to the stream and from karst influences.

Partnerships

WVCA was the local contact and contact manager. The other partners work together to conduct education and outreach and provide technical and financial assistance to the public and landowners in the watershed.

1. Greenbrier Valley Conservation District
2. WVU Extension Service
3. Natural Resources Conservation Service
4. Farm Service Agency
5. U.S. Fish and Wildlife Service
6. Trout Unlimited
7. West Virginia Department of Environmental Protection
8. Greenbrier River Watershed Association

Project highlights

Milligan Creek Watershed Report



Four projects have been completed resulting in BMPs implementation on 15 different farms. Landowners have very been cooperative; neighbors talking to neighbors have been the most effective outreach tool. A summary of the BMP implementation is provided below.

Milligan Creek SWS	BEST MANAGEMENT PRACTICES								Results	
	Pipeline (Ft)	Alt Water	Pumping Plant	Exclusion Fence (Ft)	Division Fence (Ft)	Heavy Use Protection	Nutrient Mgt Plan (Ac)	Grazing Plan (Ac)	AU	Bacteria LRs
2275				6,480					100	8.71E+11
2273	50	1		300			17	17	40	3.48E+11
2272	1,325	1		3,985			96	96	65	5.66E+11
2271	200	2		3,000					65	5.66E+11
2273	300	2		1,000					100	8.71E+11
2272	114				1,889				20	1.74E+11
2272	913	4		307					65	5.66E+11
2275	8,414	12		4,283	17,078				200	1.74E+12
2272	1,007	1		1,340	233				15	1.31E+11
2272	5,467	13	2	5,840					900	7.84E+12
2272	586	1		2,514	3,329		151		120	1.05E+12
2271		1	1	2,847			113	113	61	5.31E+11
2273		5				5	163	163	440	3.83E+12
2273	100	2	2	408	12,696	1	328	328	37	3.22E+11
2273	1,428	6	1	2,818	11,518		205	205	45	3.92E+11
	19,904	51	6	28,642	46,743	6	1,073	922	2,173	1.89E+13

Alt water: Troughs, springs, tanks, ponds and wells



Livestock in a rotational grazing system eyeing up fresh pasture.



Pipeline being installed on grade along Milligan Creek in the Bungers Mill area.

Project cost summary

FY	\$319	Match
2010	33k	22k
2012	123k	82k
2013	53k	33.3k
2014	150k	99.8k
Totals	359k	237.1k

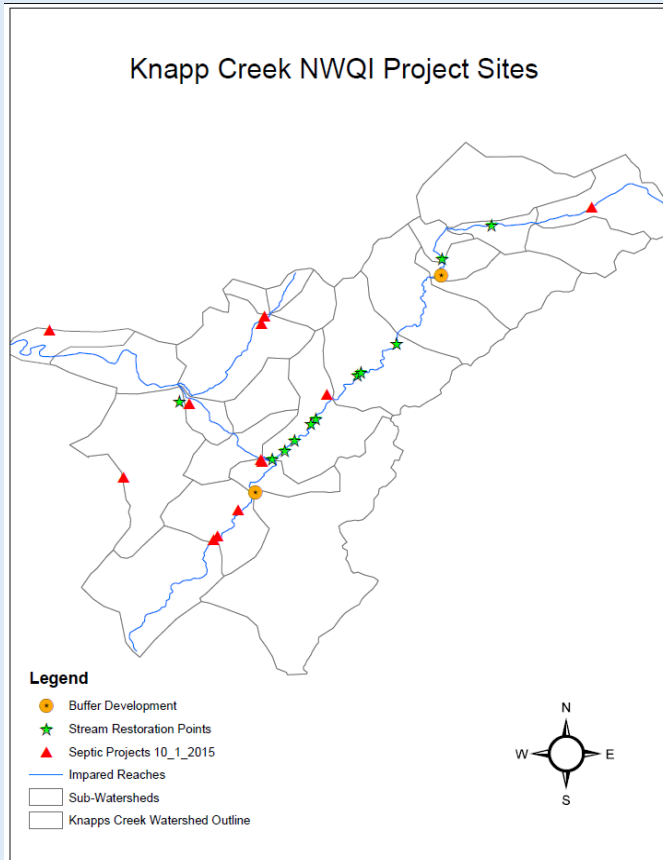
Contacts

Dennis Burns, WVCA Conservation Specialist

Greenbrier Conservation District
 179 Northridge Dr. Lewisburg WV
 681-381-4831
 Email: dburns@wvca.us



Watershed description



The Knapp Creek Watershed lies within the Greenbrier River Watershed of Pocahontas County, West Virginia. The watershed is 26.3 mile long beginning at Marlinton. This area consists mostly of grassland pasture used for beef cattle operations. There is little to no public sewer, requiring most of the homes in the area to utilize private septic systems. In this very rural community, most of the homes are older with less than adequate septic facilities.

Goals

The 2008 Greenbrier River TMDL identified bacteria as the major impairments in the basin. Past evaluations by NRCS and more recently WVCA, identified soil loss from farm lands as a significant nonpoint source contributor.

Partnerships

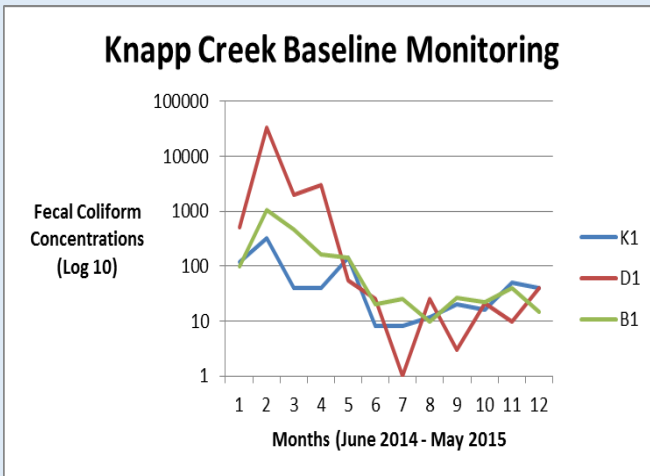
NRCS has been working to improve the area since 1999 after a management plan was

developed in response to flooding and other land use issues. The agency is now more focused partnering with WVDEP, WVCA and landowners to reduce nonpoint sources of pollution. Within the last several years NWQI funding has been important and has resulted in additional projects and has emphasized monitoring to better evaluate impacts. NWQI is no longer an option for this basin; however, work continues being funded with CWA §319, WVCA statewide Agricultural Enhancement programs, and USDA Farm Bill, and US Fish and wildlife Service programs.

Project highlights

Since the WBP approval in 2012, two §319 projects have been completed; prior to the WBP another §319 project focusing on stream restoration projects was completed. Since 2012 WVCA using §319 watershed funds and NRCS NWQI funding have completed restoration and extensive monitoring in the basin. A before and after photo of a natural stream restoration project reach is provided on the next page.

	<u>Units</u>	<u>Types</u>
Projects statistics	25	Septic system repaired/replaced/pumped
	13,042 feet	Restoration w/buffers, tree planting, fencing and crossings
	33 Acres	Buffer establishment



Thus far approximately 3.10E+12 cfu of fecal coliform bacteria and 1,745 tons/year of sediment have been reduced.

Using NWQI, volunteer and WVCA/WVDEP staff focused monitoring efforts were completed throughout the watershed. Monitoring results were inconclusive in some sub-watersheds. While there was no direct evidence that conservation practices are impacting fecal coliform bacteria levels, there is a consistent downward trend in the overall levels in all impaired streams.

Before



After



Contacts

Dennis Burns, WVCA Conservation Specialist

Greenbrier Conservation District
179 Northridge Dr. Lewisburg WV
681-381-4831
Email: dburns@wvca.us

Project cost summary

FY	\$319	Match
2012	100k	66.7k
2013	162.6k	107.3k
Totals	262.6k	174k





Watershed Description



Back Creek Watershed, of the Potomac Direct Drains watershed, flows in Berkeley and Morgan county West Virginia and Frederick County VA. It drains 274 square miles at the confluence with the Potomac River. The watershed is comprised of distinctive, high-quality, cold and warm water streams, and unique shale bedrock outcrop topography.

Back Creek is one of the few watersheds in the Eastern Panhandle that does not have water quality impairments on the WV 303(d) list of impaired waters. The watershed is described by WVDNR as a “High Quality Recreational Stream” for fishing, swimming, canoeing and kayaking. It is unique in its large areas of undeveloped and forested land. Rare, threatened, and endangered species have been documented in ecosystems throughout the WV portion of the watershed.

The WPP developed for Back Creek was approved by EPA in June, 2014.

Goals

To preserve water quality in the Back Creek Watershed through implementation of the Back Creek Watershed Protection Plan. For the

stakeholders to become more familiar with the water quality issues within Back Creek. To enable financial and technical assistance to facilitate improvement strategies and restoration projects.

Partnership efforts

Blue Heron Environmental Network (BHEN) collects data to formally establish Back Creek as a Wild and Scenic River. They have also held Save Our Streams monitoring workshop, various trash cleanups, and quarterly meetings. Cooperative efforts WVCA, in partnership with the Eastern Panhandle Conservation District, WVDNR, WVDOF and WVDEP have helped move our project goals along.

Project highlights

Within the current grant we are working to promote land conservation through conservation easements on priority agricultural parcels, reduce erosion by 0.92 tons of sediment/year through restoration of 915 ft. of eroding streambanks, perform a dirt and gravel roads assessment, conduct water quality monitoring, and promote the protection plan with education and outreach.

Back Creek Watershed Report



There was approximately 1,100 sq. ft. of existing impervious pavement removed, and porous pavers installed at the public access. Articulated concrete block and gravel was purchased and filter fabric was donated by DNR. Filter fabric was laid where the impervious surface had been taken up. Then, 6 inches of state 57 gravel sub-base was laid and measured. The articulated concrete block paver units were then placed on the gravel and gravel was poured to fill the paver units. These porous pavers allow rain water to filter through rather than running off the surface. The pavers better manage stormwater compared to conventional pavement by stopping erosion and reducing sediment and other pollutants from being transported into Back Creek.



To assist with reducing erosion two Sycamore and two Silver Maple trees were planted around the access. To help educate the public, signage has been purchased and will be placed at the access in the Spring.

The following pollution reductions are estimated based on efficiencies assigned to Porous Pavement by the Chesapeake Bay model and baseline loads in Back Creek calculated by TetraTech.

Practice	Size (acres)	Estimated Reductions (lbs/acre)		
		Nitrogen	TSS	Phosphorous
Shanghai Porous Pavers	0.05	0.69	31.07	0.05

Current and future watershed projects will focus on riparian buffer conservation easements and natural stream restoration projects. One project is currently underway (FY16) and another phase (FY18) will begin soon.

Contacts

Suzy Campbell, Chesapeake Bay Program Manager

Andrea Walker, Conservation Specialist

WV Conservation Agency
 23161 Northwestern Pike
 Romney, WV 26757
scampbell@wvca.us
 304-790-6278

WV Conservation Agency
 23161 Northwestern Pike
 Romney, WV 26757
awalker@wvca.us
 304-553-3102



