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GROUNDWATER PROGRAMS AND ACTIVITIES BIENNIAL REPORT TO THE LEGISLATURE 2024

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I. EXECUTIVE SUMMARY

The Groundwater Protection Act, West Virginia Code Chapter 22, Article 12, Section 6.a.3, requires the West Virginia Department of Environmental Protection (WVDEP) to submit a biennial report to the legislature on the status of the state's groundwater and groundwater management program, including detailed reports from each agency that holds groundwater regulatory responsibility. This is the fifthteenth Groundwater Biennial Report to the legislature since the passage of the Act in 1991 and covers the period from July 1, 2021 through June 30, 2023.

The WVDEP Division of Water and Waste Management (DWWM) Groundwater Program is responsible for compiling and editing the information contained in this report. The WVDEP, the West Virginia Department of Agriculture (WVDA), and the West Virginia Department of Health and Human Resources (WVDHHR) all have groundwater regulatory responsibility and have contributed to this report. The boards and standing committees that share the responsibility for developing and/or implementing rules, policies, and procedures for the Groundwater Protection Act are the Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Non-Point Source Coordinating Committee.

The purpose of this report is to provide a concise, yet thorough, overview of the programs charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia and to express the challenges faced, and the goals accomplished as the agencies, programs, and committees work together to protect and restore West Virginia's water resources.

Research regarding specific hydrogeologic information about the state's groundwater, such as regional and local potentiometric surfaces (water levels), groundwater quality, groundwater flow studies, and access to statewide dedicated groundwater monitoring data continues.

The Ambient Groundwater Quality Monitoring Network was established by DWWM in cooperation with the United States Geological Survey (USGS) in 1992 and is an ongoing project. This network provides valuable data critical to the management of West Virginia's groundwater resources. The major objective of the study is the assessment of the ambient groundwater quality of major systems (geologic units) within the state, and the characterization of the individual systems. Characterization of the quality of water from the major systems will help to (1) determine which water quality constituents are

problematic, (2) determine which systems have potential water quality problems, (3) assess the severity of water quality problems in respective systems, and (4) prioritize these concerns. Only by documenting the present ambient groundwater quality of the major systems can regulatory agencies assess where water quality degradation has occurred and where potential degradation is a result of natural processes or human activity.

Topical studies are conducted in the four years between rounds of sentinel well sampling. In topical studies water-quality samples are collected, analyzed, and the results presented in a USGS Scientific Investigation Report. Since 2011 the USGS has collected samples to determine baseline water-quality conditions in Upper Monongahela River Basin, an area of Marcellus Shale gas development. Groundwater samples from 41 wells and baseflow samples from 50 surface-water sites were collected and analyzed for major ions, metals, trace elements, and naturally occurring radioactive materials. The results of these analyses were published in a USGS report *Water quality of groundwater and stream base flow in the Marcellus Shale Gas Field of the Monongahela River Basin, West Virginia, 2011–12* (Chambers and others, 2014, available at: http://dx.doi.org/10.3133/sir20145233).

While many challenges remain, much has been done to provide protection and continued viability of West Virginia's groundwater resources. The WVDEP, WVDA, WVDHHR, and USGS continue to work closely to fulfill the mission of the Department of Environmental Protection, "Promoting a healthy environment".

II. GROUNDWATER PROTECTION and WATERSHED MANAGEMENT

Under the guidance of the United States Environmental Protection Agency (EPA) and the signing of the West Virginia Watershed Management Framework Document (signed in 1997), a new approach to management of the state's groundwater has begun. Total watershed management strives to bring a holistic approach to protecting the waters of the state. The signing of this document by the agencies that chose to participate as partners indicates their understanding that, by collective agreement and cooperation, stakeholders can better achieve the goals of individual water quality programs. WVDEP has chosen to participate as a partner and stakeholder in watershed management in West Virginia.

Agencies having groundwater regulatory authority and responsibility provide repositories for ground and surface water data collected about those facilities under their authority. As stated in this report's executive summary, compilation of the available

groundwater data into a collective database continues as a work in progress, providing a picture of the state's groundwater protection activities and the contributions of the associated programs.

Eventually, all groundwater data that is generated by these activities and facilities will be housed in a central data repository overseen by senior scientists from each agency under the guidance of the WVDEP's Groundwater Coordinating Committee and Information Technology Office. We anticipate that population of the central database will be implemented using a watershed approach.

Each watershed is comprised of smaller divisions called sub-watersheds from which data will be gathered and entered systematically until the larger picture emerges. A map depicting the 32 watersheds and the hydrologic groupings is shown below in Figure 1.

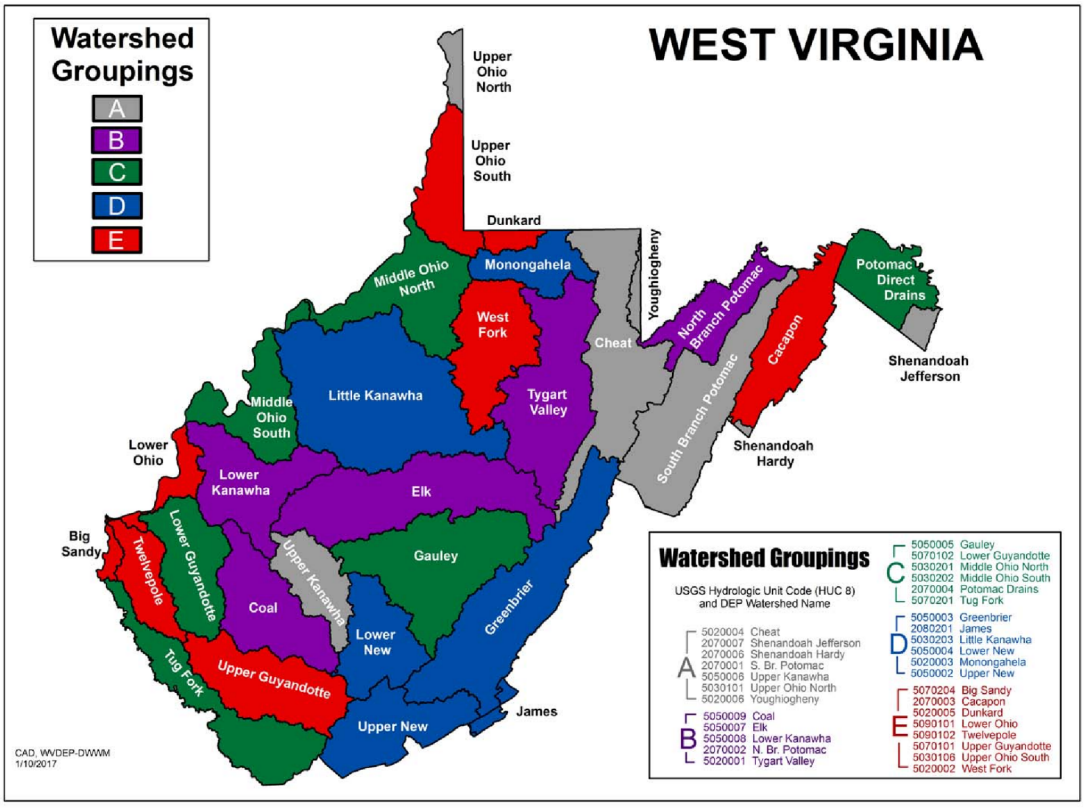


Figure 1. West Virginia Watershed Groupings.

III. BOARDS and COMMITTEES

The following boards and committees are responsible for developing and implementing policies, procedures, and rules to ensure proper application of the Groundwater Protection Act. Included is a summary of their Groundwater Protection Activities reported for the timeframe of this Biennial Report.

West Virginia Environmental Quality Board (EQB)

Appellate Activities

The Environmental Quality Board is authorized by *W. Va. Code* §22-11-21 to hear appeals of agency decisions concerning groundwater protection. The following are administrative appeals which were filed with or addressed by the Board during the last biennial reporting period and include issues arising under provisions of the Groundwater Protection Act:

Kokosing Construction Company, Inc.
Appeal No. 18-16-EQB
Filed: October 30, 2018
Agreed Order: March 20, 2023

Murray American Energy, Inc.
Appeal No. 20-07-EQB
Filed: June 26, 2020
Final Order: September 29, 2021

Lone Wolfe Natural Resource Services, Inc.
Appeal No. 20-12-EQB
Filed: December 1, 2020
Dismissed: November 1, 2021

Union Carbide Corporation
Appeal No. 21-01-EQB
Filed: January 7, 2021
Withdrawn: October 12, 2021

Panhandle Dumpsters, LLC
Appeal No. 21-02-EQB
Filed: February 11, 2021
Agreed Order: November 4, 2021

Review of Civil and Administrative Penalties

W. Va. Code §22-12-10 establishes procedures for review of the assessment of civil administrative penalties. This provision provides for an informal hearing to review the penalty and gives the Board appellate authority for review of the final decision of the agency. There were no appeals filed during the reporting period pursuant to this provision.

Groundwater Monitoring Well Drillers Advisory Board

The Legislative Rule entitled *Monitoring Well Rules*, 47 CSR 59, authorizes the Cabinet Secretary of the WVDEP to establish an advisory board. The duties of the board, as prescribed by the Cabinet Secretary of the WVDEP are to advise staff on the certification of monitoring well drillers, to assist the agency in developing groundwater monitoring well design standards, and to assist the agency in developing policies relating to monitoring well design standards, documentation, testing, and drilling related issues.

IV. WEST VIRGINIA DEPARTMENT OF AGRICULTURE

Regulatory and Environmental Affairs Division
Water Quality Protection

A. Pesticide Regulatory Programs

A pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest. Often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, rodenticides and various other substances used to control pests. Pesticides can cause harm to humans, animals or the environment as they are designed to kill potential disease-causing organisms and control insects, weeds and other pests. This presents a risk-benefit scenario where humans, animals and the environment, including water, are at risk to be adversely affected. Therefore, it is deemed necessary to regulate and control pesticides by their registration, use and application.

The Pesticide Regulatory Programs Unit regulates and controls pesticides through **ARTICLE 16A - WEST VIRGINIA PESTICIDE CONTROL ACT** and the following legislative and procedural rules:

TITLE 61 SERIES 12 - FEE STRUCTURE FOR THE PESTICIDE CONTROL ACT OF 1990

TITLE 61 SERIES 12A - CERTIFIED PESTICIDE APPLICATOR RULES AND REGULATIONS

TITLE 61 SERIES 12B - LICENSING OF PESTICIDE BUSINESSES

TITLE 61 SERIES 12C - WOOD DESTROYING INSECT TREATMENT STANDARDS

TITLE 61 SERIES 12D - AERIAL APPLICATION OF HERBICIDES TO UTILITY RIGHTS-OF-WAY

TITLE 61 SERIES 12E - REGISTRY OF PERSONS WITH HEALTH SENSITIVITY TO PESTICIDE DRIFT

TITLE 61 SERIES 12F - ASSESSMENT OF CIVIL PENALTIES AND PROCEDURES FOR CONSENT AGREEMENT OR NEGOTIATED SETTLEMENT

TITLE 61 SERIES 12G - GENERAL GROUNDWATER PROTECTION FOR PESTICIDES

TITLE 61 SERIES 12H - BULK PESTICIDE OPERATIONAL RULES

TITLE 61 SERIES 12I - NON-BULK PESTICIDE RULES FOR PERMANENT OPERATIONAL AREAS

TITLE 61 SERIES 12J - INTEGRATED PEST MANAGEMENT PROGRAMS IN SCHOOLS AND DAY CARE CENTERS

TITLE 61 SERIES 22 - GENERIC STATE MANAGEMENT PLAN FOR PESTICIDES AND FERTILIZERS IN GROUNDWATER

TITLE 61 SERIES 22A - BEST MANAGEMENT PRACTICES AT TEMPORARY OPERATIONAL AREAS FOR NON-BULK PESTICIDE MIXING AND LOADING LOCATIONS

CHAPTER 22 ARTICLE 12. GROUNDWATER PROTECTION ACT

In addition to enforcing the above regulations, the Pesticide Regulatory Programs works with the United States Environmental Protection Agency (USEPA) Office of Pesticide Programs (OPP) and the Office of Enforcement and Compliance Assurance (OECA) through a cooperative agreement to enforce the Federal Insecticide Fungicide and Rodenticide Act (FIFRA). As outlined in guidance and written in the agreement, the Pesticide Regulatory Programs works with EPA Region 3 to establish priorities for the protection of water resources from pesticides. This program is known as the Pesticides in Water Program. Currently the position that oversees this program is vacant.

The goal of West Virginia Department of Agriculture's (WVDA) Pesticides in Water Program is to ensure pesticides do not adversely affect the nation's water resources. The Pesticides Regulatory Programs utilizes a three-tier approach to manage pesticides in water:

1. Evaluate Pesticides of Interest over time to identify pesticides of concern.
2. Take actions (actively manage beyond the pesticide label) to reduce or prevent contamination from pesticides of concern over time.
3. Demonstrate the progress of the management strategy in reducing or maintaining concentrations below reference points.

Tier 1 Pesticides of Interest: Pesticides of interest are those pesticides that have been identified by State Regulatory Agencies for pesticide enforcement through a National survey conducted by the States FIFRA Issues Research and Evaluation Group (SFIREG) in 2005 (Pesticides Regulatory Programs Appendix 1). Other pesticides of interest could be added if they cause water quality impairments under the Clean Water Act §303(d) as listed or become an interest of the WVDA.

Pesticides of interest are those pesticides that have the potential to occur in ground or surface water at concentrations approaching or exceeding a human health or ecological reference point. It may be based on a Maximum Contaminant Level (MCL), drinking water health advisory, surface or groundwater quality standard (which can address human or aquatic life toxicity), EPA reference dose, EPA drinking water level of concern, or another benchmark adopted by regulation or policy. A pesticide of interest could be an active ingredient alone or the active ingredient collectively with degradates of toxicological concern.

Monitoring our States surface and groundwater for pesticide residues is the best measure to determine when an active ingredient(s) should be moved to **Tier 2**.

Tier 2 Pesticides of Concern: Pesticides that are identified as a concern from Step 1 must be managed. A pesticide is actively “managed” when activities are carried out to prevent or reduce contamination of water by a particular active ingredient so that it is prevented from reaching a specific reference point as mentioned above.

The herbicide Atrazine is an example of a Tier 2 pesticide. Atrazine’s widespread use on corn and high solubility in water chemistry led to detections nationwide of the parent compound and its breakdown products (also known as degradants) in both surface and groundwater.

WVDA relies heavily on public outreach and user education to manage pesticides of concern. The pesticide applicator certification process continuously addresses concerns of pesticides in water. This includes study material supplied for written examinations as well as initial certification training sessions. All commercial applicators using general or restricted use pesticides and all private applicators must maintain certification by attending recertification training sessions. Recertification training sessions are another opportunity to manage pesticides of concern.

Routine agricultural use inspections by Pesticide Regulatory Officers address existing water quality-related label restrictions and State regulations. Adherence to label specified setbacks from surface water and field drainage sites is emphasized. Under the

existing enforcement process first time violators are notified by letter. Additional violations can result in monetary fines or license revocation.

WVDA works very closely with the West Virginia Conservation Agency in the promotion of and adoption of voluntary Best Management Practices (BMP) shown to reduce impacts by pesticides. Examples include riparian buffer zones, filter strips and no till cultivation.

Tier 3 Demonstration of Progress: After a pesticide has advanced through the first two tiers, progress toward reductions in concentrations below a previously exceeded reference point should be demonstrated in Tier 3. At this stage the steps taken to manage a pesticide of concern to keep or return pesticide concentrations in water to below a reference point should be outlined or the certification if widespread adoption of control measures should be demonstrated. Progress toward reduction of maintenance of concentrations below the reference point could be demonstrated by:

- Targeted monitoring of water samples from vulnerable use areas that determines that mitigation measures are preventing residue levels from approaching or exceeded a reference point.
- Downward trends in concentration levels established by monitoring data in geographic areas where the pesticide of concern is being used (data from WVDA, USGS, USDA, registrant or other sources).
- The results of targeted surveys or inspections that document the wide adoption of voluntary or regulatory measures which have been proven via research to protect water quality.
- While monitoring is not required under Tier 3 it is the most representative method of showing a decrease in a particular pesticide's occurrence in water. WVDA has historically referenced studies from allied agencies such as the United States Geological Service. In addition, WVDA closely observes the data provided by the West Virginia Department of Environmental Protection's Ambient Water Quality Monitoring (AWQM) Network.
- Cancellation of a pesticide's use in the state would be the most severe action taken under Tier 3. Historically, Tier 3 actions have involved the re-classification of a general use pesticide (as classified by the USEPA) to a State restricted use pesticide (RUP). Use of State RUPs require that applicators become certified under state licensing programs before the product can be purchased for use. Other conditions could be placed on the restricted use license such as product specific training program completion prior to renewal of license.
- WVDA is confident that the uniformity of the development of its environmental programs, the continued interagency cooperation, and the reliance on successfully demonstrated management practices will facilitate the accountability tier of the management program.

Pesticides in Water Program – Reporting Requirements

Activities related to the Pesticides in Water Program are reported under the web-based Pesticides of Interest Tracking System (POINTS). POINTS is a national reporting funded by USEPA and can be found at http://points.wsu.edu. WVDA updates the system as analytes of interest or concern are revised or managed.

From the POINTS system data, USEPA on a national level expects to be able to:

- Determine how pesticides of interest were evaluated.
- Identify pesticides of concern (pesticides that approach or exceed reference points).
- Identify pesticides of concern that are being actively managed, and which may need more effective management at the national level (e.g., label changes, special studies).
- Identify pesticides for which national water quality standards, aquatic life criteria, or other national regulatory standards or reference points are needed.
- Demonstrate that state and tribal water quality management programs are effective at reducing pesticide risks to water quality locally.
- Identify states in which the FIFRA lead agency is using its resources to address pesticide impaired waters under CWA §303(d).

Other activities that advance the goal of developing and carrying out programs to protect water resources from pesticide risks:

Plastic Pesticide Container Recycling Program

More than 78,000 lbs. of plastic pesticide containers have been collected for recycling over that last eight growing seasons, including 12,450 lbs. in 2021 and 2022. WVDA maintains pesticide collection container facilities in Berkeley, Greenbrier, Hardy, Kanawha, Lewis, Jefferson, Mason, Ohio and Raleigh Counties. Sea containers are utilized to store the plastic containers for recycling. As this program continues to grow, we hope to offer more pesticide collection facilities in areas where there is heavy pesticide usage. This program requires containers to be triple or pressure rinsed to be accepted for recycling. This reduces the number of plastic pesticide containers that may enter the waste stream containing pesticide residues, therefore protecting groundwater sources. Containers are shredded and remanufactured into shipping pallets, drainage tile, composite lumber or other low contact non-food grade plastic items.

Properly rinsed pesticide containers are stored in sea

Pesticide Waste Disposal Program

The ongoing collection and annual disposal of waste and unwanted pesticides is another program aimed at reducing the potential of pesticides to reach water. The program specialist fields phone calls and emails to pick up waste and unwanted pesticides from private pesticide applicators and homeowners. In addition to individual pickups, WVDA also coordinates with county solid waste authorities to hold pesticide drop off events around the state. There have been 7 collections between July of 2022 and June of 2023 in Monongahela, Berkeley, Hampshire, Kanawha and Raleigh Counties. A total of 6,194 lbs. of waste pesticides were collected.

Waste pesticides collected for disposal.

Bulk Pesticides Storage Facilities

Bulk pesticides storage facilities are inspected annually. In addition, the secondary containment having an adequate capacity to capture a catastrophic spill the Bulk Operational Rules (§61-12H) require that pumps, transfer lines and other appendages be inspected and maintained in good operational condition and a written emergency and discharge response plan be in place. Appropriate enforcement action is taken when facilities are found to be non-compliant.

Secondary containment at a bulk facility.

Pesticides Regulatory Programs Appendix 1

State List of Pesticides of Water Quality Concern

Includes chemicals of concern for both ground and surface water
Source: State Survey for Water Resource Monitoring Programs and Analytical Parameters
October 2005 – Conducted by the SFIREG Environmental Quality Issues Working Committee

2,4-D	Lambda-cyhalothrin
Acetochlor (+ ESA, OXA)	Lindane (canceled)
Alachlor (+ESA)	Malathion
Aldicarb (+degradates)	Mesotrione
Atrazine (+ DEA, DIA, DACT, Hydroxy)	Metalaxyl
Azinphos-methyl (canceled)	Metolachlor (+ ESA, OXA, SMetolachlor)
Bentazon	Metribuzin (+ DA, DADK, DK)
Bromacil	Metsulfuron Methyl
Carbaryl	MSMA + other arsenical herbicides
Carbofuran (canceled)	Napropamide
Chrlorothalonil	Norflurazone (+ degradates)
Chlorpyrifos (+ TCP)	Pendimethalin
Clopyralid	Phenoxy herbicide group
Copper Pesticides	Phosmet
Dacthal (+degradates)	Picloram
DBCP	Prometon
Diazinon	Prometryn
Dicamba	Propazine
Dimethenamid	Propiconazole
Diuron	Simazine (+ DACT, DIA)
Endosulfan (canceled)	Sulfometuron (et. al.)
Esfenvalerate	Tebuthiuron
Ethoprop	Terbacil
Glyphosate (+ AMPA)	Thiamethoxam
Hexazinone (+ Metabolite B)	Tralkoxydim
Imazamethabenz	Triallate
Imazapyr	Triclopyr
Imidacloprid	Trifluralin
Isoxaflutole	

B. West Virginia Conservation Agency

The West Virginia Conservation Agency (WVCA) focuses its resource conservation efforts on the maintenance and/or improvement of water quality relative to natural resource use with a primary focus on agriculture and construction activities. The main concern is for surface water quality but activities impacting groundwater resources are addressed through conservation programs that implement Best Management Practices (BMPs), provide technical support, and involve educational outreach to the citizens throughout the state. The goal is to inspire and empower the people of West Virginia to value and work for clean water.

The WVCA continues its “Conservation Partnerships” with state, federal and local agencies as well as the private sector and many non-profit organizations. This cooperative approach provides benefits such as funding for projects, technical expertise and enables citizen input assisting our agency to pinpoint and target specific problems in specific areas. “Conservation Partnerships” continue to be an effective way to address West Virginia’s concerns and provide the resources vital in the solutions and/or prevention of water quality degradation issues.

Our state has a diversity of terrain and geology that challenges natural resource conservationists with a multitude of issues that must be confronted by methods that are both effective and sensitive to the specific location and individuals affected.

The WVCA undertook the following activities which either directly or indirectly protect West Virginia’s groundwater resources during the reporting period of July 1, 2021, through June 30, 2023.

AGRICULTURAL ACTIVITIES

Cost-share programs have been a significant contributor to encourage landowners to develop conservation practices on their property.

- Conservation Reserve Enhancement Program (CREP) Reporting is completed each federal fiscal year; October 1-September 30.
    - FY21 (October 1, 2020 – September 30, 2021)
        - 318.5 acres entered into contract
    - FY22 (October 1, 2021 – September 30, 2022)
        - 27.06 acres entered into contract

NUTRIENT MANAGEMENT PLANS

A nutrient management plan is a written site-specific plan which describes how the major plant nutrients (nitrogen, phosphorus, and potassium) are to be managed annually. The goal of nutrient management planning is to minimize adverse environmental effects, primarily upon water quality, and avoid unnecessary nutrient applications above the point where long run net farm financial returns are optimized.

The plan will address the most critical farm nutrient problems through measures to manage fertilizers and animal manures to reduce runoff, erosion, and nutrient loss.

FY	WV Certified Nutrient Management Plan total acres	Cropland Acres	Hay land Acres	Pasture Acres
FY21	456.07	17.8	317.27	121
FY22	1,348.42	69.54	402.02	886.86
TOTAL	***1,804.49***	***87.34***	***719.29***	***1,007.86***

AGRICULTURAL ENHANCEMENT PROGRAM (AgEP)

West Virginia Agricultural Enhancement Program's (AgEP) mission is to assist the agriculture cooperators of West Virginia Conservation Districts with the voluntary implementation of best management practices (BMPs) on agricultural lands to conserve and improve land and water quality. The program offers technical and financial assistance as an incentive to implement suggested BMPs.

Practices Completed in FY22		Practices Completed in FY 23	
Practice	**Unit Totals**	**Practice**	**Unit Totals**
Cover Crop	14 Acres	**Cover Crop**	19 Acres
Exclusion Fencing	44,178 Feet	**Exclusion Fence**	47,074 Feet
Exclusion Fence/Watering System Combo	2,400 Feet / 1 System	**Exclusion Fence/Watering System Combo**	10,636 Feet / 4 Systems
Frost Seeding	2,637 Acres	**Frost Seeding**	2,206 Acres
Heavy Use Protection Area	124,241 Sq. Feet	**Heavy Use Protection Area**	93,873 Sq. Feet
Invasive Species Management*	474 Acres	**Invasive Species Management***	391 Acres
Lime	13,819 Tons/6,507 Acres	**Lime**	12,813 Tons/6,202 Acres
Nutrient Management	1,337 Acres	**Nutrient Management**	1,610 Acres
Pasture Division Fence	77,048 Feet	**Pasture Division Fence**	51,379 Feet
Pasture Seeding	1,214 Acres	**Pasture Fence/Watering System Combo**	11,890 Feet/13 Systems
Pollinations	26 Applications	**Pasture Seeding**	607 Acres
Pond Cleanout	7 Clean Outs	**Pollinations**	51 Applications
Roof Runoff Mgmt.	2 Applications	**Pond Clean Out**	4 Applications
Urban Agriculture	55 Applications	**Roof Runoff Management**	8 Applications
Warm Season Annual Seeding	54 Acres	**Urban Agriculture**	71 Applications

Watering System	66 components/systems	**Warm Season Annual Seeding**	14 Acres
Winter Grazing	1 Application	**Water System**	46 components/systems
**ISM acres include brush acres.*		**Winter Grazing**	73 Acres
		**ISM acres include brush acres.*	

EDUCATIONAL ACTIVITIES SPECIFIC TO GROUNDWATER

The West Virginia Soil Tunnel Trailer, serving as a mobile learning unit, plays an essential role in promoting awareness of groundwater and addressing related issues faced in West Virginia. In FY23, the program successfully engaged 14,300 individuals through in-person sessions, collaborating with 14 conservation districts to deliver presentations at schools, fairs, and festivals, with a primary focus on promoting soil and water conservation. By educating and empowering the youth through this program, this education program lays the foundation for a future generation that is well-informed and proactive in groundwater conservation, combating pollution-related challenges effectively. Utilizing a hands-on approach, the program effectively enhances participants' understanding of sustainable practices and environmental conservation, ultimately fostering environmental awareness throughout West Virginia.

Through its mobile capabilities, the Soil Tunnel Trailer brings significant benefits to students in socioeconomically challenged regions, ensuring access to museum-quality, hands-on learning experiences within their own communities. Overcoming travel and resource barriers, the trailer provides valuable educational opportunities in diverse fields like science, technology, agriculture, and environmental conservation. In FY23, work commenced on a larger second Soil Tunnel Trailer unit, which is scheduled for completion in FY24. This expansion is projected to more than double our outreach throughout West Virginia, extending the program's educational impact to a broader audience across the state.

The WVCA education and outreach program, with and without the Soil Tunnel Trailer, conducted visits to numerous educational and community events between July 2021 and July 2023. The Soil Tunnel Trailer was presented at over 40 elementary schools, 13 agriculture-related fairs, three farmers markets, and 17 community events. As presenters, the Education and Outreach staff represented WVCA at various conferences, including the WV Small Farms Conference in 2023, WV Urban Agriculture Conference in 2021, WV Women in Agriculture Conference in 2021 and 2022, The Southeast Agriculture Commissioners Annual Meeting in 2022, and The National Association of Conservation Districts Annual Meeting in 2022 and 2023.

In-person presentations were provided at various youth events, including Jr. Patriot Guardens military youth programs, two middle school career exploration days, and four elementary school career exploration days. Moreover, they presented to six summer academy programs, five 4H camps, 4 STEM festivals, and three college campus events focusing on career exploration. Additionally, the program attended four summer park events in MS4 designated cities, DEP Earth Day event, seven state park youth day events, and four water festivals, further emphasizing their dedication to fostering environmental awareness and educational outreach throughout West Virginia.

As we attend events, we recognize the significance of photos for this type of reporting and program documentation. However, the primary focus of events attended by the Education and Outreach staff is on youth, and it is our priority to ensure the safety and privacy of all attendees. West Virginia is home to approximately 6,161 children in foster care. When we attend events, we are often providing services to these children. We do not know which children are in care or not, so we maintain this practice

of not taking photos at both public and private events. This policy is aimed at safeguarding the well-being and security of the children present, respecting their privacy and that of their families, and fostering a comfortable and secure environment during the outreach programs. By adhering to this practice, the West Virginia Conservation Agency (WVCA) demonstrates its commitment to creating a safe and respectful atmosphere for all participants in the events.

Top Left to right: (L) WVCA staff, along with Bigfoot, prepare for approximately 5,000 attendees at the West Virginia Winter Blues Farmers Market in Charleston, WV. (R) Mrs. Jens Kindergarten class enjoy the book “Tops and Bottoms” with Education and Outreach Specialist Aimee Figgatt. Photo provided by Milton Elementary School and used with permission.

Bottom Left to Right: (L) 15-Year-old Sophie Slack assisted in the soil tunnel trailer build by helping the fabricators learn how far a student could reach on the wall when utilizing a mobility device. Photo courtesy of the Slack Family and used with permission. (M) Mrs. Aimee, Education and Outreach Specialist, pretending to be an aquatic creature along with students from the West Virginia Schools for the Deaf and The Blind who are hiding from birds who are looking for a meal. (R) Cinderella and Prince Charming are headed to the ball but stopped to learn more about the ecosystem under their feet at the West Virginia Small Farms Conference.

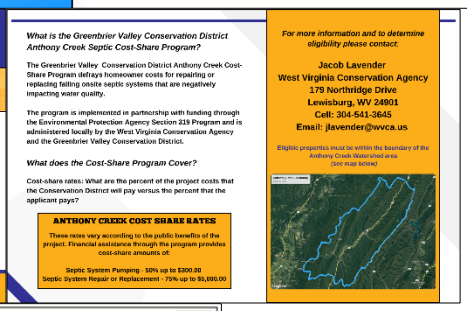
Communication and Outreach Specialists at the WVCA played a pivotal role in supporting the Groundwater Program. They were instrumental in creating various marketing materials, such as social media posts, step-in signs, pamphlets, brochures, flyers, newsletter articles, educational materials, and mailings, utilizing their skills in graphic arts and marketing. Working closely with conservation specialists administering the Groundwater Program through the state's conservation districts, the outreach specialists effectively communicated and disseminated crucial information about groundwater conservation and sustainable practices to a diverse audience across West Virginia. Their efforts significantly contributed to the success and expansion of the Groundwater Program's outreach and educational initiatives during FY23.

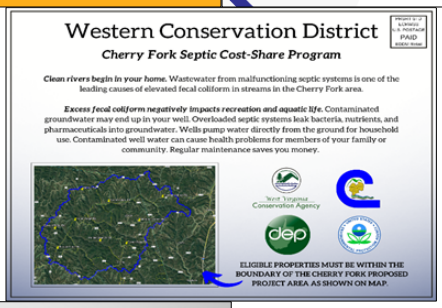

LET'S MAKE ONE THING
PERFECTLY CLEAR.
WATER
WEST VIRGINIA
ASSOCIATION OF RC&D COUNCILS


GREENBRIER VALLEY
CONSERVATION DISTRICT
Clean Water
Farm

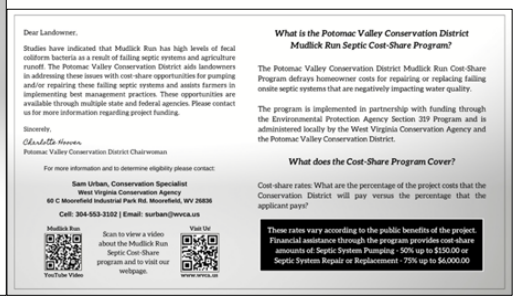

CARING FOR YOUR SEPTIC SYSTEM
A healthy river begins in your home
Clean rivers begin in your home. Wastewater from malfunctioning septic systems is one of the leading causes of elevated fecal coliform in streams in the Meadow River and Mill Creek area.
Excess fecal coliform negatively impacts recreation and aquatic life. Contaminated groundwater may end up in your well. Overloaded septic systems leak bacteria, nutrients, and pharmaceuticals into groundwater. Wells pump water directly from the ground for household use. Contaminated well water can cause health problems for members of your family or community. Regular maintenance saves you money.
West Virginia Conservation Agency


Learn more about the Anthony Creek Watershed
SEPTIC SYSTEM ASSITANCE PROGRAM
A cost-share program from Greenbrier Valley Conservation District
PRSRT STD
ECRWSS
U.S. POSTAGE
PAID
ECDM Retail
ANNOUNCING A NEW SEPTIC
SYSTEM ASSITANCE PROGRAM
The Greenbrier Valley Conservation District serves residents of Greenbrier, Monroe, and Pocahontas Counties. The district utilizes public grant funds to assist property owners within the Anthony Creek Watershed boundary with the operation and maintenance of septic systems located on their property.
Helping you protect your health and safety: Septic system failure results in serious personal health, and financial or environmental risks. By addressing septic system issues with cost-share opportunities for pumping and/or repairing these failing septic systems you can extend the life of, or replace, your aging septic system.
Studies have indicated that Anthony Creek has high levels of fecal coliform bacteria as a result of failing septic systems and agriculture runoff. Source: WVDEP


What is the Greenbrier Valley Conservation District Anthony Creek Septic Cost-Share Program?
The Greenbrier Valley Conservation District Anthony Creek Cost-Share Program defrays homeowner costs for repairing or replacing failing onsite septic systems that are negatively impacting water quality.
The program is implemented in partnership with funding through the Environmental Protection Agency Section 319 Program and is administered locally by the West Virginia Conservation Agency and the Greenbrier Valley Conservation District.
What does the Cost-Share Program Cover?
Cost-share rates: What are the percent of the project costs that the Conservation District will pay versus the percent that the applicant pays?
ANTHONY CREEK COST SHARE RATES
These rates vary according to the public benefits of the project. Financial assistance through the program provides cost-share amounts of:
Septic System Pumping - 50% up to $300.00
Septic System Repair or Replacement - 75% up to $5,000.00
For more information and to determine eligibility please contact:
Jacob Lavender
West Virginia Conservation Agency
179 Northridge Drive
Lewisburg, WV 24901
Cell: 304-541-3645
Email: jlavender@wvca.us
Eligible properties must be within the boundary of the Anthony Creek Watershed area (see map below)

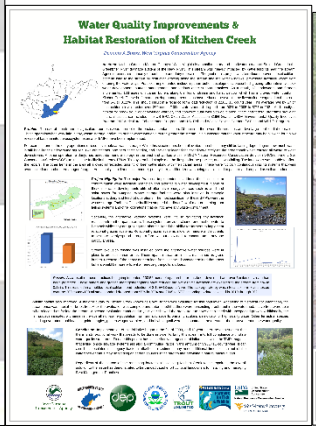

Western Conservation District
Cherry Fork Septic Cost-Share Program
Clean rivers begin in your home. Wastewater from malfunctioning septic systems is one of the leading causes of elevated fecal coliform in streams in the Cherry Fork area.
Excess fecal coliform negatively impacts recreation and aquatic life. Contaminated groundwater may end up in your well. Overloaded septic systems leak bacteria, nutrients, and pharmaceuticals into groundwater. Wells pump water directly from the ground for household use. Contaminated well water can cause health problems for members of your family or community. Regular maintenance saves you money.
ELIGIBLE PROPERTIES MUST BE WITHIN THE BOUNDARY OF THE CHERRY FORK PROPOSED PROJECT AREA AS SHOWN ON MAP

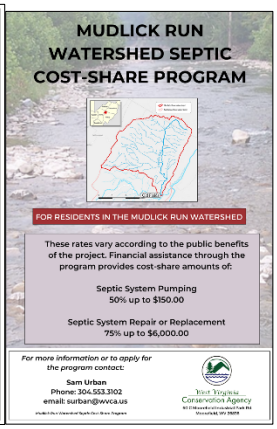

CARING FOR YOUR SEPTIC SYSTEM
A HEALTHY WATERSHED BEGINS IN YOUR HOME
PRSRT STD
ECRWSS
U.S. POSTAGE
PAID
ECDM Retail
Clean rivers begin in your home. Wastewater from malfunctioning septic systems is one of the leading causes of elevated fecal coliform in streams in the Mudlick Run area.
Excess fecal coliform negatively impacts recreation and aquatic life. Contaminated groundwater may end up in your well. Overloaded septic systems leak bacteria, nutrients, and pharmaceuticals into groundwater. Wells pump water directly from the ground for household use. Contaminated well water can cause health problems for members of your family or community. Regular maintenance saves you money.
Eligible properties must be within the boundary of the Mudlick Run Proposed Project Area
West Virginia Conservation Agency


Dear Landowner,
Studies have indicated that Mudlick Run has high levels of fecal coliform bacteria as a result of failing septic systems and agriculture runoff. The Potomac Valley Conservation District aids landowners in addressing these issues with cost-share opportunities for pumping and/or repairing these failing septic systems and assists farmers in implementing best management practices. These opportunities are available through multiple state and federal agencies. Please contact us for more information regarding project funding.
Sincerely,
Charlotte Hoover
Potomac Valley Conservation District Chairwoman
For more information and to determine eligibility please contact:
Sam Urban, Conservation Specialist
West Virginia Conservation Agency
60 C Moorefield Industrial Park Rd. Moorefield, WV 26836
Cell: 304-553-3102 | Email: surban@wvca.us
Mudlick Run YouTube Video
Scan to view a video about the Mudlick Run Septic Cost-Share program and to visit our webpage.
Visit Us
What is the Potomac Valley Conservation District Mudlick Run Septic Cost-Share Program?
The Potomac Valley Conservation District Mudlick Run Cost-Share Program defrays homeowner costs for repairing or replacing failing onsite septic systems that are negatively impacting water quality.
The program is implemented in partnership with funding through the Environmental Protection Agency Section 319 Program and is administered locally by the West Virginia Conservation Agency and the Potomac Valley Conservation District.
What does the Cost-Share Program Cover?
Cost-share rates: What are the percentage of the project costs that the Conservation District will pay versus the percentage that the applicant pays?
These rates vary according to the public benefits of the project. Financial assistance through the program provides cost-share amounts of: Septic System Pumping - 50% up to $150.00 or Septic System Repair or Replacement - 75% up to $6,000.00


Make a Difference
Conservation starts at home
How can local conservation districts help?


TIPS TO HEALTHY GROWING
Plant a seed, save your soil.
CONSERVE WATER
BOOST YOUR NUTRIENTS
COMPOSTING IS GOOD FOR YOU, AND THE ENVIRONMENT!
BEST MANAGEMENT PRACTICES
AVOID IMPROPER USE OF CHEMICALS
CONTROL SOIL EROSION
LESS DISTURBANCE, MORE BENEFITS
West Virginia Conservation Agency


Water Quality Improvements &
Habitat Restoration of Kitchen Creek


MUDLICK RUN
WATERSHED SEPTIC
COST-SHARE PROGRAM
FOR RESIDENTS IN THE MUDLICK RUN WATERSHED
These rates vary according to the public benefits of the project. Financial assistance through the program provides cost-share amounts of:
Septic System Pumping
50% up to $150.00
Septic System Repair or Replacement
75% up to $6,000.00
For more information or to apply for the program contact:
Sam Urban
Phone: 304.553.3102
email: surban@wvca.us
West Virginia Conservation Agency

Let's talk about...

Conservation MATTERS

The West Virginia Conservation Agency and the state's 14 Conservation Districts seek your support during the 2022 legislative session. You can help by:

- Supporting the Governor's proposed $11,228,779.00 budget for WVCA and district operations in Fiscal Year 2023.
- Supporting the WVCA's request for an additional $2.5 million to address stream mitigation and agricultural program expansion.
- Supporting revisions to West Virginia Code §19-21A, the state's Conservation District law. The legislation makes several changes to ensure the important work of the state's 14 conservation districts continues as conservation nears its 100th anniversary.

West Virginia's Conservation Community is asking for your support because Conservation is working across the state by:

- Supporting and expanding the tax base by helping the agricultural community implement best management practices that help improve their bottom line.

- Protecting people and property by maintaining West Virginia's small watershed flood-control dams and channels that provide benefits to nearly 60 percent of the state's residents.

- Working with cities, counties, and the state's 14 conservation districts to address watershed and natural resource concerns at the local level.

- Involving thousands of West Virginians who work to make their homes, communities and state a better place to live!

Conservation Matters because Conservation Works!

West Virginia Conservation Agency

www.wvca.us | info@wvca.us

Capitol Conservation District

Serving Kanawha County

Our Horse Environmental Awareness Program is a Section 319 program that keeps horse manure from polluting streams in our district.

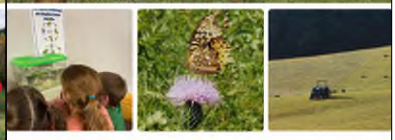
Protecting people and property with small watershed flood control dams in the Elk Twomile Creek watershed, and advocating for operations and maintenance funding.

Conservation education is a key part of our mission. We teach students, have led the effort to build community gardens in Kanawha County, and are on the cutting edge when it comes to promoting new conservation in WV. We also won a statewide award in '21 for our communication efforts.

A combined $61,794 spent on agricultural enhancement by the district and cooperators in FY 21, for urban agriculture, lime, pond cleanout, heavy use area protection, pollination and more. CCD has led the way in urban agriculture cost-share assistance.

Please contact our district for more information about our available programs.

Capitol Conservation District
418 Goff Mountain Road Suite 102
Cross Lanes, WV 25313
Phone: (304) 759-0736
Email: CCD@wvca.us
https://www.wvca.us/district/ccd.cfm



Elk Conservation District

Serving Braxton, Clay, Nicholas and Webster counties

Protecting people and property with small watershed flood control dams in the Saltlick Creek watershed, and advocating for operations and maintenance funding.

A combined $154,949 spent on agricultural enhancement by the district and cooperators in FY 21, for lime, pasture division fence, nutrient management, exclusion fence, cover crop and more.

To promote conservation education, we participate in the West Virginia Envirothon competition, offer our "Watch Me Grow" tadpole to frog program for elementary school students, partner with Birch River Elementary on their high tunnel for students, and have made improvements to the Nature Trail at Braxton County Middle, and much more.

In our heavily forested district, we value our partnerships with public agencies and private entities, such as the WV Division of Forestry and the local timber industry.

Please Contact Our District for more information about our available programs.

Elk Conservation District
740 Airport Road
Sutton, WV 26601
Phone: (304) 765-2815 | Fax: (304) 765-9635
Email: ECD@wvca.us
https://www.wvca.us/district/ecd.cfm

Eastern Panhandle Conservation District

Serving Berkeley, Jefferson, and Morgan counties

A combined $147,152 spent through the *Agricultural Enhancement Program* by the district and cooperators in FY 21, for Lime, Pasture Seeding, Frost Seeding and more.

- Watershed projects in the Eastern Panhandle are funded through a combination of federal and state funds. Federal funds come from Clean Water Act Section 319 Program and Chesapeake Bay Program grants. These require a 40-50% match, much of which comes from WVCA state funds.
- The large number of watershed projects we accomplish each year would not be possible without having these state funds to leverage against federal funds.
- Practices offered through the Chesapeake Bay Program include: Pasture Divisional Fence and Stream Exclusion Fence.

Conservation District Services

- Soil and Forage Analyses
- Equipment Rentals
- Cost Share Assistance
  - Agricultural
  - Home
- Watershed Association Support
- Seeding/Seed and Rain Barrel Sales
- Conservation Education

Please contact our district for more information about our available programs.

Eastern Panhandle Conservation District
151 Aikens Center, Suite 2
Martinsburg, WV 25404
Phone: (304) 263-4376
Email: epcd@wvca.us
https://www.wvca.us/district/epcd.cfm

Visit our Website

Follow Us! Facebook

Guyan Conservation District

Serving Boone, Cabell, Lincoln, Logan, Mingo and Wayne counties

- A combined $85,863 spent on agricultural enhancement by the district and its cooperators in FY 21, for heavy use area protection, lime, nutrient management, pollination, urban agriculture and more.
- We're working with schools, county commissions, and other partners to extend outreach and build interest in conservation.
- We've enacted special projects to promote awareness of native pollinators and we also help high tunnel growers improve soil health through shade cloth and plastic replacement cost-assistance programs.
- We are proud of our partnerships with other state and federal agencies and farm and cattleman associations. Through 7-1-3u agreements, we've partnered with our county commissions to address flooding problems and manage blockages.

Please contact our district for more information about our available programs.

Guyan Conservation District
2651 8th Street Road
Huntington, WV 25701
Phone: (304) 528-5716 | Fax: (304) 691-4417
Email: GCD@wvca.us
www.wvca.us/district/gcd.cfm

Greenbrier Valley Conservation District

Serving Greenbrier, Monroe, and Pocahontas counties

A combined $268,005 spent through the Agricultural Enhancement Program (AgEP) by the district and cooperators in FY 21, for Lime, Exclusion Fence, Pasture Division Fence, Watering Systems and more.

The economic impact of the AgEP and 319 programs is approximately ten times the investment of the State of West Virginia.

- Watershed projects in the Eastern Panhandle are funded through a combination of federal and state funds. Federal funds come from Clean Water Act Section 319 Program and Chesapeake Bay Program grants. These require a 40-50% match, much of which comes from WVCA state funds.
- The large number of watershed projects we accomplish each year would not be possible without having these state funds to leverage against federal funds.

Visit our Website

Please contact our district for more information about our available programs.

Greenbrier Valley Conservation District
179 Northridge Drive
Lewisburg, WV 24901
Phone: (304) 645-617 | Email: gvcd@wvca.us
https://www.wvca.us/district/gvcd.cfm

Little Kanawha Conservation District

Serving Calhoun, Ritchie, Roane, Wirt, and Wood counties

District and cooperators spent a combined $200,092 through the Agricultural Enhancement Program (AgEP) in FY 21, for practices such as Heavy Use Area Protection, Watering Systems, Lime, Pasture Division Fence and Water and Woodland Exclusion Fence and more.

Protecting people and property with watershed flood control dams and advocating for operations and maintenance funding. LKCD is home to 6 flood control dams. Two of these impoundments have extra capacity to serve as public water supply. Both of these plus three of the other four also provide recreation as well.

Talking Points

- Invasive Species - Autumn Olive, Multiflora Rose
- Protecting Pollinators - Improving pollinator habitat
- Sediment removal from existing flood control dams
- Erosion prevention on farm roads and feeding areas

We maintain valued partnerships with state and federal agencies, local extension service, school system, local government and non-profit conservation-focused entities.

Visit Our Webpage

SCAN ME

Please contact our district for more information about our available programs.

Little Kanawha Conservation District
91 Boyles Lane, Parkersburg, WV 26104
Phone: (304) 422-9088 | Email: LKCD@wvca.us
https://www.wvca.us/district/lkcd.cfm

Monongahela Conservation District

Serving Marion, Monongalia and Preston counties

Protecting people and property with small watershed flood control dams, including the newly rehabilitated Upper Deckers No. 1 dam in Preston County.

A combined $71,983 spent on agricultural enhancement by the district and cooperators in FY 21, for heavy use area protection, lime, pasture division fence, invasive species management, nutrient management and more.

To promote conservation education and outreach, we host field days like our weed wiper demonstration and training project and participate in community outreach and recognize outstanding service to conservation.

We value our partnerships, including the WVU Extension Service, and will continue to advocate for additional resources for extension agents.

Please Contact Our District for more information about our available programs.

Monongahela Conservation District
201 Scott Avenue
Morgantown, WV 26508
Phone: (304) 296-0081
Fax: (304) 285-3151
Email: MCD@wvca.us
https://www.wvca.us/district/mcd.cfm

Northern Panhandle Conservation District

Serving Brooke, Hancock, Marshall and Ohio counties

A combined $236,714 spent on agricultural enhancement by the district and cooperators in FY 21, for lime, pasture division fence, watering systems, exclusion fence, heavy use area protection and more.

Protecting people and property with small watershed flood control dams in the Wheeling Creek, Harmon Creek and Upper Grave Creek watersheds, and advocating for operations and maintenance funding.

To promote conservation education, we participate in the West Virginia Envirothon competition, offer the Hands On Ag Day for local students at the Marshall County Fairgrounds in Moundsville, and take a lead role in the WV Association of Conservation Districts' education efforts.

We are the home of the 2021 West Virginia Conservation Farm of the Year, Meadow View Farm, which is owned operated by Jeff and Janet Allen of Marshall County.

Please Contact Our District for more information about our available programs.

Northern Panhandle Conservation District
1 Ballpark Drive
McMechen, WV 26040
Phone: (304) 238-1231
Email: NPCD@wvca.us
https://www.wvca.us/district/npcd.cfm

Potomac Valley Conservation District

Serving Grant, Hampshire, Hardy, Mineral, and Pendleton counties

A combined $414,905 spent through the Agricultural Enhancement Program by the district and cooperators in FY 21, for Lime, Invasive Species, Hay Reseeding or Establishment, Frost Seeding and Heavy Use Area Protection.

Pursue financial and technical assistance to address the aging flood control structures and the operation and maintenance program. PVCD is home to 73 of the state's 170 watershed dams and it is a challenge to complete the annual maintenance on all of the structures.

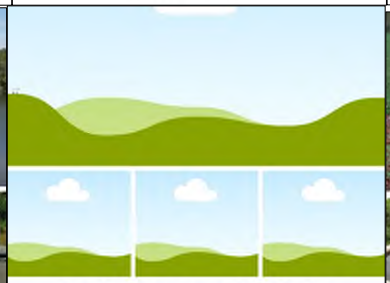
PVCD promotes local workshops to highlight conservation education practices, participates in the West Virginia Envirothon competition, provides Chesapeake Bay education and outreach, and sponsors the West Virginia Soil Tunnel Trailer for schools and local events.

Practices offered through the Chesapeake Bay Program include: Cover Crop, Litter Transfer, Division Fence and Water Facilities.

SCAN ME

Please contact our district for more information about our available programs.

Potomac Valley Conservation District
500 East Main Street Romney, WV 26757
Phone: (304) 822-5174 | Email: PVCD@wvca.us
https://www.wvca.us/district/pvcd.cfm



Southern Conservation District

Serving Serving Fayette, McDowell, Mercer, Raleigh, Summers, and Wyoming counties

A combined $147,075 spent through the Agricultural Enhancement Program by the district and cooperators in FY 21, for Lime, Pasture Division Fence, Heavy Use Area Protection, Exclusion Fence and Watering System.

Pursue financial and technical assistance to address the aging flood control structures and the operation and maintenance program. SCD is home to 15 of the state's 170 watershed dams and it is a challenge to complete the annual maintenance on all of the structures.

Our district working crew provides technical assistance and installs watering systems and spring developments, builds fences, builds and cleans out ponds and removes brush and invasive species. Our equipment rental program is a popular cost-saving resource for local farms.

Partnerships with other state and federal agencies, watershed associations, extension service, local schools, and other local conservation-based organizations.

SCAN ME

Please contact our district for more information about our available programs.

Southern Conservation District
463 Ragland Road, Beckley, WV 25801
Phone: (304) 253-0261 | Email: SCD@wvca.us
https://www.wvca.us/district/pvcd.cfm

Tygarts Valley Conservation District

Serving Barbour, Randolph, Taylor, Tucker and Upshur counties

A combined $152,342 spent on agricultural enhancement by the district and cooperators in FY 21, for watering systems, invasive species, nutrient management, lime, litter transfer and more.

Our district working crew provides technical assistance and installs watering systems and spring developments, builds fences, builds and cleans out ponds and removes brush and invasive species. The district also rents out equipment.

Conservation outreach is important to us. We are leading efforts to revive the chestnut tree with Dunstan hybrids, teaching kids and cooperators about conservation, being active in local farmers markets, and advocating for locally grown and healthy food for our communities.

We value our partnerships with local, state and federal government agencies, watershed associations, farm to school programs, school boards, the WV Farm Bureau and cattlemans' associations.

Please contact our district for more information about our available programs.

Tygarts Valley Conservation District
16346 Barbour County Hwy
Philippi, WV 26416
Phone: (304) 457-3026 | Fax: (304) 457-6927
Email: TVCD@wvca.us
https://www.wvca.us/district/tvcd.cfm

Upper Ohio Conservation District

Serving Pleasants, Tyler and Wetzel counties

- Our district is in a three-county region full of small farms and forested land, where mostly part-time farmers raise livestock on their property.

- We seek to teach the next generation about conservation through our involvement in the West Virginia Envirothon competition and by hosting field days and the West Virginia Soil Tunnel Trailer in our district.

- A combined $122,818 spent on agricultural enhancement by the district and its cooperators in FY 21, for pasture division fence, exclusion fence, lime, heavy use area protection and watering systems.

- In additional to our county, state and federal partners, our supervisors are key members of the West Virginia Association of Conservation Districts who advocate daily to benefit conservation across the state.

Please contact our district for more information about our available programs.

Upper Ohio Conservation District

201 Underwood Street
Middlebourne, WV 26149
Fax: (304) 758-5007 | Phone: (304) 758-2512
Email: UOCD@wvca.us
www.wvca.us/district/uocdcfm

Western Conservation District

Serving Jackson, Mason, and Putnam counties

- District and cooperators spent a combined $140,199 through the Agricultural Enhancement Program (AgEP) in FY 21, for practices such as Lime, Watering System, Pasture Division Fence, Exclusion Fence, Frost Seeding and more.
- We continue to advocate for funding for district cost-share programs.
- Expanding work on 319 projects within our district, including the Cherry Fork project in Putnam County to repair and replace failing septic systems to improve water quality.

Talking Points

- EDUCATION AND OUTREACH
- FLOOD CONTROL WATERSHED DAMS
- PARTNERSHIPS
  - Federal Government
  - State Government
  - Local City and County Government
  - Non-Profit Community-Based Organizations
  - WVU Extension Service

Please contact our district for more information about our available programs.

Visit Our Webpage

Western Conservation District

224-C First Street, Point Pleasant, WV 25550
Phone: (304) 675-3054
Email: wcd@wvca.us
https://www.wvca.us/district/wcd.cfm

West Fork Conservation District

Serving Doddridge, Gilmer, Harrison and Lewis counties

Protecting people and property with small watershed flood control dams in the Salem Fork and Polk Creek watersheds, and advocating for operations and maintenance funding.

A combined $132,935 spent on agricultural enhancement by the district and cooperators in FY 21, for lime, heavy use area protection, watering systems, pasture division fence, nutrient management and more.

Conservation and Education

Agricultural Enhancement Program
WV Envirothon
Teacher of the Year
District Forestry Contest
Conservation Field Day
Grassland Competition
Roger Nestor Memorial
Soil Judging Contest
Appalachian Grazing Conference
WV Soil Tunnel Trailer

Equipment Rentals

2-ton and 4-ton Stoltzfus Lime Spreaders
Weed Wiper
Herd Sure-Feed Broadcaster

Please Contact Our District for more information about our available programs.

West Fork Conservation District

87 Ollie Lane Suite 104
Mt. Clare, WV 26408
Phone: (304) 627-2160
Email: WFCD@wvca.us
https://www.wvca.us/district/wfcd.cfm

West Fork Conservation District

Serving Doddridge, Gilmer, Harrison and Lewis counties

Protecting people and property with small watershed flood control dams in the Salem Fork and Polk Creek watersheds, and advocating for operations and maintenance funding.

A combined $132,935 spent on agricultural enhancement by the district and cooperators in FY 21, for lime, heavy use area protection, watering systems, pasture division fence, nutrient management and more.

Conservation and Education

Agricultural Enhancement Program
WV Envirothon
Teacher of the Year
District Forestry Contest
Conservation Field Day
Grassland Competition
Roger Nestor Memorial
Soil Judging Contest
Appalachian Grazing Conference
WV Soil Tunnel Trailer

Equipment Rentals

2-ton and 4-ton Stoltzfus Lime Spreaders
Weed Wiper
Herd Sure-Feed Broadcaster

Please Contact Our District for more information about our available programs.

West Fork Conservation District

87 Ollie Lane Suite 104
Mt. Clare, WV 26408
Phone: (304) 627-2160
Email: WFCD@wvca.us
https://www.wvca.us/district/wfcd.cfm

GREEN INFRASTRUCTURE

VIRTUAL TRAINING

West Virginia Conservation Agency

New River Conservancy

Southern Conservation District 304-253-0261

ngicp

dep

SCAN ME

Stormwater management practices that protect, restore, or mimic the natural water cycle are referred to as green infrastructure (GI). It is a collection of engineered systems that utilize natural or "green" approaches to manage stormwater locally. Stormwater is stored temporarily at or near where it falls to be used by trees and vegetation, stored and used later for irrigation, or allowed to soak into the ground through layers of soil, which remove pollutants from the stormwater through natural processes.

www.ngicp.org

The National Green Infrastructure Certification Program (NGICP) provides the base-level skill set needed for entry level workers to properly construct, inspect and maintain green stormwater infrastructure (GI). Designed to meet international best practice standards, NGICP is a tool that can be used to meet a wide range of needs, including professional development for existing GI professionals and as part of a larger workforce development to provide candidates with the technical skills necessary to enter the green workforce and earn a livable wage.

Instruction for the program will be provided by Dr. Dwaine Jones.

Dr. Jones is currently the Dean at the University of the District of Columbia's College of Agriculture, Urban Sustainability, and Environmental Sciences.

He has over 20 years of combined experience in green infrastructure programs, research, urban design, environmental planning and program management with government, academia, nonprofit and community-based agencies, and international governments and universities. He was Founder of the Low Impact Development Certificate Program at North Carolina State University, and has degrees in Urban Planning, Environmental Planning, Urban Design, and Evidence-Based Coaching.

January 11th through February 10th
8 a.m. to Noon
Tuesdays and Thursdays - Via Zoom

Application & Class Fees $185
Testing & Certification Fees $150
Register at: https://envirocert.org/event/ngicp-virtual-training-4/

Financial assistance may be available for qualifying individuals!

Contact:
Dennis Burns *dburns@wvca.us*

SAVE THE DATE

A free workshop "Introduction to Green Infrastructure for Stormwater Management" will be held on December 7, 2021 at the Southern Conservation District office (463 Ragland Road, Beckley, WV) from 6:30 p.m. to 8 p.m. Call 304-957-2989 for more information and to RSVP.

Conservation Matters

The Little Kanawha Watershed

Activity Book

West Virginia Conservation Agency

WATER WORD SCRAMBLE

1. Every **ngivli** thing needs water to live. _____
2. The average American uses about 50 **oslgaln** of water each day. _____
3. Only 1% of the water on **rteha** is fresh water that is available for drinking or other uses. _____
4. If water is contaminated, it might not be safe to eat the **hsif** you catch or to **wsmi** in the water. _____ & _____
5. An **egrifaw** is an underground area of water that collects between spaces in rocks. _____
6. A **lewl** is a deep hole dug or drilled below the ground surface into an aquifer to get water. _____
7. **tolatunPis** can seep through the soil and make ground water unsafe to drink. _____
8. Water treatment plants can remove pollutants from water so it is **asfe** to drink. _____
9. Drinking water can come from **grduon** or **usrfaec** water. _____ & _____
10. **fnuoRf** is water that naturally flows off the land, sometimes forming streams. _____
11. Soil and other pollutants are often **draeopsrtnt** to streams as storm water runs off the ground. _____
12. It is everyone's **pesrobsinility** to help prevent water pollution. _____
13. Many communities get their drinking water from underground sources called an **qfiuaar**. _____
14. Cleaning pollution from aquifers is **ycsolt**. _____

"CITY WATER and WELL WATER"

Many people in North America get their water from a public water utility. You may hear this referred to as "city water". Water utilities get their water from rivers, lakes, reservoirs or underground aquifers. The water is treated to make it safe to drink. While others may get their water from a source directly below their own home. This is what you will hear referred to as "well" water. Wells are often seen in rural areas where municipal water is not available and should be tested regularly for quality.

Because we reuse the same water over and over, it can become polluted by people and industry. Even deep underground aquifers can be polluted from the surface. For example, many household items, such as car wax, spot remover or floor polish and other chemicals should not be poured down the drain or thrown out in the trash. Even lawn chemicals and other garden products used outdoors may be toxic, and can contaminate water sources by running off the land into storm drains. That water can end up in lakes and rivers.

Let's take care of our water resources. Use your "Blue Thumb" to conserve water, protect it and get involved.

ALL OF US NEED LESS ENVIRONMENTAL WORD FIND THE FUTURE IS GREEN

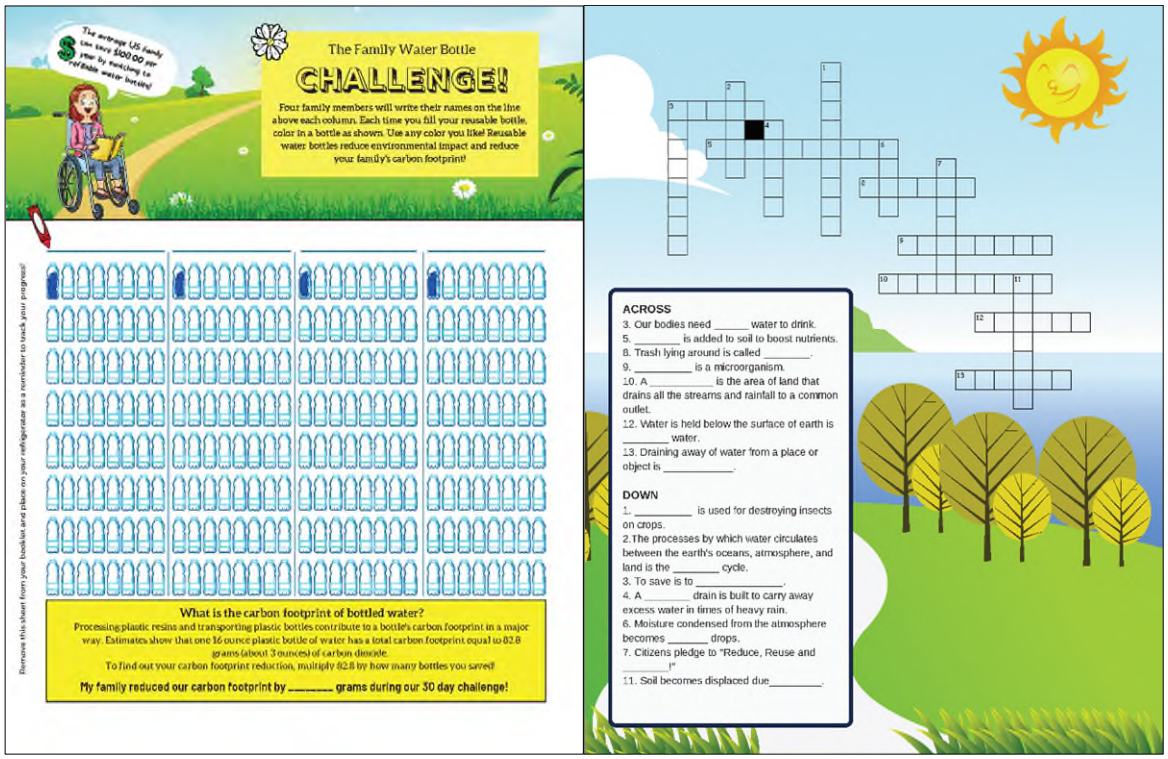
T W R R E G M M F C W G J R I L E H R K
S A O E E K U A P O L L I N A T O R S E
T T T V R J S C N O I T A V R E S N O C
J E L I T T E R F P S W R R G M D T E H
R R E R B R B O E A H E E Q G R R R M S
A T L C A A I I O V U O J T I S U V O E
I N C A S B H N R S A W S P L T X R W D
N O Y M B P W V E Z R P A P L A A Z T I
B I C O B X O E X E E R S U H I N S P M
A T E T C A Z R E C I R C U N O O D A E
R U R O L N R T C A X I Y G O P R T S N
R L B P V B N E N R R J A E M R W O H T
E L N M X U A B P G E R T O L I O S U T
L O R P L T U R A U D V C Q R W S P I S
R P U O K F S A C E T U O R T K O O R B
V E V C F F F T N R P R E C W B U S X F
O U D E Q H S E W A T E R S H E D M T R
K C R U A V P S N E G O R T I N Z H M H
D I E F C L G Y S Z U D W M M U Z H D Z
A I R Q S E P A H P O P N K B P F S L W

AGRICULTURE	NITROGEN	RIPARIAN BUFFER
BROOK TROUT	PHOSPHOROUS	SEDIMENT
COMPOST	POLLINATORS	SOIL
CONSERVATION	POLLUTION	TREE
COVER CROPS	POROUS PAVERS	VOLUNTEER
CRAB	POTOMAC RIVER	WATER
HABITAT	RAIN BARREL	WATERSHED
LITTER	RAIN GARDEN	REDUCE
MACRO INVERTEBRATES	RECYCLE	REUSE

RECYCLE SYMBOL DE-CODING

You have probably seen the recycling symbol on containers. But, do you know what the different numbers are to help people know if it can be recycled? Using internet research and checking items around your house, match up the symbols below with the correct item.

1. This is polyethylene terephtalate, also known as PETE or PET. It is generally clear. This plastic is picked up by most curbside recycling programs. _____
2. This is high density polyethylene, or HDPE. It is usually opaque (cloudy). It is also picked up by most curbside recycling programs. _____
3. This is polyvinyl chloride, also known as PVC. PVC is a tough plastic. It is rarely accepted by recycling programs. _____
4. This is low-density polyethylene (LDPE). It is typically thin and flexible. _____
5. This is polypropylene. This plastic is also considered safe, and is increasingly being accepted by curbside recycling programs. It is hard plastic used in food containers and textiles. _____
6. This is polystyrene, or Styrofoam. It is difficult to recycle and most recycling programs won't accept it. _____
7. This number basically means "everything else." It includes polycarbonate and BPA, which are not safe for use as food or drink containers. It is difficult to recycle and most curbside recycling programs won't accept it. _____



Outreach Events

- Staff attended the Tomato Festival in downtown Fairmont in August 2022. They provided a rain barrel assembly demonstration and distributed pollinator seed packs as well as mason bee nests. Information about district programs was readily available as well.

- The West Virginia Conservation Agency (WVCA) joined the West Virginia Department of Agriculture at Dairy Night at the park, during the Charleston Dirty Birds games held at the Charleston and Morgantown semi-pro baseball parks. During the event, the WVCA actively promoted conservation programs specifically tailored to the agriculture industry, with a focus on grasslands, hay lands, and other forage management. They highlighted the Agricultural Enhancement Program (AgEP), which provides benefits to agricultural producers through grassland nutrient management and various other support measures. Additionally, the WVCA emphasized the importance of mitigating non-point source pollution caused by runoff on feed areas, emphasizing the benefits of implementing heavy use protection areas. The WVCA also actively promoted urban agriculture best management practices during the event.

- In the fall of 2021, through a partnership with Berkeley County Farmland Protection, direct mailings were sent to easement holders in an effort to promote CREP as well as NRCS and EPCD programs. The outreach was well received by landowners and several new relationships were established.

- In September 2021, EPCD hosted a workshop that focused on soil health and grazing techniques. It was attended by approximately 28 individuals.

- In January 2022, West Virginia Conservation Agency produced and distributed a video that highlighted the benefits of CREP. The video can be found at the link below. To date, the video has been viewed approximately 450 times. Benefits of CREP in West Virginia (Conservation Reserve Enhancement Program) Video - YouTube

- September 2022 provided an opportunity for another successful grazing workshop. PVCD and EPCD joined with partnering agencies to provide educational information to approximately 100 attendees. The primary focus was grazing techniques.

- 2022 GVCD Farm Field Day
    - October 5th, 2022
    - Shawlin Hills Farm in Greenbrier County
    - 30 people in attendance
    - Talks
        - ❖ Pollinators and beekeeping
        - ❖ Native warm-season grasses as forage
        - ❖ Rotational grazing
        - ❖ Soil health and fertility
    - Farm tour
    - Panel of local conservation partners

- Attended Greenbrier River Watershed Association Watershed Celebration Day at Lost World Caverns (April 22, 2023)

- Attended Autumn Harvest festival with Indian Creek Watershed Association (Fall 2022)

- Attended watershed association meetings within the district.

STORMWATER MANAGEMENT

Conservation Specialists serve as direct service providers or help coordinate assistance from other sources to watershed organizations and landowners. WVCA supports statewide efforts to address nonpoint pollution with education and outreach, coordination and implementation of projects addressing runoff, erosion and sediment control, stormwater management, nutrient and pest management, stream cleanup, riparian demonstrations, stream bank stabilization, pre and post project monitoring, watershed assessments, agriculture BMP selection and installation, the availability and types of conservation programs, financial assistance, and water quality improvements.

NPS PROJECTS

WVCA CONSERVATION SPECIALIST FUNCTIONS AS 319 WATERSHED PROJECT MANAGERS:

WVCA's Conservation Specialists (CS) support volunteer watershed associations, educate citizens on non-point source pollution issues, identify local stakeholders, partners and funding sources, and take the lead for Project Teams (PTs) consisting of community stakeholders to place projects on the ground. Watershed Project Proposal funds are used to install specific projects designed to remedy or decrease contributions to the impairment of the priority watershed in which the projects are installed.

WVCA Conservation Specialists (CS) support volunteer watershed associations, educate citizens on non-point source pollution issues, identify local stakeholders, partners and funding sources, and take the lead for projects.

Sleepy Creek §319 Watershed Project – Morgan County

The goal of the Sleepy Creek Watershed Project is to reduce fecal coliform loads within the watershed from failing septic systems.

- 8 septic systems repaired
- 20 septic systems pumped
- One septic care seminar for homeowners held – 16 attendees
- Various other outreach and education efforts
- Water quality monitoring for fecal coliform bacteria

Sleepy Creek CBIG Watershed Project – Morgan County

The goal of the Sleepy Creek CBIG Watershed Project is to reduce fecal coliform, nitrogen, phosphorus and sediment loads within the watershed from stormwater runoff from urban and agricultural land uses.

- Riparian buffer plantings – 1.93 acres
- Reforestation plantings – 2.37 acres
- Outreach and education efforts
- Biological water quality monitoring for benthic macroinvertebrates

Elks Run §319 Watershed Project – Jefferson County

The goal of the Elks Run Watershed Project is to reduce fecal coliform and sediment loads within the watershed from failing septic systems and stormwater runoff from urban and agricultural land uses.

- Water quality monitoring
- Tree plantings - 0.18 acres
- Earth Day 2023 education and outreach event – 125 attendees
- Various other outreach and education efforts
- Rain garden design for future implementation
- Cover crops planted – 100 acres
- 32 septic systems pumped

Back Creek Protection §319 Watershed Project

The goal of the Back Creek Protection Watershed Project is to promote land conservation and reduce sediment loads within the watershed from eroding streambanks.

- Outreach and education efforts
- Restoration and stabilization of approximately 936 feet of streambank on Back Creek and associated riparian buffer planting
- Water quality monitoring

Indian Creek §319 Watershed Projects – Monroe County

- 22 septic systems pumped
- 20 septic systems repaired or replaced
- 9,502' sensitive area exclusion fence installed

Second Creek §319 Watershed Projects – Greenbrier and Monroe Counties

- 9 livestock alternative water systems installed
    - 21,133' livestock pipeline
    - 8 water pumping facilities
    - 3 wells
    - 1 spring development
    - 30 water troughs with heavy use area protection
    - 7 water reservoir tanks
- 23,629' pasture division fence installed
- 8,528' sensitive area exclusion fence installed

Meadow River §319 Watershed Project – Greenbrier County

- 3 septic systems pumped
- 2 septic systems replaced
- 1 woody debris stream blockage removed

Mudlick Run §319 Watershed Project – Hardy County

The goal of the Mudlick Run Watershed Project is to reduce the fecal coliform loads in the watershed from failing septic systems and livestock grazing too close to the stream.

- Outreach provided via mailers, yard signs and a septic workshop (15 in attendance)
- 3 septic systems pumped
- 2 septic systems repaired
- Contacts made with landowners for possible future implementation of exclusion fence and alternative water system(s)

WVCA IS A FULL PARTNER IN THE CHESAPEAKE BAY PROGRAM. CHESAPEAKE BAY
EFFORTS INCLUDE:

The West Virginia Chesapeake Bay Program is an effort by the West Virginia Conservation Agency, West Virginia Department of Environmental Protection, West

Virginia Department of Agriculture and several other state, federal and local partners to implement the Chesapeake Bay Total Maximum Daily Load (TMDL). The Chesapeake Bay TMDL is a comprehensive "pollution diet" to restore the health of the Bay and all of its tributaries by setting limits for nitrogen, phosphorus and sediment pollution. The TMDL is the largest clean-up ever initiated by EPA, encompassing a 63,000 square mile watershed. It is designed to ensure that all pollution control measures needed to fully restore the Bay and its tidal rivers are in place by 2025. Each jurisdiction has developed a Watershed Implementation Plan (WIP) that details how the pollution allocations will be met.

West Virginia is currently in Phase 3 of its WIP which outlines how the 2025 goals will be met. The WIP outlines in detail how pollution reduction strategies will be undertaken in each major load sector: Wastewater, Developed Lands, Agriculture, Forest, and Other. Reducing nitrogen, phosphorus and sediment in local creeks and river will mean healthier water resources to better sustain tourism, fishing, drinking water supplies, wildlife habitat and other uses.

AGRICULTURAL BMP IMPLEMENTATION

Chesapeake Bay Implementation Grant (CBIG) funds have been allocated to assist agricultural producers with the installation of cover crops, stream exclusion fencing, alternative watering systems, riparian buffer establishment, heavy use area protection, divisional fencing and poultry litter transfer. With the assistance of these funds, WVCA and Conservation Districts have helped the state reduce nutrient and sediment loads by implementing Best Management Practices (BMPs).

A total of 10,976.27 acres of cover crops were planted during this time. Cover crops improve water quality by reducing soil erosion and nutrient runoff. Some examples of cover crops are clover, barley, rye and triticale. Often, when producers harvest their cash crops (corn, soybeans, etc.), the fields lay bare in the winter. By establishing a cover crop during the winter months, the soil is held in place as opposed to being washed away during heavy rain events.

Additionally, 7,483.09 tons of poultry litter were transferred out of the watershed. The Potomac Valley is rich with poultry production and therefore, has a surplus of litter. Transferring this litter prevents excess nutrients from entering streams.

Producers installed 73,581.18 feet of divisional fencing, 8,663 feet of stream exclusion fencing and 18 alternative watering systems. These fencing practices, in combination with water systems, allows producers to implement grazing plans for livestock. This improves the quality and quantity of forages which provides more vegetation to filter surface water of excessive nutrients and sediment.

NPS Project Photos

Back Creek stream restoration and bank stabilization September 2022

Sleepy Creek tree plantings spring 2022

Sleepy Creek septic care seminar September 2022

Elks Run Earth Day 2023 event April 2023

Elks Run tree plantings spring 2023

Pipeline for Watering System

Exclusion Fence

Spring Development/Solar Panel – Watering Systems

Woodland Exclusion Fence

v. SUMMARY OF GROUNDWATER QUALITY IN WEST VIRGINIA

United States Geological Survey
WVDEP Cooperative

Introduction

The United States Geological Survey (USGS) and the WVDEP had 5 active groundwater cooperative projects during Federal Fiscal Years 2021 and 2022. These projects were designed to provide the WVDEP with hydrologic and geologic data and information, and included interpretative projects with respect to USGS groundwater quality and hydrogeologic assessments to support the mission and activities of the WVDEP, and to fulfill requirements of the West Virginia Groundwater Protection Act. These projects are part of a long-term on-going ambient groundwater quality program operated by the USGS in cooperation with the WVDEP and the West Virginia Department of Health and Human Resources (WVDHHR).

Projects include 1) a statewide groundwater level network operated by the USGS in cooperation with the WVDEP, used for assessment of groundwater storage and drought prediction and monitoring for West Virginia, 2) a statewide borehole logging project operated cooperatively by the USGS and the WVDEP to provide critical information related to groundwater flow processes of the state's fractured-bedrock aquifers, 3) a project to assess groundwater quality used by rural residential homeowners in areas of current and past coal mining in southern West Virginia and oil and gas development in northwestern West Virginia in the area where the Marcellus Shale is being developed for wet gas, 4) an assessment of the hydrogeologic framework of complex fractured-rock and karst limestone aquifers in Monroe County, West Virginia, and 5) a survey of the occurrence of per- and polyfluoroalkyl substances (PFAS) in public drinking water supplies throughout West Virginia.

Background

The USGS has a long history of cooperative data collection, monitoring efforts, and hydrologic studies with the WVDEP and other state, federal, county, and local agencies to provide critical data on surface- and groundwater quality, streamflow discharge, groundwater levels, aquatic health, and to better understand complex groundwater flow processes. These topics have been assessed by long-term data-collection networks and interpretative scientific studies. These data-collection efforts, long-term networks, and hydrologic assessments help to provide information that the WVDEP requires to fulfill its mission. Some of the projects date back to the inception of the West Virginia Department of Environmental Protection. Summary descriptions of on-going projects follows, with associated maps and tables of sites monitored or assessed.

Statewide Groundwater-Level Network

The statewide groundwater level network is comprised of 19 wells (Table 1) with at least 2 wells in each of West Virginia's six major climatological zones, and provides state, federal, and local water-resource managers data on the current condition of groundwater levels throughout the State of West Virginia. The data are commonly used to assess current conditions of groundwater storage, to predict the onset of a drought, and in times of drought to assess the severity of the drought with respect to groundwater storage. In many states the data are used by regulatory agencies to issue drought proclamations, and to serve as the basis for issuing voluntary or mandatory water conservation orders. During the last major drought, the data from the network were used to assess the magnitude of the drought with respect to groundwater levels statewide. At that time the statistical analysis of the data had to be computed manually, but at present the data is all automated and easily accessed in a USGS online groundwater level database for West Virginia and Virginia available at https://rconnect.usgs.gov/vawv-groundwater/.

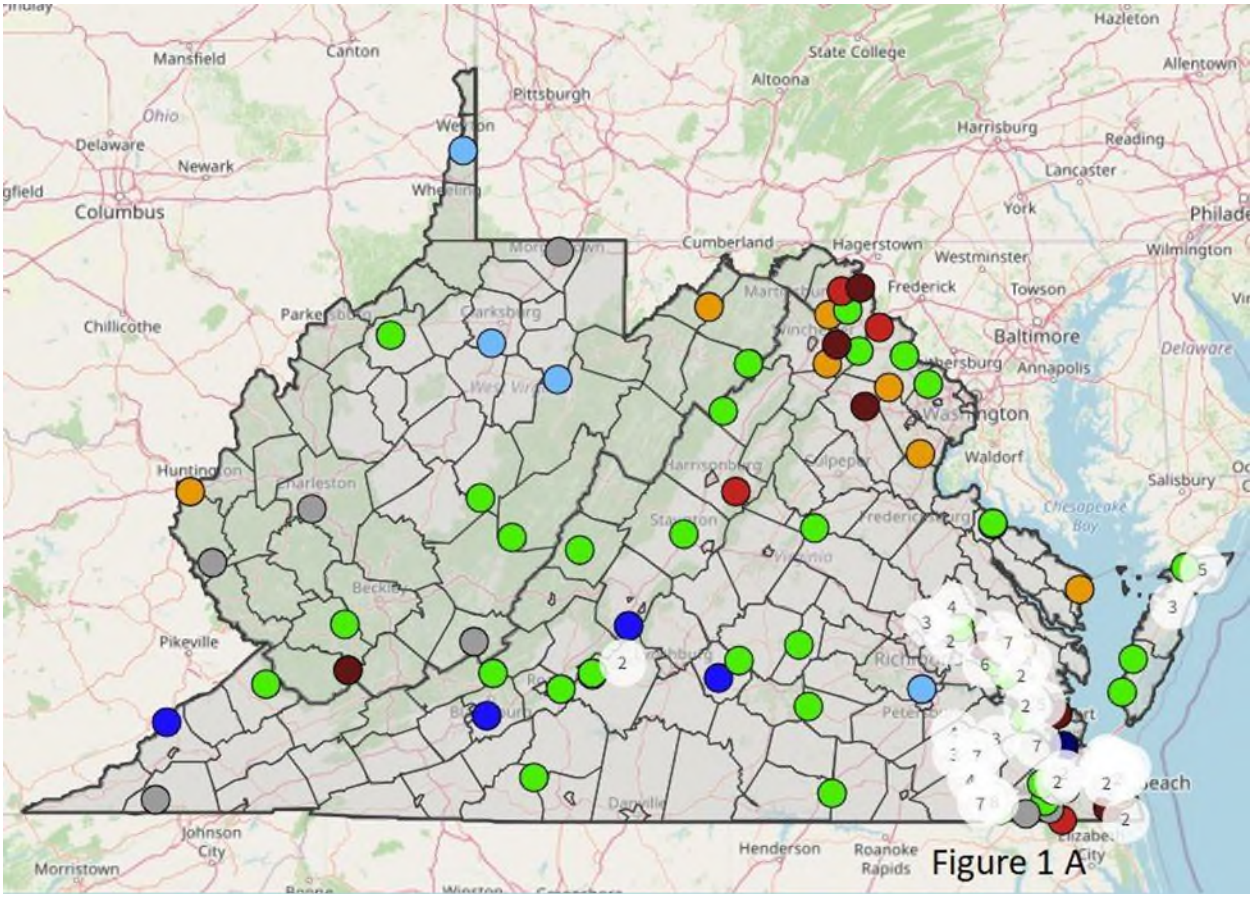
Table 1. List of wells that comprise the Statewide Groundwater-Level Monitoring Network. The USGS operates the network, which is funded by the USGS and the WVDEP Division of Water and Waste Management as part of a long-term cooperative project.

USGS Station Number	USGS Well Number	Location of Well
372322081241501	Mcd-0204	McDowell County
373839081255201	Wyo-0148	Wyoming County
380653080155301	Poc-0256	Pocahontas County
381619081392901	Kan-0192	Kanawha County
382008080292801	Web-0167	Webster County
382205082304501	Way-0144	Wayne County
385849079563901	Bar-0136	Barbour County
390333078370801	Hrd-0301	Hardy County
391020080244101	Har-0165	Harrison County
391308081064201	Rit-0116	Ritchie County
391920078032201	Ber-0840	Berkeley County
392200078532001	Min-0173	Mineral County
392725077582401	Ber-0445	Berkeley County
392757077501001	Jef-0797	Jefferson County
393959079555901	Mng-0586	Monongalia County
401216080362703	Brk-0066	Brooke County
401216080362703	Jef-0526	Jefferson County
373234080320101	Mnr-0162	Monroe County
401216080362703	Way-0110	Wayne County

Graphs in figures 1 A & B, retrieved from the USGS groundwater level website, illustrate how the statistical data for long-term water levels can be used to assess current groundwater levels across the State of West Virginia, and in turn how the data

may be used to predict the onset of drought and assess the magnitude of a drought. Figure 2A shows long-term groundwater levels for Virginia and West Virginia in context with long-term statistical trends (green dots represent the normal range 25th – 75th percentile, light blue dots above normal > 75th – 90th percentile, bright blue dots much above normal > 90th – 95th percentile, dark blue dots very high groundwater levels > 95th percentile, orange dots below normal levels >10th – 25th percentile, bright red dots much below normal > 5th – 10th percentile, and dark red dots very low groundwater levels <5th percentile). Likewise, figure 2B shows daily groundwater levels in context with statistical percentile classes for an individual well along with the period of record for the last 2 years. For example, the orange and brown boxes in figure 2B show current groundwater levels at well Ber-0445 in Berkeley County are all currently well below normal, and potentially indicative of an ensuing drought.

Figure 1. Graphs showing A) current groundwater levels for Virginia and West Virginia and B) statistical groundwater-level trends for the Berkeley County monitoring well showing far below normal groundwater levels with respect to long-term data.



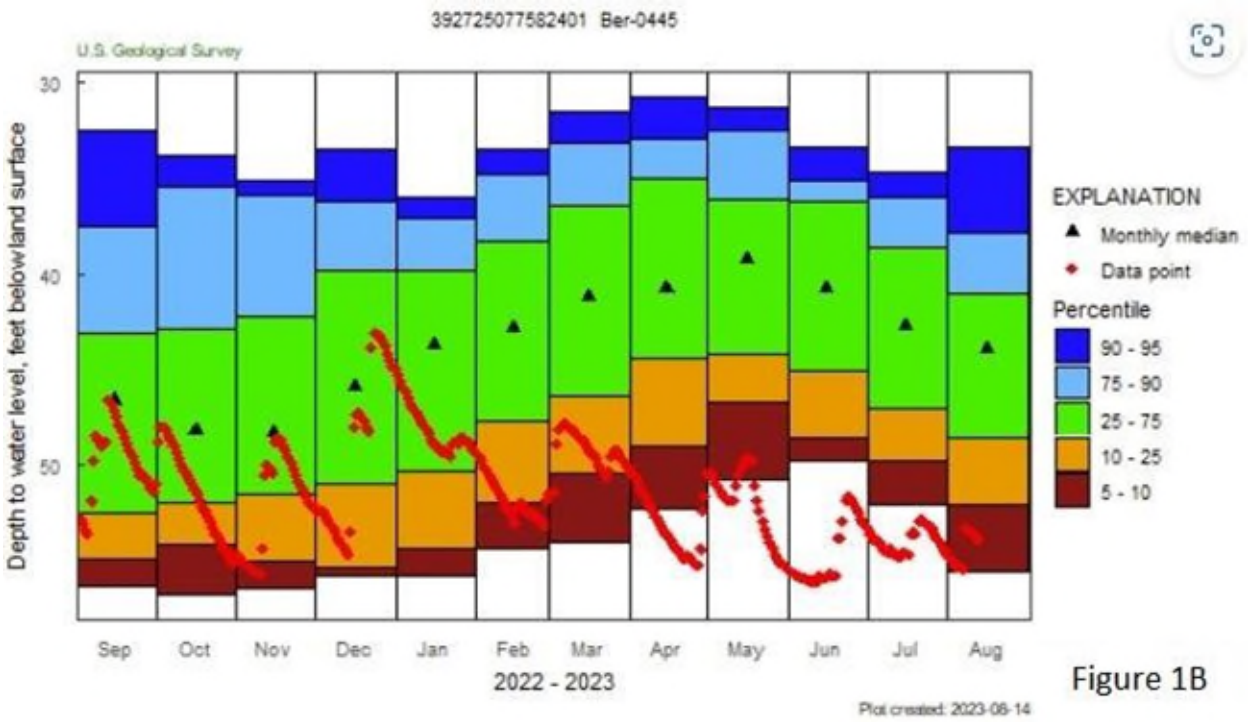


Figure 1B

West Virginia Aquifer Characterization and Borehole Geophysics Program

The West Virginia Water Resources Protection Act required the WVDEP to develop a plan to characterize the groundwater aquifers within the state. The West Virginia Water Resources Management Plan of 2013 identified fractured-rock aquifers in the state as an area where more information was needed to fulfill the requirements of the Act. To address these data and information gaps, the WVDEP and USGS cooperatively developed the West Virginia Borehole Geophysics program with the purpose of collecting and analyzing data that will fulfill the requirements of the Act.

The objectives of the program were to collect borehole geophysical data within the state and use this information to calculate and understand the distribution of aquifer properties and processes controlling groundwater flow for a wide variety of fractured-rock aquifers within the state. To complete these objectives, personnel from the USGS and WVDEP collected geophysical data from 100 groundwater wells in West Virginia between 2015 and 2019 . Table 2 lists the types of borehole geophysical tools employed for the study and the types of assessments that are derived from each geophysical tool. The USGS has invested approximately $300,000 in the equipment and vehicles required for the project, and the tools purchased were specifically selected for characterization of the state’s fractured rock aquifers.

Table 2. Table listing the types of borehole geophysical tools employed for the logging project and the types of data provided by the respective tool.

Borehole Geophysical Tool	Types of data available from the tool
Downhole camera	Provides a downhole video of the borehole
3-arm caliper tool	Measures diameter of the borehole and used to assess locations of fractures within a well
EM induction tool	Measures formation conductivity and used to assess borehole lithology, and differentiate saline zones
Multi-parameter electrical tool	Measures a wide range of formation and fluid properties such as fluid resistivity, formation resistivity, water temperature, formation gamma radiation, spontaneous potential and other properties and used to assess fresh and saline water zones and differentiate formation lithology
Acoustic televiewer	Uses acoustic waves to produce an image of the borehole and used to determine fracture properties
Optical televiewer	Provides a 360-degree image of the borehole and used to determine fracture properties
EM flowmeter	Measures the flow of water in the borehole and used to assess water bearing fractures
Full wave sonic porosity	Uses sound waves to determine formation and fracture porosity.

As of August of 2023, data were collected and analyzed for 126 groundwater wells in West Virginia (Fig. 2), with 100 wells being logged from 2015 to 2019 and the remaining 26 wells logged as part of prior USGS projects. Federal fiscal year 2019 was scheduled to be the last year of data collection and two additional fiscal years (2020 and 2021) were scheduled for analysis and report writing. Due to the Covid-19 pandemic, the large mobilization effort to sample all public water systems in West Virginia for PFAS compounds, and limited manpower within the USGS, this project has been subjected to numerous delays. In 2022 the USGS had staff from our New York Water Science Center process a large quantity of data collected for the project. In 2023 the USGS was able to concentrate a significant amount of manpower and time to the project and data analysis is on-going and scheduled for completion in August of 2023. A first draft of the interpretive report summarizing findings of the study is scheduled to be completed by September 30th, 2023, with final approval and publication of the report planned to be completed in the winter of 2023-2024.

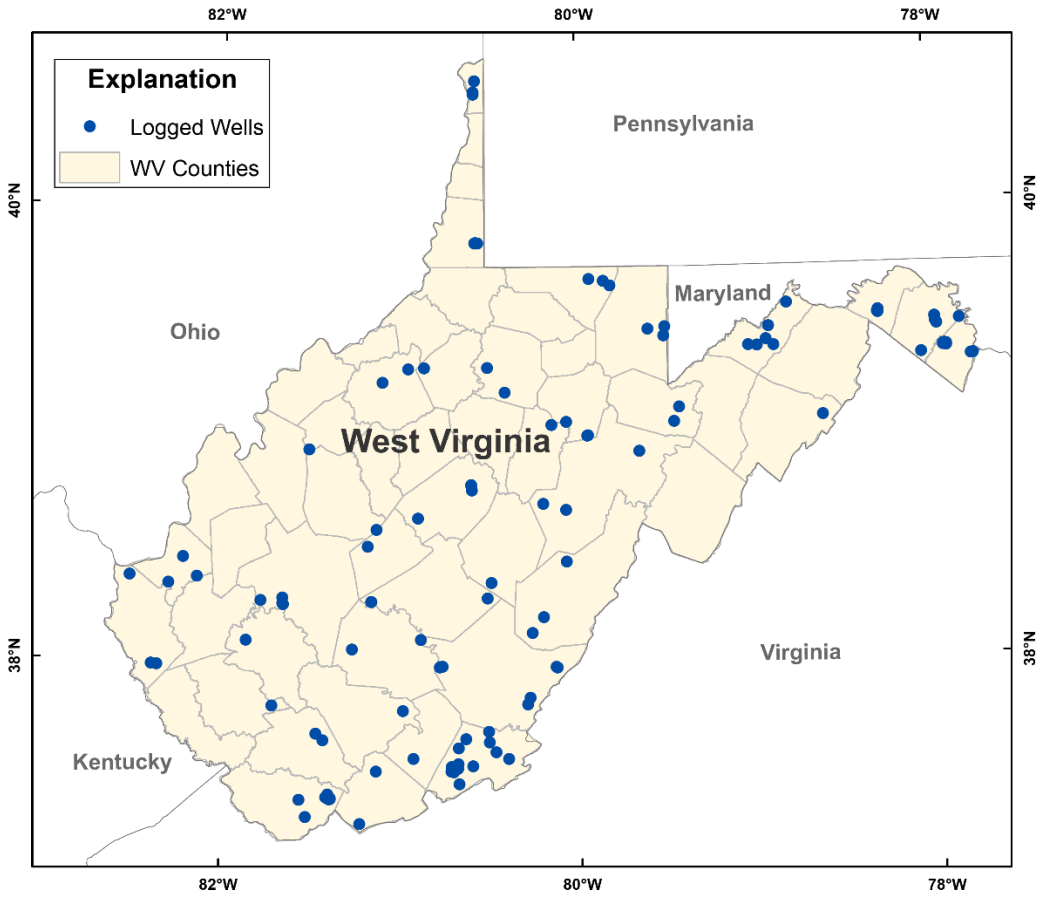


Figure 2. Map showing locations of wells logged as part of the Statewide Borehole Geophysics Program and previous USGS projects through August 2019.

Assessment of Drinking Water Quality in Rural Areas with Either Active and Legacy Coal Mining or Oil and Gas Development

This project consisted of two primary objectives: 1) to assess groundwater quality in a 7-county area in West Virginia's southern coalfields and determine the quality of water available to rural residential homeowners in areas of past or current coal mining, and 2) to assess groundwater quality in an area of current intense Marcellus Shale "wet gas" development. In addition to examining relations among groundwater quality with respect to coal mining and shale gas production, this study provides a benchmark of current conditions for future comparison. A tertiary but equally important objective is to collect groundwater-quality data in areas of the state that have been under-represented in previous studies.

This project has been completed and two reports were published summarizing results of the study. A report summarizing the groundwater quality of southern West Virginia's coal mining region, available at https://pubs.er.usgs.gov/publication/sir20195059, was released in 2020. A similar

report, available at https://pubs.er.usgs.gov/publication/sir20225094, summarizing the quality of groundwater in northwestern West Virginia in areas of Marcellus Shale “wet gas” production was released in October of 2022.

Monroe County Groundwater Resource Assessment and Monitoring Project

A countywide assessment of the groundwater resources in Monroe County was initiated in October of 2017 and all field data collection activities have been completed. Major objectives of the project included 1) development of a hydrogeologic framework for Monroe County including sinkhole mapping and fracture trace and lineament analysis, 2) determining directions of groundwater flow by development of a countywide water table (potentiometric surface) map and by conducting tracer tests with fluorescent dyes, 3) water budget assessment and analysis of the availability of groundwater resources in the County by interpreting soil water budget recharge estimates and correlating those estimates with similar recharge estimates made for key index stream gaging stations, 4) assessing groundwater flow velocities and potential for contaminant transport by conducting two groundwater tracer tests using fluorescent tracers, and 5) characterizing fracture, bedding plane, and lithologic controls on groundwater flow by collecting borehole geophysical data for as many unused wells as can practically be located within the county.

All field activities were completed by the end of December 2019. The Covid-19 pandemic resulted in a multi-year long delay in final data analysis and writing and review of the interpretive report summarizing the results of the study. This delay was a result of field staff inability to travel during the pandemic to complete the geologic mapping portion of the project, which was needed to properly interpret the hydrogeologic data collected for the study. At the time of writing of this project status update, the report summarizing the findings of the study had been written and completed both peer review and editorial review. The report is currently being processed for publication by USGS editorial staff and will be submitted to the USGS Bureau Approving Official for final approval of publication as a USGS Scientific Investigations Report in August of 2023. The report is anticipated to be approved and available to the public by September 30th, 2023.

Per- and Polyfluoroalkyl Substances in West Virginia's Public Source Water

PFAS are industrial compounds used in lubricants, fire-fighting foams, and non-stick materials. PFAS compounds have been detected in West Virginia’s groundwater and surface waters. West Virginia Senate Concurrent Resolution 46 (2019) directed the West Virginia Department of Environmental Protection and the West Virginia Department of Health and Human Services to “purpose and initiate a public source-water supply study plan to sample perfluoroalkyl and polyfluoroalkyl substances for all community water systems in West Virginia, including schools and daycares that operate

treatment systems regulated by the West Virginia Department of Health and Human Resources." This project was completed and a report titled Occurrence of per- and polyfluoroalkyl substances and inorganic analytes in groundwater and surface water used as sources for public supply in West Virginia, available at https://pubs.er.usgs.gov/publication/sir20225067, was released in July 2022.

Additional work involving PFAS was initiated by the WVDHHR, and the USGS sampled finished water at 37 public water systems that exceeded the human health benchmarks for PFAS established by the EPA in the 2022 statewide study. Those systems were sampled in the winter of 2022 and the data was released to the public as a USGS Data Release titled "Per and polyfluoroalkyl Substances in Drinking Water at Select Public Water Systems in West Virginia, 2022, available at https://www.usgs.gov/data/and-polyfluoroalkyl-substances-drinking-water-select-public-water-systems-west-virginia-2022, in April 2022.

In response to requirements imposed by the West Virginia PFAS Protection Act, the WVDEP and WVDHHR has entered into an agreement with the USGS to sample treated drinking water at an additional 100 public water systems throughout the State. The project will commence in October 2023 and samples will be collected through the end of 2023. A USGS Data Release is planned to be published in Spring of 2024 to release the results to the public.

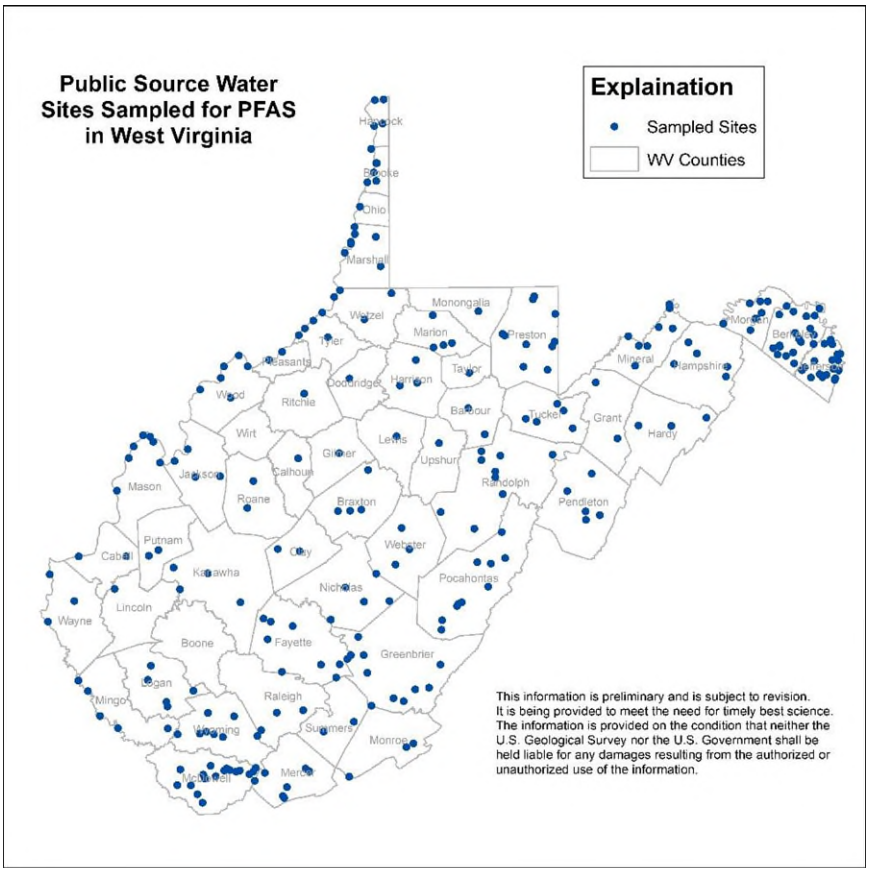


Figure 3. Map showing locations of Public source water sites sampled for PFAS in West Virginia by the USGS in cooperation with the WVDEP and WVDHHR.

VI. DEPARTMENT OF ENVIRONMENTAL PROTECTION

A. Office of Oil and Gas

The Office of Oil and Gas (OOG) regulates West Virginia's oil and natural gas industry. Protection of groundwater is of utmost importance and is achieved through the permitting, inspection and enforcement of exploration, production, plugging and injection activities of the industry. Over 62,000 active wells are maintained by the OOG. Regulations aimed at protecting groundwater have been in existence since 1929. Additional regulations have been added in subsequent years to further aid in the protection of groundwater. The OOG believes that groundwater protection is maximized by conforming to these existing regulations and practices. The following is a summary of selected regulatory functions and activities the OOG conducts in protecting groundwater.

Fresh Water Casing and Drilling Practices- 35 CSR 4-11.3; 35 CSR 8-9.2

For conventional wells, operators must set fresh water casing at least 30 ft. below the deepest fresh water horizon and circulate cement to surface prior to drilling into any oil, gas or salt water bearing strata. With the passage of W. Va. Code § 22-6A, the Horizontal Well Act, in December 2011, and its corresponding legislative rule, 35CSR8, going into effect in July 2013, at least 300 ft. of freshwater casing must be run and cemented to surface on applicable horizontal wells, known as H6A wells. The freshwater casing may be extended deeper to cover known aquifers or to cover a coal seam prior to drilling below sea level (elevation) and must always be cemented to the surface. The operator must also employ practices and procedures necessary to minimize damage or disturbance to strata including groundwater until casing has been set.

Plugging Methodology – 35 CSR 4-13, W. Va. Code § 22-6-24, 35 CSR 8 – 19, 35 CSR 8 - 20

During plugging and abandonment operations of a well, the operator is required to separate oil, gas and water-bearing strata with 100 ft. cement plugs to completely seal the borehole and prevent communication with other zones, including groundwater.

Water Supply Testing- 35 CSR 4-19 and 35 CSR 8-15

For conventional wells, operators are required to notify landowners within 1,000 ft. of a proposed drill site for a well. At the request of the landowner, the operator shall sample and analyze water from any wells or springs within this 1,000 ft. radius. If no requests are made, then the operator shall choose an existing well or spring from within the 1,000 ft. to sample and analyze. Operators are required to move out to 2,000 ft. if there are no wells or springs within 1,000 ft. Sampling parameters include, but are not limited to pH, iron, chlorides, total dissolved solids and detergents (MBAS). Results are to be submitted to the landowner as well as the OOG. Results are kept on file for groundwater quality purposes should a problem ever arise.

The operator shall sample and analyze water from any existing water wells or developed springs within 1500 ft. from the center of the proposed pad for all wells permitted under W. Va. Code § 22-6A. Under 35 CSR 8-15.3.b, the Chief can require the operator to sample and analyze out to 2000 feet. parameters include, but are not limited to: total petroleum hydrocarbons (GRO, DRO,ORO), BTEX, chloride, sodium, total dissolved solids (TDS), aluminum, arsenic, barium, iron, manganese, pH, calcium, sulfate, detergents (MBAS), dissolved methane, dissolved ethane, dissolved butane, dissolved propane, and bacteria (total coliform).

Underground Injection Control Program – 35 CSR 4-7

The OOG administers the Underground Injection Control (UIC) Program for Class II and III injection wells. Class II wells include brine disposal and secondary recovery gas and water injection wells. Class III wells include solution mining wells. The current active inventory of Class II and III wells consists of approximately 16 private and 15 commercial brine disposal wells, 469 secondary recovery wells and 8 solution mining wells. The primary focus of this program is the protection of groundwater from injection operations.

During the permitting process, operators are required to sample and analyze all water wells, springs and surface water bodies within at least a quarter-mile radius of the injection well or facility. Solution mining permits further require that groundwater be sampled, analyzed and charted on a quarterly basis. To ensure well integrity, mechanical integrity tests (MITs) are required to be conducted on every injection well by the operator at least once during the 5-year permit term to ensure that injected fluid is not migrating into any Underground Source of Drinking Water (USDW). Operators are required to submit reports monthly of daily activity for each injection well.

Abandoned Well – 35 CSR 6

Abandoned wells are the most problematic regulatory area relating to groundwater, especially for wells drilled 75 to 100 years ago when technology and concern for groundwater protection were not as advanced as today. These wells, which are found throughout the state, now pose potential and actual threats to groundwater quality, as aquifers penetrated by these wells are typically not cased to protect them from contaminants within the borehole of the well. Some of the typical contaminants that may affect groundwater quality include hydrocarbons, chlorides and metals. The OOG works with both industry and the federal government to locate, prioritize and plug or produce abandoned wells. The OOG has a priority ranking of abandoned wells and those that pose a significant and/or immediate threat to human health or the environment are scheduled for evaluation first.

Annual Inspection – 35 CSR 4-11.6

Operators are required to visually inspect all their unplugged wells on an annual basis. Any significant leakage or well integrity failure is to be reported to the OOG and measures should be taken to remedy the problem. Operators are required to submit certification to the OOG that the inspections have been conducted.

General Water Pollution Control Permit, GP-WV-1-88, GP-WV-1-07

The primary function of the land application general permit, GP-WV-1-88, is the prevention of pollution to the waters of the state relating to the handling and disposing of drilling wastes. Operators applying for a conventional well work permit involving the use of a pit for holding wastes generated during well work must also register this site and indicate the method for treating and disposing of the pit contents. If land application is the chosen method of disposal, a groundwater protection plan (GPP), must be filed as part of the permit packet. Generally, most pit contents (excluding those generated from an H6A well) may be land applied after proper treatment and aeration procedures.

Another general permit, GP-WV-1-07, allows for produced water from certain coalbed methane wells to be applied directly to the ground. To qualify for coverage under this permit, candidate wells must meet strict water quality criteria. Analyses of surface water, and in some cases, groundwater, must be presented to OOG on a semi-annual basis for review.

Spill Prevention and SPCC Plans -- 35 CSR 1, 35 CSR 8 - 18

To prevent discharged oil from reaching waters of the state, all operators are to have adequate containment or diversionary structures in place at each well or facility. Operators are also required to have a Spill Prevention Control Countermeasure (SPCC) Plan for these facilities. This requirement was devised as a result of the passage of the Clean Water Act (CWA) to protect waters of the state from discharged oil.

For horizontal wells permitted under W. Va. Code § 22-6A-1, operators must further ensure that all site equipment is positioned and used in a manner that will prevent spills into waters of the state. Provisions also exist that describe the use of pad liners, containment structures, catchment basins, and bulk chemical storage on site.

Miscellaneous

To prevent discharged oil from reaching waters of the state, all operators are to have adequate containment or diversionary structures in place at each well or facility. Operators are also required to have a Spill Prevention Control Countermeasure (SPCC) Plan for these facilities. This requirement was devised as a result of the passage of the Clean Water Act (CWA) to protect waters of the state from discharged oil.

For horizontal wells permitted under W. Va. Code § 22-6A-1, operators must further ensure that all site equipment is positioned and used in a manner that will prevent spills into waters of the state. Provisions also exist that describe the use of pad liners, containment structures, catchment basins, and bulk chemical storage on site.

B. Division of Water and Waste Management

WVDEP's Division of Water and Waste Management (DWWM) is the State's lead agency for the regulation and protection of groundwater. See, W. Va. Code §22-12-6(a). As such, it coordinates with all the other agencies of State government charged with groundwater protection to maintain the State's groundwater management strategy and the data management system that allows these agencies to administer the State's groundwater program. Several programs within DWWM are charged with aspects of groundwater protection, namely the Groundwater Program, the Office of Waste Management's Solid Waste Permitting Unit, the Office of Water Resources' Hazardous Waste Permitting Unit, and the Water Use Section. Also within WVDEP, both the Division of Mining and Reclamation, which includes the Office of Abandoned Mine Lands, Reclamation and Enforcement, and the Office of Oil and Gas have programs dedicated to groundwater protection. Finally, the Division of Land Restoration has programs that oversee the remediation of sites that have been impacted by past industrial practices, which almost always involves the cleanup of contaminated groundwater.

1. Office of Waste Management

a) Solid Waste Permitting Unit (SWPU)

The SWPU regulates solid waste facilities under the Solid Waste Management Rule, 33CSR1. This includes the review of applications for various permitting activities for new and existing facilities such as permit issuance, renewal, or closure. The SWPU reviews applications to accept special waste, to alter groundwater monitoring systems, and reviews statistical groundwater monitoring reports, conducts construction quality assurance and quality control inspections, and compliance assistance to waste generators.

Description	Permitted Facilities 2023
Active Municipal Solid Waste Landfills (Class A & B)	18
Closed Municipal Solid Waste Landfills (Class A & B)	27
Active Construction/Demolition Waste Facilities (Class D and D-1)	23
Yard Waste Composting Facilities	1
Transfer Stations	17
Waste Tire Facilities	1
Registered Recycling Facilities (Class E)	195
Incinerator	1
Mixed Waste Processing Facilities	1
Industrial Landfills (Class F) including CCB and CCR	41

Some landfills are currently allowed to accept drill cuttings and associated drilling waste for proper disposal. Those facilities had to obtain modifications to their permits, which require that the leachate from the cells holding this waste be monitored separately from rest of the landfills waste through dedicated monitoring wells and that the leachate emanating therefrom be treated by publicly owned treatment works (POTWs).

Oil and other chemicals, primarily from vehicles, and leachate can contaminate stormwater flowing from solid waste facilities. Plans for structures and procedures for managing stormwater are a part of the detailed plans reviewed by the SWPU. Proper design, construction, and management prevent contaminated stormwater from infiltrating into the groundwater.

In an effort to protect groundwater, the Solid Waste Management Rule requires an impermeable liner system for solid waste municipal solid waste landfills. This multiple layer liner system includes a leak detection zone that will alert the facility should there be a failure in the liner. If contamination has been detected by routine detection monitoring, the landfill may be required to begin corrective action to clean up the groundwater.

Permitted landfills must sample groundwater-monitoring wells twice each year and perform statistical tests to determine whether groundwater has been contaminated. The statistical reports are reviewed by the SWPU and the Office of Environmental Enforcement (OEE) takes any necessary enforcement action.

Groundwater monitoring wells must sometimes be replaced because they have caved in, gone dry, or are located where the disposal area is expanding. The SWPU reviews well replacement plans to ensure that the new wells are properly placed to detect potential groundwater contamination as soon as possible.

Groundwater monitoring reports are submitted to the SWPU on paper. The Integrated Regulatory Information Support system (IRIS) , which is being developed by WVDEP, will accept groundwater-monitoring data electronically and provide an interface to statistical and mapping software that will allow the SWPU to check statistical calculations.

The proper management of waste reduces the likelihood of groundwater contamination by reducing the amount and controlling the types of contaminants in leachate. This is achieved by special waste requests which are reviewed by the SWPU and either approved or denied for disposal.

The SWPU is responsible for ensuring that facilities are properly designed by reviewing plans and granting permit modifications for expansion. During construction at these facilities, the SWPU conducts quality assurance/quality control (QA/QC) inspections to assure that facilities are built according to specifications and accepted industry practices.

Through the Landfill Closure Assistance Program (LCAP), the WVDEP is currently monitoring the 31 closed solid waste landfills in West Virginia. Under this program, the emphasis is on the capping of these facilities to minimize groundwater impact. Active solid waste landfill facilities have an on-going program to identify and address any groundwater releases. The LCAP Program utilizes consultants who follow the procedures outlined in 33CSR1 to sample, analyze, and identify groundwater and any associated problems. The SWPU has assisted LCAP by providing geological assistance on program priorities.

2. Hazardous Waste Permitting Section

The Hazardous Waste Permitting Unit (Permits) was established by Chapter 22, Article 18 of the West Virginia Code and the rules promulgated thereunder. Legislative Rule, Title 33, Series 20, known as the Hazardous Waste Management System (HWMS), are the regulations promulgated to regulate the storage, treatment, and disposal of hazardous wastes generated and managed in West Virginia. The HWMS has incorporated by reference the Code of Federal Regulations (CFR) promulgated under the Resource Conservation and Recovery Act (RCRA) amendments of 1984. All provisions of 40CFR264 Subpart F and 40CFR265 Subpart F, which pertain to groundwater protection and any releases from a Solid Waste Management Unit (SWMU), have been incorporated by reference in their entirety.

Permits and the State of West Virginia coordinate this regulatory effort with the EPA. In general, as a summary of the relationship between the two agencies, West Virginia has authorization to assume the lead role in the groundwater protection and monitoring at the permitted units in West Virginia while EPA has the lead for implementing corrective action activities.

Groundwater Protection Goal and Priorities

The goal of Permits is to identify all permitted sites with groundwater contamination or potential for groundwater contamination due to a release, remediate the site, and return the site to its original condition.

The priority objectives are as follows:

- Identify all sites with contaminated groundwater or potential for groundwater contamination.
- Define the contaminants, source, and extent of contamination.

WVDEP is targeting to have all RCRA facilities to select final remedies that would eliminate human exposure and control off-site contamination including any off-site migration of contaminated groundwater, which is in alignment with National RCRA-Corrective Action Program vision, mission and goals for 2030.

Mechanisms to Regulate and Protect Groundwater at Permitted Units

The Groundwater monitoring regulations in 40 CFR Part 264/265, Subpart F, is one part of an overall strategy to reduce the likelihood of environmental contamination resulting from hazardous waste treatment, storage, disposal and any SWMU under the Corrective Action Program. This strategy includes restrictions on disposal of untreated hazardous waste, unit-specific standards for land-based hazardous waste management units, and monitoring groundwater below these units. The land disposal restrictions program requires the treatment of hazardous wastes before disposal to reduce the mobility or toxicity of hazardous constituents. The unit-specific standards for land-based hazardous waste management units seek to prevent the release of hazardous waste to the environment.

Groundwater monitoring is the final link in this strategy to prevent environmental contamination. Owners and operators of all land-based units must institute a groundwater program that is able to detect and characterize any releases of hazardous waste or hazardous constituents to the groundwater underlying the facility. Should the other elements of the strategy fail, groundwater monitoring will detect the release so it can be remedied.

The regulations in Subpart F of Part 264/265 are general requirements, establishing performance-based standards that state what a successful groundwater monitoring program must accomplish; they do not dictate specific technical standards. Each facility's groundwater monitoring program is unique because no two Treatment, Storage, or Disposal Facilities (TSDF) are the same. Individual groundwater monitoring programs are based on site-specific conditions, including the underlying geology and hydrology, contaminants in the groundwater, as well as the properties of wastes managed on site.

Regulatory authority is available to require the owner and operator of a TSDF to remediate releases of hazardous waste or hazardous constituents to the environment. All permitted facilities must comply with Part 264, Subpart F, for releases from SWMUs. There are three stages to the Part 264, Subpart F, groundwater monitoring and follow-up activities:

- Detection monitoring - to detect if a release has occurred.
- Compliance monitoring - to determine if regulatory standards have been exceeded once a release has occurred.
- Corrective action - to remediate a release to the groundwater.

Section 264.97 sets out the basic requirements that apply to all groundwater monitoring programs under Part 264, Subpart F. The specific requirements that apply to each of the three phases of groundwater monitoring are found in section 264.98, 264.99, and 264.100.

The general requirements for groundwater monitoring programs at permitted facilities are found in Subpart 264.97. These general requirements apply to all three phases of groundwater monitoring: detection monitoring, compliance monitoring, and corrective action. A groundwater monitoring program established pursuant to Part 264, Subpart F, must have a sufficient number of monitoring wells, installed at appropriate locations and depths, to yield water samples that:

- Represent the background conditions of the site.
- Represent the quality of groundwater passing the point of compliance.
- Detect any contamination of the uppermost aquifer at the point of compliance.

The goal of a detection monitoring program is to detect and characterize any release of hazardous constituents from a regulated unit into the uppermost aquifer. The detection monitoring system must be installed at the point of compliance and adhere to the task requirements applicable to all groundwater monitoring systems. The owner and operator must monitor for certain indicator parameters and any other specific waste constituents or reaction products that would provide a reliable indication of the presence of hazardous constituents in groundwater at the point of compliance.

Once it is established that a release has occurred, the owner and operator must institute a compliance-monitoring program. The goal of the compliance-monitoring program is to ensure that the amount of hazardous constituents released into the uppermost aquifer does not exceed acceptable levels. Once those levels are exceeded, the owner and operator must initiate corrective action. The compliance-monitoring program establishes routine monitoring (at least semi-annually).

The goal of the Subpart F corrective action program is to bring regulated units and/or SWMU back into compliance with the required standards at the point of compliance. The Subpart F corrective action program seeks to accomplish this goal by requiring that the owner and operator either remove the hazardous constituents or treat them in place. Examples of corrective measures include excavation, stabilization, solidification, and source control. The owner and operator must also conduct corrective action to remove or treat in place any hazardous constituents that exceed the required standards between the point of compliance and the down gradient property boundary, and beyond the facility boundary where necessary to protect human health and the environment.

Mechanisms for Corrective Action

The Hazardous and Solid Waste Act of 1984 (HSWA) required corrective action for all releases of hazardous waste or constituents from any SWMU at a facility seeking a permit regardless of when the waste was placed in the unit. A SWMU is any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. This definition includes

any area at a facility where solid wastes have been routinely and systematically released. This authority is applied to any facility seeking a permit, including operating permit, post-closure permits, and permits-by-rule after November 8, 1984.

Under HSWA, Congress also gave EPA the authority to issue orders requiring cleanups at interim status facilities. For interim status TSDFs that were already in operation when the applicable RCRA standards were established, and that are operating under the standards in 40 CFR Part 265 until they receive a permit Under 3008(h), as added by HSWA, the EPA can issue an administrative order or file a civil action whenever it determines, on the basis of any information, that there is or has been a release of hazardous waste into the environment from the facility. This applies to facilities that are currently operating under interim status, that formerly operated under interim status, or that should have obtained interim status. It also applies to any release of hazardous waste or constituents from the facility. In addition to requiring cleanup, EPA has the authority under 3008(h) to revoke or suspend interim status. Finally, as with 3004(v), EPA may use 3008(h) to require corrective action beyond the facility boundary and to require proof of financial assurance for cleanup.

One of the keys to understanding the RCRA corrective action program is knowing when a facility becomes subject to the corrective action. A facility can enter the corrective action program in one of primarily four ways. Facilities can enter the corrective action program under statutory authorities, by enforcement orders, by volunteering to perform cleanups, or after detecting statistically significant increases of contamination according to the groundwater monitoring requirements in 40 CFR 264, Subpart F.

In the past, EPA has used the corrective action process to evaluate and document the nature and extent of contamination, identify the physical and geographic characteristics of the facility, and identify, develop, and implement appropriate corrective measures. The conditions at contaminated sites vary significantly, making it difficult to adhere to one rigid process. Consequently, the corrective action process is designed to be flexible.

The original corrective action process of investigation and remedy selection and implementation comprise several activities. These activities are not always undertaken as a linear progression toward final facility cleanup but can be implemented flexibly to meet site-specific corrective action needs most effectively. These activities are:

- RCRA Facility Assessment (RFA) - identifies potential or actual releases from SWMUs.

- Interim/Stabilization Measures - implements measures to achieve high-priority, short-term remediation needs.

- RCRA Facility Investigation (RFI) - compiles information to fully characterize the release.

- Corrective Measures Study (CMS) - identifies appropriate measures to address the release.

Once the implementing agency has selected a remedy, the facility enters the corrective measures implementation (CMI) phase of corrective action. During the CMI, the owner and operator of the facility implement the chosen remedy. This phase includes design, construction, maintenance, and monitoring of the chosen remedy, all of which are performed by the facility owner and operator with agency oversight.

A remedy may be implemented through a phased approach and phases could consist of any logically connected set of actions performed sequentially over time or concurrently at different parts of a site.

Facilities with On-going Corrective Action

The following table provides the facilities in WV that are included in the RCRA Corrective Action Program. It lists the facilities and provides CA Status in the form of attained measures such as current human exposure under control (CA 725), groundwater releases controlled (CA 750), remedy construction (CA 550), performance standards attained (CA 900), and corrective action process terminated (CA 999). YE stands for YES. This table is periodically updated.

Additional information about site history and project details can be obtained from the EPA website(https://www.epa.gov/hwcorrectiveactioncleanups/contact-information-corrective-action-hazardous-waste-clean-ups-delaware) and selecting the facility of interest.

Table. RCRA Corrective Action (CA) Program Tract Facilities as of 2023.

No.	EPA ID	Handler Name	City	State	CA 725	CA 750	CA 550	CA 900	CA 999
1	WVD980552384	ADDIVANT USA LLC - NORTH PLANT (SI GROUP USA LLC)	MORGANTOWN	WV	YE	YE			
2	WVD061776977	ADDIVANT USA LLC - SOUTH PLANT (SI GROUP USA LLC)	MORGANTOWN	WV	YE	YE			
3	WVD980554588	AEP - KANAWHA RIVER PLANT	GLASGOW	WV	YE	YE	YE	YE	YE
4	WVD981107600	AES ENVIRONMENTAL, LLC (CLEAN EARTH OF MORGANTOWN)	MORGANTOWN	WV	YE	YE	YE	YE	YE
5	WVD980554760	AIRCO WELDING PROD CHESTER WIRE PLANT	CHESTER	WV	YE	YE	YE	YE	
6	WVD060692126	ALLIANCE TUBULAR HOLDINGS LLC	JANE LEW	WV	YE	YE	YE	YE	YE
7	WV0170023691	ALLIANT TECHSYSTEMS OPERATIONS LLC, ABL OPERATIONS	ROCKET CENTER	WV	YE	YE			

No.	EPA ID	Handler Name	City	State	CA 725	CA 750	CA 550	CA 900	CA 999
8	WVD063461958	APPALACHIAN TIMBER SERVICES LLC	SUTTON	WV	YE	YE	YE		
9	WVD000068908	ARCELORMITTAL WEIRTON LLC (CLEVELAND-CLIFFS WEIRTON LLC)	WEIRTON	WV	YE	YE			
10	WVD041517830	BALL AEROSOL & SPECIALTY CONTAINER INC	WEIRTON	WV	YE	YE	YE	YE	YE
11	WVD980707178	BEAZER EAST-COLLIERS	COLLIERS	WV	YE	YE	YE		
12	WVD063468342	BROWNING FERRIS IND CHEMICAL SERV INC	CHARLESTON	WV	YE	YE	YE	YE	YE
13	WVR000001719	CHEMICAL LEAMAN TANK LINES INC	INSTITUTE	WV	YE	YE	YE		
14	WVD005012851	CHEMOURS COMPANY FC LLC	BELLE	WV	YE	YE	YE		
15	WVD041952714	CHEMOURS COMPANY FC (POTOMAC RIVER WORKS PRW L..C)	FALLING WATERS	WV	YE	YE	YE		
16	WVD045875291	CHEMOURS COMPANY FC LLC	WASHINGTON	WV	YE	YE	YE		
17	WVD009233297	CONSTELLIUM ROLLED PRODUCTS	RAVENSWOOD	WV	YE	YE	YE		
18	WVD056866312	COVESTRO LLC	PROCTOR	WV	YE	YE	YE		
19	WVD004341491	CYTEC INDUSTRIES, INC	WILLOW ISLAND	WV	YE	YE			
20	WVD004336343	EAGLE NATRIUM LLC	PROCTOR	WV	YE	YE	YE		
21	WVD000068601	FLINT GROUP PIGMENTS (EVERETT HANNAH PROPERTIES)	HUNTINGTON	WV	YE	YE			
22	WVD005005079	FMC CORP - HYDROGEN PEROXIDE DIVISION	SOUTH CHARLESTON	WV	YE	YE	YE	YE	YE
23	WVD004319539	FOLLANSBEE PLANT	FOLLANSBEE	WV	YE		YE		
24	WVD005005087	GREAT LAKES CHEMICAL CORPORATION	NITRO	WV	YE	YE	YE		
25	WVD076826015	HUNTINGTON ALLOYS CORPORATION	HUNTINGTON	WV	YE				
26	WVD004336749	KOPPERS INC. (PETRO EMPIRE LIQUIDS AND STORAGE)	FOLLANSBEE	WV	YE	YE	YE		
27	WVD003080959	KOPPERS INC.	GREEN SPRING	WV	YE	YE	YE		
28	WVD005010277	MILLER SPRINGS REMEDIATION MGMT - GLENN SPRINGS HOLDINGS	BELLE	WV	YE	YE	YE	YE	
29	WVD004325353	MPM SILICONES, LLC	FRIENDLY	WV	YE	YE	YE		
30	WVD044145209	RUBBERMAID COMMERCIAL PRODUCTS LLC	MARTINSBURG	WV	YE	YE	YE	YE	YE
31	WVD088911854	SABIC INNOVATIVE PLASTICS US LLC	WASHINGTON	WV	YE	YE	YE		
32	WVD981034101	SAFETY-KLEEN SYSTEMS, INC.	WHEELING	WV	YE	YE	YE	YE	
33	WVD057634776	SHELL LUBRICANTS	NEWELL	WV	YE	YE			
34	WVD980555395	SMR TECHNOLOGIES INC	FENWICK	WV	YE	YE	YE	YE	YE

No.	EPA ID	Handler Name	City	State	CA 725	CA 750	CA 550	CA 900	CA 999
35	WVD039990965	SOLUTIA NITRO SITE	NITRO	WV	YE	YE	YE	YE	
36	WVD004337135	ST. MARYS REFINING COMPANY, INC.	SAINT MARYS	WV	YE	YE	YE		
37	WVD074968413	THIOKOL SPECIALTY CHEMICAL DIV	NEWELL	WV	YE	YE	YE		
38	WVD988766127	TRC SPENT CATHODE STORAGE PILE	RAVENSWOOD	WV	YE	YE	YE		
39	WVD005005509	UNION CARBIDE CORPORATION - INSTITUTE OPERATIONS	INSTITUTE	WV	YE	YE	YE		
40	WVD005005483	UNION CARBIDE CORPORATION - SOUTH CHARLESTON PLANT	SOUTH CHARLESTON	WV	YE	YE			
41	WVD060682291	UNION CARBIDE CORPORATION - TECK PARK OPERATIONS	SOUTH CHARLESTON	WV	YE	YE	YE		
42	WVD000739722	UNION CARBIDE CORPORATION / PTO	NITRO	WV	YE	YE	YE		
43	WVD000737387	SAFETY-KLEEN SYSTEMS, INCORPORATED 4075-02	POCA	WV					YE
44	WVR000502815	WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION	ELKVIEW	WV	YE	YE	YE		

Groundwater Data Collection and Management

Most groundwater data is collected by facilities or environmental firms on the facilities' behalf. Occasionally samples are collected by DWWM personnel for the purpose of comparison. Regardless of who is collecting groundwater samples, sampling methodology and analytical testing procedures must comply with the protocols prescribed by the appendices to 40 CFR 261. All samples must be analyzed by laboratories certified by the DWWM.

Permits do not have a database for the management of groundwater data. Currently, facility groundwater data is submitted in paper form and reviewed by hazardous waste personnel assigned to the facility. In the future groundwater data will be submitted electronically. The electronic data will be stored, managed, and shared among the divisions of WVDEP and other agencies with groundwater certification. The electronic data will be available to the public as well. In the future the data will be submitted by e-permitting system.

Program Consideration and Needs

There are difficulties inherent with trying to clean areas to pristine levels where industry has been associated with business activities for decades. There are economic and technical obstacles that need to be considered in areas that will probably never be

utilized for drinking water. However, that must be balanced with the ideal that our groundwater is a valuable resource not to be taken for granted. There are many who have a stake in the decisions on how best to manage the environment. In the future, policy and decision making must be addressed by administration in a manner that each operating unit is clear as to the direction and in the manner these issues are to be decided.

3. Water Use Section

The Water Use Section operates under the authority of the 2008 Water Resources Protection and Management Act (W.Va. Code §22-26). The Section's formative publication, the West Virginia Water Resources Management Plan, provides a comprehensive review of the state's waters and was adopted by the Legislature in 2014. The Water Use Section has continued to implement the provisions and recommendations of both the Act and Plan with several ongoing programs, projects, and studies relevant to the state's groundwater resources.

Annually, Section staff presented the 2020 and 2021 Annual Water Resources Reports to the Joint Legislative Oversight Commission on State Water Resources in support of West Virginia Water Resources Protection and Management Act requirements on 12/7/21 and 12/6/22, respectively. The 2022 Annual Water Resources Report will be finalized soon and presented to the Joint Legislative Oversight Commission on State Water Resources in late 2023. The Water Use Section has experienced a full turn over of 2 technical FTE and 0.5 administrative FTE within the reporting timeframe.

Water Use Section-Groundwater Related Requirements

1. Large Quantity Use

Any entity that withdraws more than 300,000 gallons in 30 days from state's water resources (surface or groundwater), and anyone who bottles water for resale, regardless of the quantity withdrawn, is considered a Large Quantity User (LQU) under the Water Resources Protection and Management Act. These LQUs use the WVDEP Electronic Submission System (ESS) to report their withdrawals annually to the Water Use Section. LQU surveys are collected between January 1 and March 31 of the year following water withdrawal; we will receive 2023 reports beginning January 1, 2024. The Section has been collecting LQU information since 2010 and monitoring trends in water use. We share water withdrawal with research partners including state universities and the USGS as well as the Joint Legislative Oversight Commission on State Water Resources annually. The LQU data represents our best insight into water use throughout West Virginia but is by no means definitive. The Water Use Section does not collect any water withdrawal information on users below the LQU threshold; the cumulative impact of such withdrawals is unknown.

The section has been working on a system migration project since 2021. Annual

LQU survey will be conducted using e-Permitting through a new online data submission system. Main objective is to keep the same mechanism to allow LQUs to self-enroll and self-report their water withdrawal data. With the project progress, LQU survey is scheduled to use e-Permitting from 2023 data submission cycle, starting January 2024.

The data quality management has been implemented in the LQU data summary cycle. Commonly used primary and foreign keys for annual calculation have been reviewed and cleaned up based on USGS recommendation. Any data change or update requests from LQU were reflected in the WVDEP LQU database for water use analysis. The 2022 data has not been finalized yet due to priority of contract for development of new online data submission system.

In general, total water use has been increased due primarily to the increase in water use by thermoelectric and chemical operations. Thermoelectric operations continue to be the largest water use sector overall excluding hydroelectric. Groundwater withdrawals remain relatively consistent, comprising less than 5% of the total water use in West Virginia. Public water supply is the single largest user of groundwater.

	2020		2021	
Water Use Sector	**Total Withdrawn (in gallons)**	**% of Total Withdrawn**	**Total Withdrawn (in gallons)**	**% of Total Withdrawn**
Agriculture/ Aquaculture	9,568,490,855	1.60%	8,453,267,673	1.32%
Chemical	111,383,530,431	18.65%	142,025,333,594	22.14%
Industrial	40,129,250,348	6.72%	15,478,774,963	2.41%
Mining	9,896,635,282	1.66%	11,380,977,450	1.77%
Oil & Gas	2,923,297,711	0.49%	3,603,079,370	0.56%
Petroleum	296,017,675	0.05%	290,570,264	0.05%
Public Water Supply	57,304,394,679	9.60%	60,485,128,163	9.43%
Recreation	1,209,768,769	0.20%	935,428,884	0.15%
Thermoelectric	363,483,322,266	60.87%	398,031,543,142	62.04%
Timber	957,057,719	0.16%	910,633,110	0.14%
TOTAL	**597,151,765,735**		**641,594,736,613**	

Table 1. Total withdrawals (WD) from the 2020 and 2021 WVDEP LQU database.

	2020		2021	
Water Use Sector	**Groundwater Withdrawn (in gallons)**	**% Groundwater of total Withdrawn**	**Groundwater Withdrawn (in gallons)**	**% Groundwater of total Withdrawn**
Agriculture/ Aquaculture	253,718,000	2.65%	167,492,400	1.98%
Chemical	8,174,023,872	7.34%	8,953,023,716	6.30%
Industrial	598,867,324	1.49%	763,768,862	4.93%
Mining	4,745,101,586	47.95%	5,313,089,296	46.68%
Oil & Gas	39,514,147	1.35%	17,263,638	0.48%
Petroleum	295,911,793	99.96%	284,264,502	97.83%
Public Water Supply	10,141,063,722	17.70%	12,211,833,868	20.19%
Recreation	317,612,920	26.25%	329,426,263	35.22%
Thermoelectric	348,418,580	0.10%	438,657,461	0.11%
Timber	13,380,899	1.40%	10,986,515	1.21%
TOTAL	**24,927,612,843**		**28,489,806,521**	

Table 2. Groundwater withdrawals (GW WD) from the 2020 and 2021 WVDEP LQU database.

2. Water Management Plans for H6A wells

The Water Use Section of the WVDEP is responsible for the processing, analysis, and approval of operator-submitted water management plans. Pursuant to WV Code §22-6A-7 and the Horizontal Well Development Rule 35CSR8, natural gas operators developing horizontal wells that use water more than 210,000 gallons during any 30-day period, shall submit a Water Management Plan as part of the well work permit application. H6A well work permit applicants must identify all potential water sources with the inclusion of a Water Management Plan along with their horizontal well permit application. The WVDEP evaluates each proposed water source (surface water, groundwater, purchased water, or recycled frac water) for suitability based on a variety

of considerations.

As of June 30, 2023, the Water Use Section received and reviewed 2,559 individual Water Management Plans associated with WV Code §22-6A well work, including new pad-level plans and existing Water Management Plan modifications, all relating to the planned withdrawal of surface and groundwater used in horizontal well drilling operations. The actual volume of water used in these operations is captured by the LQU program.

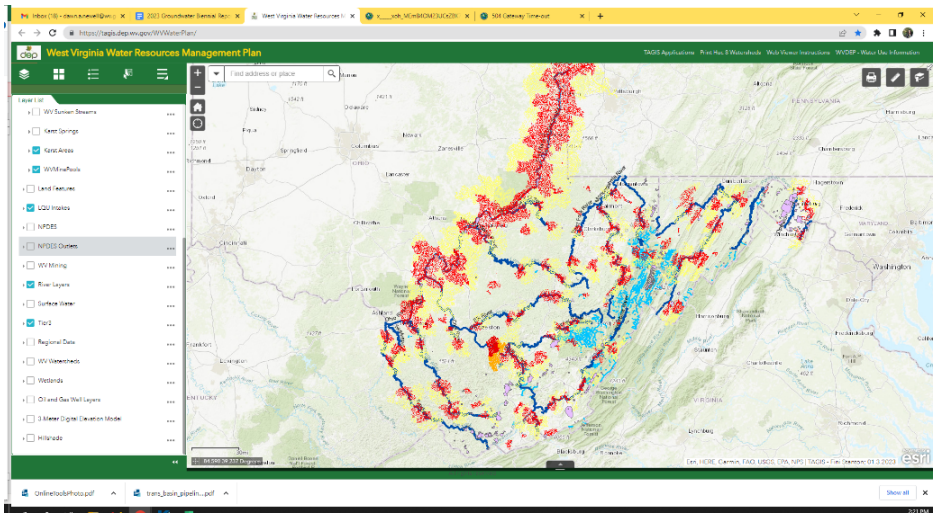
Water Use Section - Groundwater Related Research

Collaborated and coordinated with USGS and WVU on recent, current and potential water quantity research projects in support of West Virginia Water Resources Protection and Management Act requirements such as but not limited to:

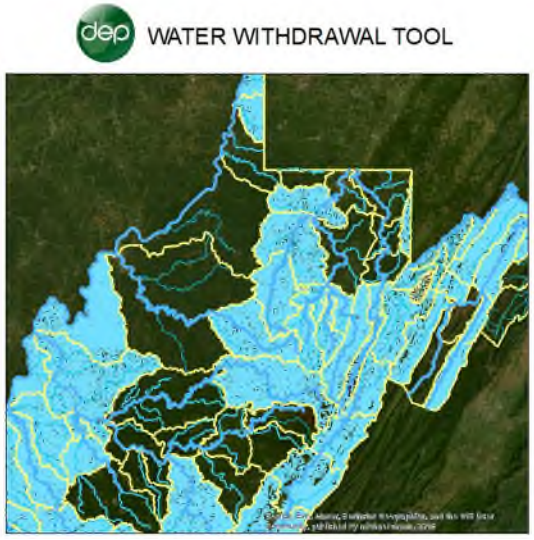
1. 2022, Groundwater quality and geochemistry of the western wet gas part of the Marcellus Shale Oil and Gas Play in West Virginia: USGS SIR 2022–5094, https://doi.org/10.3133/sir20225094
2. 2022, Occurrence of per- and polyfluoroalkyl substances and inorganic analytes in groundwater and surface water used as sources for public water supply in West Virginia: USGS SIR 2022–5067, https://doi.org/10.3133/sir20225067
3. 2023, Per- and polyfluoroalkyl Substances in Drinking Water at Select Public Water Systems in West Virginia, 2022: USGS Data Release, https://doi.org/10.5066/P9WZ9Y4K
4. 2023, Quantifying Water Security in West Virginia and the Potomac River Basin: WVU Eric Sjöstedt, Michael Strager, Nicolas Zegre
5. ETA July 2023, Groundwater Quality in Abandoned Underground Coal Mine Aquifers: USGS
6. ETA September 2023, Monroe County Hydrogeologic Assessment: USGS
7. ETA February 2024, Geophysical Groundwater Well Logging: USGS
8. Discussing project proposal for a comprehensive water-use study of Jefferson and Berkeley Counties with USGS

Water Use Section - GIS Internet Based Water Information Tools

In cooperation with the TAGIS group, the Water Use Section maintains a suite of internet-based tools that display water resources management data in a Geographic Information System (GIS). The Water Resources Management Mapping Tool acts as a clearinghouse for all manner of data relevant to groundwater management, including LQU withdrawals, watershed delineations, karst, monitoring wells, springs, mine pools, NPDES, geology, and more. Link: http://tagis.dep.wv.gov/WVWaterPlan/



TAGIS and the Water Use Section also maintain a Water Withdrawal Guidance Tool. Developed in 2009, this tool helps direct potential water withdrawals towards only those surface waters with sufficient flow. The Section continues to investigate improvements to this tool, including the incorporation of groundwater resources, stream ecology, and higher spatial resolutions. Link: https://tagis.dep.wv.gov/wwts/



Water Use Section - Program Needs

The Water Use Section respectfully requests the continued support from the Legislature and all concerned state agencies regarding funding and cost-sharing solutions for the 183 stream gauges and 19 groundwater level monitoring wells in the local network managed by the USGS. In federal fiscal year FY 2022 which runs from October 1, 2021 through September 30, 2022, West Virginia contributed $820,000. There are plans for an increase in the FY 2023 and FY 2024 state budgets for this network to cover operational and maintenance costs associated with supply and travel, however it has not yet been finalized.

Federal Fiscal Year (October 1 through September 30)	State of WV	Sum of USGS Funding	Other Locality, Federal and Private Funding	Total Funding	Overall Annual Increase
FY 2019	$765,000	$545,320	$809,330	$2,119,650	N/A
FY 2020	$800,000	$562,800	$805,380	$2,168,180	2.24%
FY 2021	$800,000	$561,765	$841,440	$2,203,205	1.59%
FY 2022	$820,000	$560,234	$882,500	$2,262,734	2.63%

The Water Use Section along with other WVDEP program staff continue to participate in the quarterly stream gaging council meetings to support continued cooperation and prioritization of statewide water resources data development.

4. Groundwater Program

The DWWM's Groundwater and UIC Programs coordinate the groundwater protection efforts of the WVDHHR's Bureau for Public Health, the Department of Agriculture, and various WVDEP programs that have authority under West Virginia's Groundwater Protection Act. This is in addition to its own main responsibilities below.

a) Groundwater Quality Standard Variances - Title 47 Series 57

Title 47 Series 57 established procedures for facilities to petition the secretary for a variance from groundwater protection standards for an individual source or for a class of sources. If the secretary agrees that a variance is appropriate, the rulemaking procedures will be initiated in accordance with Chapter 29 Article 3 of the W. Va. Code. The secretary may deny a variance; however, only the Legislature may grant a variance.

Variances may be granted by the Legislature to allow groundwater quality standards to be exceeded for a single source or class of sources, which by their nature cannot be conducted in compliance with the requirements of W. Va. Code 22-12-5. The benefits of granting the variance must outweigh the benefit of complying with existing groundwater quality standards and demonstrate that there is no technologically feasible alternative available. The request must also show that granting the variance is more in the public interest than adherence to existing groundwater quality standards.

During this reporting period, there have been no new requests for any groundwater quality standard variances. Nine current variance well owners have submitted monitoring/reporting data, some with remedial action plans, per regulation and this data was reviewed to determine variance well compliance.

b) Groundwater Protection Regulations - Title 47 Series 58

The Groundwater Protection Rule, 47 CSR 58, requires Groundwater Protection Plans (GPPs) from facilities that have the potential to affect groundwater. They are preventative maintenance documents that cover all processes and materials at a facility that may reasonably be expected to influence groundwater quality. The facility must make an inventory of all potentially contaminating processes and materials and have structures and practices in place to prevent groundwater contamination from these processes and materials. Groundwater protection practices include, at a minimum, quarterly inspections and maintenance by facility personnel and spill cleanup procedures. The Groundwater Protection Rule also sets out instructions for how to prepare and implement GPPs.

During the reporting period GPPS for 622 West Virginia facilities were reviewed by the Groundwater Program. Of these, 616 were approved and sent to the Permits Section, or facility, where appropriate and became part of the permitted facilities' permits. Facilities that do not have permits are mailed approval letters or letters identifying deficiencies in their GPP's that need to be addressed. Inspectors visited 321 facilities during the reporting period to check on the efficacy of the applicable GPPs.

Underground Storage Tank (UST) facilities that distribute store only gasoline or diesel fuel are regulated by the Underground Tanks Program of the DWWM. The purpose of DEP's Underground Storage Tank (UST) Section is to regulate underground storage tanks that contain petroleum or hazardous substances to determine compliance with state rules and federal regulations.

The UST team performs the following tasks:

- Conducts compliance inspections on active UST facilities such as gas stations, chemical plants, trucking depots, fuel distributors, airports
- Inspects new underground storage tank installation
- Provides information, where possible, to individuals who are buying property with USTs issues citations and notice of violations
- Prohibits delivery to USTs not meeting certain requirements
- Conducts compliance assistance inspections
- Answers citizen questions and complaints
- Provides emergency response to suspected releases from UST

c) Geochemistry of West Virginia's Water

Groundwater quality is affected by human activities and can be degraded as a result of industrial waste disposal, coal mining, oil and gas drilling, agricultural activities, domestic or municipal waste disposal, transportation, and rural development. While the overall quality of West Virginia's water resources are very good, there are many concerns to be addressed, more than the scope of this report will allow here. The Groundwater program is pursuing development of a Needs Assessment to begin a comprehensive database of groundwater quality. Two main concerns expressed by many are the increasing abundance of PFAS compounds & their toxicity and pharmaceuticals & endocrine disrupting chemicals in groundwater.

PFAS Concerns

PFAS are a group of man-made chemicals that includes PFOA, PFOS, GenX, and many other chemicals. PFAS have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s. PFOA and PFOS have been the most extensively produced and studied of these chemicals. Both of these chemicals are very persistent in the environment and in the human body – meaning they don't break down and they can accumulate over time (bioaccumulation). There is evidence that exposure to PFAS can lead to a variety of adverse human health effects.

PFAS can be found in:

- Food packaged in PFAS-containing materials, processed with equipment that used PFAS, or grown in PFAS-contaminated soil or water.
- Commercial household products, including stain- and water-repellent fabrics, nonstick products (e.g., Teflon), polishes, waxes, paints, cleaning products, personal care products, and fire-fighting foams (a major source of groundwater contamination at airports and military bases where firefighting training occurs).
- Workplace, including production facilities or industries (e.g., chrome plating, electronics manufacturing or oil recovery) that use PFAS.
- Drinking water, typically localized and associated with a specific facility (e.g., manufacturer, landfill, wastewater treatment plant, firefighter training facility).
- Living organisms, including fish, animals and humans, where PFAS have the ability to build up and persist over time.

Certain PFAS chemicals are no longer manufactured in the United States as a result of phase outs including the PFOA Stewardship Program in which eight major chemical manufacturers agreed to eliminate the use of PFOA and PFOA-related chemicals in their products and as emissions from their facilities. Although PFOA and PFOS are no longer manufactured in the United States, they are still produced internationally and can be

imported into the United States in consumer goods such as carpet, leather and apparel, textiles, paper and packaging, coatings, rubber and plastics.

PFAS are found in a wide range of consumer products that people use daily such as cookware, pizza boxes, stain repellents, and many personal care products. Most people have been exposed to PFAS. Many of these PFAS bioaccumulate and can accumulate and stay in the human body for long periods of time. As a result, as people are exposed to PFAS from different sources over time, the level of PFAS in their bodies may increase to the point where they suffer from adverse health effects.

The most-studied PFAS chemicals are PFOA and PFOS. Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have been shown to cause tumors in animals. The most consistent findings are increased cholesterol levels among exposed populations, with more limited findings related to:

- low infant birth weights,
- effects on the immune system,
- cancer (for PFOA),
- thyroid hormone disruption (for PFOS).
- effects on the immune system, Basic Information on PFAS
- cancer (for PFOA), and
- thyroid hormone disruption (for PFOS).

PFAS are a group of man-made chemicals that have been in use since the 1940s and are (or have been) found in many consumer products like cookware, food packaging, and stain repellents. PFAS manufacturing and processing facilities, airports, and military installations that use firefighting foams are some of the main sources of PFAS. PFAS may be released into the air, soil, and water, including sources of drinking water. PFOA and PFOS are the most studied PFAS chemicals and have been voluntarily phased out by industry, though they are still persistent in the environment. There are many other PFAS, including GenX chemicals and PFBS in use throughout the world.

GenX is a trade name for a technology that is used to make high performance fluoropolymers (e.g., some nonstick coatings) without the use of perfluorooctanoic acid (PFOA). HFPO dimer acid and its ammonium salt are the major chemicals associated with the GenX technology. GenX chemicals have been found in surface water, groundwater, finished drinking water, rainwater, and air emissions in many areas.

Perfluorobutane sulfonic acid (PFBS) has been used as a replacement chemical for PFOS. PFBS has been identified in environmental media and consumer products, including surface water, wastewater, drinking water, dust, carpeting and carpet cleaners, and floor wax.

There are a variety of ways that people can be exposed to these chemicals at varying levels of exposure. For example, people can be exposed to low levels of PFAS through food, which can become contaminated through:

- Contaminated soil and water used to grow the food,
- Food packaging containing PFAS, and
- Equipment that used PFAS during food processing.

Exposure to PFAS chemicals can occur if the chemicals are released during normal use, biodegradation, or disposal of consumer products that contain PFAS. People may be exposed to PFAS used in commercially treated products to make them stain and water-repellent or nonstick. These goods include carpets, leather and apparel, textiles, paper and packaging materials, and non-stick cookware.

People who work at PFAS production facilities, or facilities that manufacture goods made with PFAS, may be exposed in certain occupational settings or through contaminated air.

Drinking water supplies in many communities have been contaminated by these chemicals. Such contamination is becoming increasingly common, especially in areas where industrial facilities produce or use PFAS in the manufacturing process, or near oil refineries, airfields or other locations at which PFAS were used for firefighting.

As these chemicals are ubiquitous and persistent in the environment, it is important that suppliers of drinking water test for the presence of these chemicals in the water supply. At present, many water treatment facilities are unable to remove these chemicals when detected, and pass through the treatment system and into surface and groundwaters. Many of these compounds that pass through treatment facilities are related to the use of medications and personal care products and are linked to health problems associated with endocrine disruption. This is discussed more fully below.

Further research must be conducted to determine toxicity and how best to remediate water contaminated by these chemicals.

Pharmaceuticals and Endocrine Disrupting Chemicals in Groundwater

The presence of pharmaceuticals and endocrine disrupting chemicals in groundwater continues to be a major concern as these chemicals are used in so many products consumed in everyday life. Endocrine disrupting chemicals are found in such products as antimicrobial soaps and disinfectants, flame retardants, plasticizers, linings in food containers (such as bisphenol A), food preservatives, shampoos, sunscreen, bug sprays, cosmetics, and many other personal care products. In addition to these products, pharmaceuticals and endocrine disrupting chemicals also enter drinking water supplies as they pass through septic tank and leach field systems, and water treatment plants. The source comes from many over-the-counter medications, veterinary drugs, prescription drugs such as cholesterol medications, natural and synthetic estrogens compounds, heart medications, steroids, and pain medications to name but a few.

The presence of pharmaceuticals and endocrine disrupting chemicals in groundwater has raised concerns regarding their effects on human health including the continued viability of antibiotic medications. Endocrine disruptors can mimic or partly mimic naturally occurring hormones in the body like estrogens (the female sex hormone), androgens (the male sex hormone), and thyroid hormones, potentially producing overstimulation. They also bind to a receptor within a cell and block the endogenous hormone from binding. The normal signal then fails to occur and the body fails to respond properly. Examples of chemicals that block or antagonize hormones are anti-estrogens and anti-androgens. Endocrine disruptors also interfere or block the way natural hormones or their receptors are made or controlled, for example, by altering their metabolism in the liver.

Because endocrine disrupting chemicals are found in such a wide variety of products; their presence appears to be ubiquitous in the environment. Bioassays of fish in the Potomac River and other bodies of water routinely find intersex characteristics in the fish sampled. One such mutation is the presence of eggs in the testes of male fish. Another concern is the presence of certain antibiotics in ground and surface waters. As many of these compounds are known endocrine disruptors, their presence even at low concentrations warrant additional scrutiny.

The practice of land applying biosolids from waste treatment facilities and livestock operations on agricultural areas must be reevaluated in light of recent research, as these biosolids have been shown to be laden with a wide variety of pharmaceuticals, endocrine disrupting chemicals, and especially, antibiotics. Agricultural industry uses some eighty percent of antibiotics manufactured. At this time, more study needs to be done in this area to determine the appropriate course of action needed to address this concern. Given the amount of pharmaceuticals and endocrine disrupting chemicals entering the environment, recent exemptions for the agricultural industry regarding regulation of land applying biosolids from waste treatment facilities and livestock operations must be perceived as a step in the wrong direction.

Pharmaceuticals and Personal Care Products in the Environment

d) Monitoring Well Driller Certification / Recertification Program

The Monitoring Well Driller Program (MWDP) instructs and certifies monitoring well drillers in the design, construction, alteration, and abandonment of monitoring wells and boreholes. This program, authorized by 47 CSR 59 Monitoring Well Regulations, was established to ensure industry, well owners, and the regulatory community that all monitoring wells and boreholes are to be installed and abandoned by knowledgeable drillers.

The WVDEP is responsible for the certification of monitoring well drillers. This is now accomplished by online testing as of January 1, 2020 at the West Virginia Online Learning website, www.onlinelearning.wv.gov. Drillers seeking certification contact the Groundwater Program, and a monitoring well testing verification form is sent to them to determine eligibility to take the monitoring well certification test. If the driller is found to have the qualifications for certification, an Online Learning application is set up and Online Learning then sends an email with passwords and information on how to access the test online. The certification process can now be completed online from the driller's home or office. It is no longer necessary to come to Charleston to take the test.

As of June 30, 2023, the Monitoring Well Driller Program has certified six hundred eighty (680) monitoring well drillers. There are currently two hundred six (206) active monitoring well drillers, and four hundred seventy-four (474) inactive monitoring well drillers, 2 of which were certified during this reporting period.

Please contact the WVDEP Groundwater Program at 304-590-0294 for information on the Online Monitoring Well Driller Test and eligibility verification. The recertification of the monitoring well drillers is handled directly by the Monitoring Well Driller Program. Recertification requires a fee and the completion of an address verification form.

To track the driller certification and recertification process, the WVDEP's Information Technology Office developed a monitoring well driller module to the Environmental Resource Information System (ERIS). ERIS is a flexible client/server system of Windows programs, which allows WVDEP offices to track and manage a wide variety of environmental information.

The driller module of ERIS contains a listing of drillers who are currently certified and those whose certification has expired. This module is capable of generating and tracking certification and recertification correspondences, invoices for fees, certification card, and address verification forms. Reports can be generated from this module containing drillers' addresses, initial certification date, certification date, certification expiration date, driller registration numbers, and fee invoicing information.

e) Monitoring Well Installation and Abandonment

Legislative Rule 47 CSR 60, entitled *Monitoring Well Design Standards,* establishes the minimum acceptable documentation and standards for the design, installation, completion, and abandonment of monitoring wells, and boreholes. This rule does not eliminate nor supersede the more stringent aspects of well design criteria as established by federal programs such as RCRA or CERCLA but only stipulates that, at a minimum, monitoring wells must be constructed and abandoned in accordance with 47 CSR 60.

As is the case of any rule, there are unforeseen circumstances that require alternatives and exceptions when compliance with the rule is unfeasible or unnecessary. The alternatives and/or exceptions are handled through written waiver requests on an individual basis.

The rule has resulted in the need for both electronic and paper files to document the installation, completion, and abandonment and groundwater monitoring wells, boreholes, and geoprobe locations. The electronic submission software became available as of 2003, with a format that consists of drop-down menus areas for written comments.

During this reporting period the following monitoring well installation and abandonment documentation forms were received and reviewed:

Year	Completion Forms	Abandonment Forms	Modification Forms	Total
2021 July to Dec	96	164	2	262
2022 Jan to June	85	69	2	156
2022 July to Dec	129	156	0	285
2023 Jan to June	48	182	0	230

Year	Completion Forms	Abandonment Forms	Modification Forms	Total
Total from July 2021 - June 2023	358	571	4	933

All forms are reviewed for completeness and correct information. The major deficiencies commonly noted are casing and screen depths that are out of order and data that was reported after the 60-day required reporting period.

f) Underground Injection Control (UIC) Program

The Underground Injection Control (UIC) Program, governed by the Legislative Rule entitled *Underground Injection Control*, 47 CSR 13, is designed to ensure that fluids injected underground will not endanger drinking water sources. DWWM regulates what are called Class 5 wells, which include agriculture drainage wells, improved sinkholes, industrial disposal wells, stormwater wells, and septic systems that have the capacity to serve 20 or more people. During the reporting period, the UIC Program issued four (4) UIC Industrial/Commercial permits, reissued eleven (11) stormwater disposal permits, issued one (1) new stormwater disposal permit, issued six (6) modifications to stormwater disposal permits, issued eighteen (18) new permits for on-site sewage disposal, reissued eighty-five (85) permits for sewage disposal, modified one (1) sewage disposal permit, and transferred six (6) sewage disposal permits. DWWM also has Primacy, or primary enforcement authority, for Class 1 and Class 4 injection well types while seeking Primacy for Class 6 carbon capture and sequestration wells. There are currently no permits for these well classes. During the reporting period, the UIC Program also approved 41 Rule Authorizations for injection-by-rule.

The Division of Mining and Reclamation regulates all UIC permits associated with mining operations and the Office of Oil and Gas regulates all UIC permits associated with oil and natural gas production operations, which are addressed in their sections of this report.

g) Groundwater Program Remediation Activities

Groundwater's Remediation Program is directly involved with the remediation of sites containing contaminated groundwater and soil. Since 1991, the program has worked on more than five hundred (500) sites. There were approximately 25 active remediation projects during this reporting period. This includes sites that have been issued Rule Authorizations for the injection of subsurface releasing compounds to enhance remediation.

Remediation sites include rail yards, factories, refineries, fuel bulk terminals, aboveground fuel tanks, and spills. Contaminants range from gasoline, diesel fuel, oil, and chlorinated solvents to materials such as cow manure. While the Program frequently works in conjunction with other WVDEP offices and State and Federal agencies, often the sites that come into it do not fit squarely within the remediation box of other groups, and this Program is the last recourse to remediate the contamination to acceptable levels. The Remediation Program cleans sites to the standards established in the Legislative Rule entitled *Requirements Governing Groundwater Standards*, 47 CSR 12.

During this reporting period 12 No Further Action letters were issued to sites where contamination has been successfully remediated. The program has provided advice to other sections of WVDEP and made referrals where appropriate.

h) Septic Tank Seal Registration

Any person or company that is required to obtain a small sewage disposal installation permit must register the septic tank(s) associated with that permit with DWWM's Groundwater Program. The registration is valid for the life of the tank(s) and enables WVDEP to ensure that the tank is constructed and installed in such a way as to protect groundwater.

5. Non-Point Source Program

During the reporting period 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). *Table 1* provides a summary.

Table 1. §319 Program status.

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 Extended	Sep-22	Sep-23	Sep-24	Sep-25	Sep-26
Cancelled projects	3	2	1	1	1	

Implementation of Best Management Practices (BMPs)

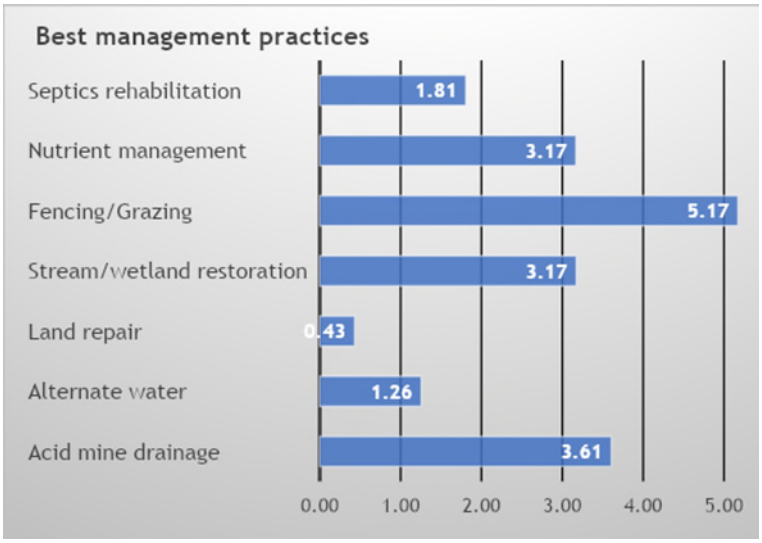
BMP implementation and NPS pollutant reduction are the major goals of our watershed projects. The efforts of our dedicated staff, partners and local stakeholders

have made significant impacts in restoring and protecting our watersheds impacted and threatened by NPS pollution. 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.

Overall BMP implementation has increased slightly as the effects from the pandemic are beginning to lessen. Unfortunately, there are still supply chain issues for certain materials and the workforce 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 has 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**	**7.79**
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**	**0.40**

Units: million lbs/yr

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

More in the 2020 annual report

Additional information from watershed projects, successes and watershed plan updates from the past year are available in the annual report at: https://dep.wv.gov/WWE/Programs/nonptsource/_NPSReports/_Pages/319Report.aspx. Appendix 1 and 2 provide a summary of 2022 implementation results.

The groundwater connection

Although §319 projects do not specifically target groundwater resources there are connections simply due to the nature of most treatment. These projects improve surface water conditions and reduce the cost of drinking water treatment long-term in communities most impacted by nonpoint source pollution.

Appendix 1. §319 projects and AgE BMPs

Project	BMPs	Number	Unit	Date	HUC	Drainage
Pipestem Creek Ag BMPs	Alternate water sources	4	IU	Nov-22	050500020909	Little Bluestone River
Spring Creek Phase I	Alternate water sources	9	IU	Sep-22	050500030408	Slabcamp Run-Greenbrier River
Second Creek V	Alternate water sources	4	IU	Aug-22	050500030703	Lower Second Creek
Second Creek IV	Alternate water sources	1	IU	Mar-22	050500030703	Lower Second Creek
Barlow Portal Project-1	AMD - Access road	1,350	FT	Jul-22	050200010502	Left Fork-Sandy Creek
Roaring Creek - North Portal	AMD - Limestone leachbed	300	TONS	Nov-22	050200010406	Roaring Creek
Roaring Creek - North Portal	AMD - Pond	2,397	CUYRD	Nov-22	050200010406	Roaring Creek
New River Drive	Critical area planting	1	AC	Jul-22	050500040103	Outlet Piney Creek
Burnside Branch	Fence	46,706	FT	Nov-22	050500020701	Burnside Branch
Burnside Branch	Fence	8,469	FT	Mar-22	050500020701	Burnside Branch
Pipestem Creek Ag BMPs	Fence	2,703	FT	Mar-22	050500020909	Little Bluestone River
Pipestem Creek Ag BMPs	Fence	4,565	FT	Nov-22	050500020909	Little Bluestone River
SWP-WBP integration Phase II	Fence	4,277	FT	Mar-22	050500030202	Headwaters Knapp Creek
Spring Creek Phase I	Fence	25,355	FT	Sep-22	050500030408	Slabcamp Run-Greenbrier River
Second Creek V	Fence	11,304	FT	Aug-22	050500030703	Lower Second Creek
Second Creek IV	Fence	43,673	FT	Mar-22	050500030703	Lower Second Creek
Second Creek Karst III	Fence	1,591	FT	Nov-22	050500030703	Lower Second Creek
Second Creek V	Grazing systems	4	IU	Aug-22	050500030703	Lower Second Creek
Spring Creek Phase I	Irrigation pipe	6,450	FT	Sep-22	050500030408	Slabcamp Run-Greenbrier River
New River Drive	Land grading	1	AC	Jul-22	050500040103	Outlet Piney Creek
New River Drive	Land smoothing	1	AC	Jul-22	050500040103	Outlet Piney Creek
Back Creek Protection Plan	Natural channel restoration	936	FT	Sep-22	020700040407	Elk Branch-Back Creek
Woodrow Wilson Restoration	Natural channel restoration	552	FT	Sep-22	050500040103	Outlet Piney Creek
Woodrow Wilson Restoration	Wetland creation	1	AC	Sep-22	050500040103	Outlet Piney Creek

Ag Inhancement Program	Nutrient Management Plan	211	AC	May-22	020700010101	Laurel Fork-North Fork South Branch
Ag Inhancement Program	Nutrient Management Plan	816	AC	Sep-22	020700040201	Upper Sleepy Creek
Ag Inhancement Program	Nutrient Management Plan	2	AC	Dec-22	020700040407	Elk Branch-Back Creek
Ag Inhancement Program	Nutrient Management Plan	18	AC	Mar-22	020700040904	Turkey Run-Opequon Creek
Ag Inhancement Program	Nutrient Management Plan	38	AC	Aug-22	020700040908	Evans Run-Opequon Creek
Ag Inhancement Program	Nutrient Management Plan	362	AC	Aug-22	020700041105	Rocky Marsh Run
Ag Inhancement Program	Nutrient Management Plan	26	AC	Jul-22	020700070302	Evitts Run
Mudlick Run	Septic pumping	3	IU	Nov-22	020700010602	Anderson Run
Sleepy Creek VI	Septic pumping	1	IU	Nov-22	020700040202	Middle Fork-Sleepy Creek
Sleepy Creek VI	Septic pumping	1	IU	Nov-22	020700040202	Middle Fork-Sleepy Creek
Sleepy Creek VI	Septic pumping	3	IU	Mar-22	020700040202	Middle Fork-Sleepy Creek
Sleepy Creek VI	Septic pumping	1	IU	Nov-22	020700040205	Lower Sleepy Creek
Tuscarora Creek Phase III	Septic pumping	13	IU	Mar-22	020700040907	Tuscarora Creek
Burnside Branch	Septic pumping	7	IU	Nov-22	050500020701	Burnside Branch
Burnside Branch	Septic pumping	2	IU	Mar-22	050500020701	Burnside Branch
Indian Creek Phase III	Septic pumping	2	IU	Nov-22	050500020702	Rock Camp Branch
Indian Creek Phase III	Septic pumping	2	IU	Nov-22	050500020703	Upper Indian Creek
Browns Creek Phase II	Septic pumping	2	IU	Nov-22	050500090608	Browns Creek-Coal River
Burnside Branch	Septic repair	6	IU	Nov-22	050500020701	Burnside Branch
Indian Creek Phase III	Septic repair	1	IU	Nov-22	050500020701	Burnside Branch
Indian Creek Phase III	Septic repair	2	IU	Mar-22	050500020701	Burnside Branch
Indian Creek Phase III	Septic repair	3	IU	Nov-22	050500020702	Rock Camp Branch
Sleepy Creek VI	Septic replacement	2	IU	Mar-22	020700040203	Middle Sleepy Creek
Browns Creek Phase II	Septic replacement	13	IU	Mar-22	050500090608	Browns Creek-Coal River

Appendix 2. §319 projects and AgE load reductions

Project	Pollutant	Reduction	Unit	Date	HUC	Drainage
Beaver Creek - McElroy Seep	Acidity	30,359	LBS/YR	Jun-22	050200040603	Beaver Creek-Little Sandy Creek
Beaver Creek - McElroy Seep	Metals (Aluminum)	3,152	LBS/YR	Jun-22	050200040603	Beaver Creek-Little Sandy Creek
Beaver Creek - McElroy Seep	Metals (Iron)	174	LBS/YR	Jun-22	050200040603	Beaver Creek-Little Sandy Creek

New River Drive	Metals (Iron)	373	LBS/YR	Jul-22	050500040103	Outlet Piney Creek
Beaver Creek - McElroy Seep	Metals (Manganese)	126	LBS/YR	Jun-22	050200040603	Beaver Creek-Little Sandy Creek
Ag Inhancement Program	Nitrogen	13,400	LBS/YR	May-22	020700010101	Laurel Fork-North Fork South Branch
Ag Inhancement Program	Nitrogen	48,624	LBS/YR	Sep-22	020700040201	Upper Sleepy Creek
Ag Inhancement Program	Nitrogen	121	LBS/YR	Dec-22	020700040407	Elk Branch-Back Creek
Ag Inhancement Program	Nitrogen	500	LBS/YR	Mar-22	020700040904	Turkey Run-Opequon Creek
Ag Inhancement Program	Nitrogen	3,750	LBS/YR	Aug-22	020700040908	Evans Run-Opequon Creek
Ag Inhancement Program	Nitrogen	29,701	LBS/YR	Aug-22	020700041105	Rocky Marsh Run
Ag Inhancement Program	Nitrogen	1,670	LBS/YR	Jul-22	020700070302	Evitts Run
Mudlick Run	Pathogens (Coliform)	1.19E+09	CFU	Nov-22	020700010602	Anderson Run
Sleepy Creek VI	Pathogens (Coliform)	16400000000	CFU	Mar-22	020700040201	Upper Sleepy Creek
Sleepy Creek VI	Pathogens (Coliform)	4150000000	CFU	Mar-22	020700040202	Middle Fork-Sleepy Creek
Sleepy Creek VI	Pathogens (Coliform)	4140000000	CFU	Nov-22	020700040202	Middle Fork-Sleepy Creek
Sleepy Creek VI	Pathogens (Coliform)	32800000000	CFU	Nov-22	020700040203	Middle Sleepy Creek
Sleepy Creek VI	Pathogens (Coliform)	4.15E+09	CFU	Mar-22	020700040205	Lower Sleepy Creek
Sleepy Creek VI	Pathogens (Coliform)	8.29E+09	CFU	Nov-22	020700040205	Lower Sleepy Creek
Tuscarora Creek Phase III	Pathogens (Coliform)	53900000000	CFU	Mar-22	020700040907	Tuscarora Creek
Burnside Branch	Pathogens (Coliform)	1.19E+12	CFU	Mar-22	050500020701	Burnside Branch
Burnside Branch	Pathogens (Coliform)	1.87E+07	CFU	Nov-22	050500020701	Burnside Branch
Burnside Branch	Pathogens (Coliform)	1.89E+07	CFU	Nov-22	050500020701	Burnside Branch
Burnside Branch	Pathogens (Coliform)	1.62E+12	CFU	Nov-22	050500020701	Burnside Branch
Burnside Branch	Pathogens (Coliform)	5.92E+11	CFU	Nov-22	050500020701	Burnside Branch
Indian Creek Phase III	Pathogens (Coliform)	3.78E+07	CFU	Mar-22	050500020701	Burnside Branch
Indian Creek Phase III	Pathogens (Coliform)	1.89E+07	CFU	Nov-22	050500020701	Burnside Branch
Indian Creek Phase III	Pathogens (Coliform)	7.56E+07	CFU	Nov-22	050500020702	Rock Camp Branch
Indian Creek Phase III	Pathogens (Coliform)	1.89E+07	CFU	Nov-22	050500020703	Upper Indian Creek
Pipestem Creek Ag BMPs	Pathogens (Coliform)	385000000000	CFU	Nov-22	050500020909	Little Bluestone River
Spring Creek Phase I	Pathogens (Coliform)	4220000000000	CFU	Sep-22	050500030408	Slabcamp Run-Greenbrier River
Second Creek V	Pathogens (Coliform)	6040000000000	CFU	Aug-22	050500030703	Lower Second Creek

Second Creek IV	Pathogens (Coliform)	1.43E+12	CFU	Mar-22	050500030703	Lower Second Creek
Second Creek Karst III	Pathogens (Coliform)	1.88E+12	CFU	Nov-22	050500030703	Lower Second Creek
Browns Creek Phase II	Pathogens (Coliform)	2.30E+11	CFU	Mar-22	050500090608	Browns Creek-Coal River
Woodrow Wilson Restoration	Pathogens (Coliform)	1.21E+12	CFU	Sep-22	050500040103	Outlet Piney Creek
Ag Inhancement Program	Phophorus	18,963	LBS/YR	May-22	020700010101	Laurel Fork-North Fork South Branch
Ag Inhancement Program	Phophorus	48,424	LBS/YR	Sep-22	020700040201	Upper Sleepy Creek
Ag Inhancement Program	Phophorus	134	LBS/YR	Dec-22	020700040407	Elk Branch-Back Creek
Ag Inhancement Program	Phophorus	1,585	LBS/YR	Mar-22	020700040904	Turkey Run-Opequon Creek
Ag Inhancement Program	Phophorus	3,600	LBS/YR	Aug-22	020700040908	Evans Run-Opequon Creek
Ag Inhancement Program	Phophorus	41,006	LBS/YR	Aug-22	020700041105	Rocky Marsh Run
Ag Inhancement Program	Phophorus	835	LBS/YR	Jul-22	020700070302	Evitts Run
Woodrow Wilson Restoration	Sediment-Siltation	66,000	LBS/YR	Sep-22	050500040103	Outlet Piney Creek
Back Creek Protection Plan	Sediment-Siltation	830,600	LBS/YR	Sep-22	020700040407	Elk Branch-Back Creek

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

6. Watershed Assessment Branch

The Watershed Assessment Branch (WAB) consists of biologists, environmental specialists, and analysts whose primary focus is to measure and assess the physical, chemical, and biological integrity of WV's streams, rivers, lakes and wetlands. These data and assessments are used to report on water quality, prepare restoration plans, aid in implementation of those plans, and measure improvement. WAB is not responsible for monitoring or reporting on groundwater quality. Even so, given the bidirectional connection to groundwaters, understanding surface water quality and flow may provide insight into groundwater quality.

Monitoring

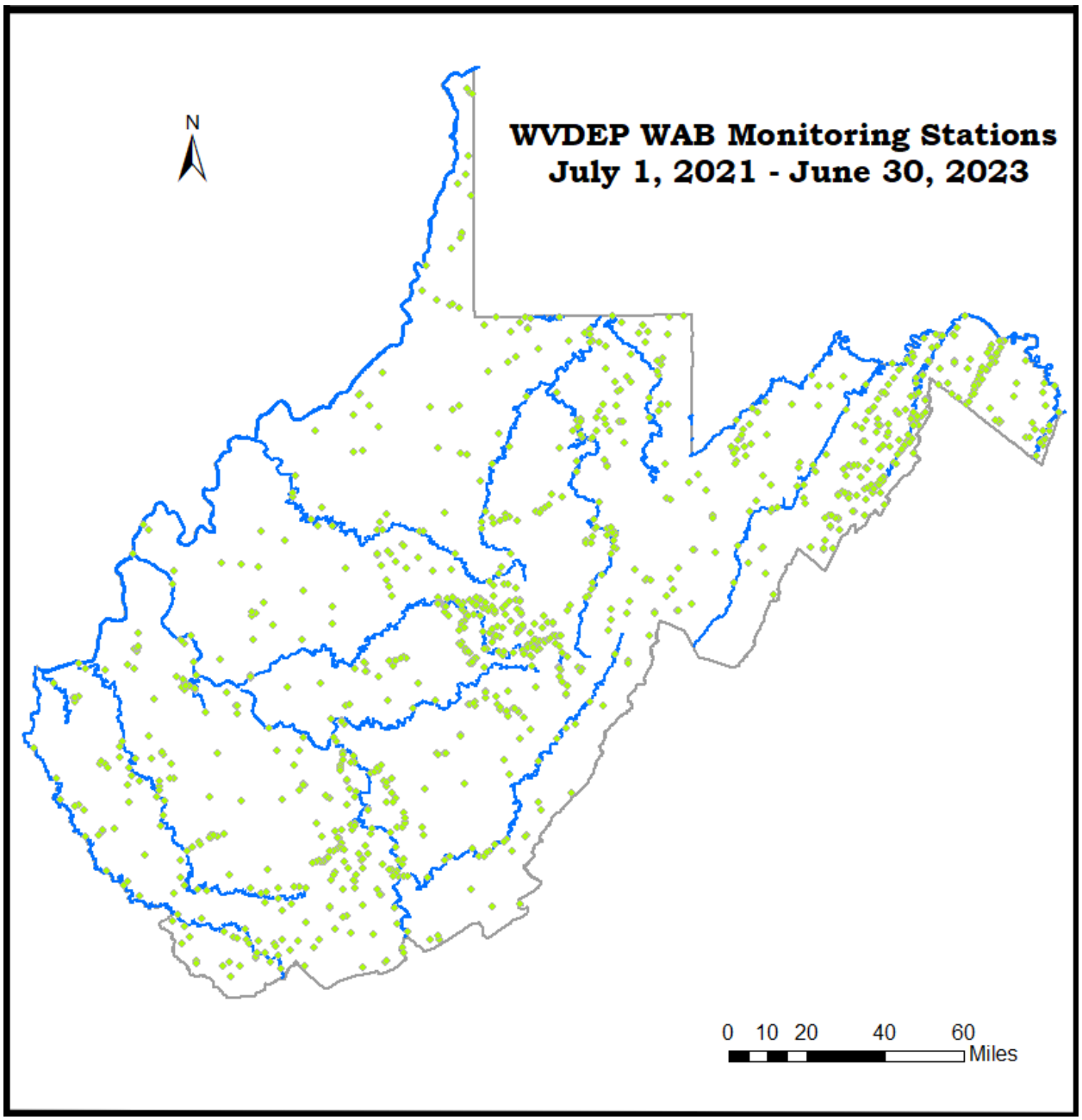
WAB collections data through numerous monitoring programs including probabilistic (random) monitoring; targeted sampling; ambient long-term monitoring in large rivers and streams (AWQMN) ; LTMS long-term monitoring in select smaller streams relative to the ambient program; the Regional Monitoring Network (RMN – a collaborative program to study changes in stream temperature and flow conditions at reference stations), continuous monitoring using deployable water quality meters (CIM); pre-TMDL monitoring (TMDL); lakes monitoring; wetland monitoring, including the WV Wetlands Rapid Assessment Method (WVWRAM); harmful algal bloom monitoring (HAB); filamentous algae monitoring; and fish tissue collection for consumption advisories.

WAB collects field parameters (e.g., dissolved oxygen, pH, temperature, and specific conductivity) and water samples to be analyzed by laboratories for parameters such as alkalinity, acidity, hardness, aluminum, iron, manganese, selenium, basic ions, fecal coliform, total suspended solids, and nutrients. Depending upon the situation, additional parameters may be analyzed. In addition to water quality samples, WAB evaluates habitat. Habitat evaluations reflect the physical conditions that support aquatic life communities. WAB utilizes US EPA's Rapid Bioassessment Protocol (RBP) for measuring the quality of in-channel and riparian habitat in streams and rivers. Channel flow status is evaluated as part of the RBP protocol. During drought conditions, groundwater discharges are important for maintaining a healthy channel flow status, and therefore the water levels necessary to support aquatic life. Discharge is routinely measured in some monitoring programs including TMDL and RMN.

Water chemistry and even habitat can change depending upon the day of a site visit. Monitoring of aquatic life communities such as benthic macroinvertebrates and fishes, provides WAB a more comprehensive evaluation of biological integrity. Analyzing benthic macroinvertebrates is especially helpful, because they are diverse in species, live in all stream sizes, have a wide range of tolerances to pollutants and stressors, and account for past seasonal and flow conditions. For example, a field reading for pH only provides information about the specific environmental conditions at the time of a site visit. An analysis of the benthic macroinvertebrate community may reveal acidity (low pH) as a stressor during low flow conditions of the stream in another season.

Results

From July 1, 2021 through June 30, 2023, WAB personnel conducted assessments that resulted in the collection of 5,753 water quality samples from 1,136 sites on 736 distinct streams/rivers, 36 lakes, and 45 wetlands. These sites are shown below. 607 of these sampling events included collection of benthic macroinvertebrates.



Assessment and monitoring data are stored and managed in a database called WABbase. WABbase is a custom, in-house designed database that utilizes Oracle as a back-end with multiple Microsoft Access frontend interfaces. A portion of the data is

entered manually. However, some certified laboratories submit lab analyzed water quality results electronically. Additionally, WAB is in the process of submitting surface water quality information to EPA's Water Quality Portal database via their Water Quality Exchange (WQX).

Results of water quality monitoring are used for many purposes. Assessment of the data is reported in the WV Integrated Water Quality Monitoring and Assessment Report (Integrated Report). The Integrated Report fulfills the reporting requirements of the Clean Water Act Sections 303(d),305(b) and 314. To see current and historic IRs visit: http://www.dep.wv.gov/WWE/watershed/IR/Pages/303d_305b.aspx.

When waters are listed on the CWA Section 303(d) as impaired, the development of Total Maximum Daily Loads (TMDLs) is required. TMDLs are restoration plans that provide a prescription to reduce loading from pollutant sources. In order to properly represent pollutant sources, WVDEP conducts pollutant source tracking studies using desktop and field investigations and reports these sources in the TMDL. WAB uses geographic information systems (GIS) to strategically plan the location of sampling sites, to identify the geologic and land use patterns upstream from the sampling sites, and to establish a list of potential waterbody stressors associated with both surface and underground activities and disturbances. WAB also uses this program to print maps showing the geographic distribution of violations in a watershed.

A watershed model is built to represent permitted and non-permitted sources. The hydrology of the model considers infiltration to groundwater, as well discharges from groundwater referred to as interflow and storage of groundwater when representing the weather conditions and flow of the streams. Different land uses are represented differently depending upon the permeability of the soils and underlying geology. In this effort to properly represent the hydrology of a watershed, subsurface sources of pollution, such as acid mine drainage or failing septic system flows are considered. Reductions are made to such sources in the restoration plan. In watersheds where surface waters are polluted, groundwater may be carrying pollutants or conversely vulnerable to contamination. TMDL implementation projects may restore and protect both surface and groundwater.

Interagency Collaboration

WAB staff gather data from third parties, including citizens and partnering agencies. These data are considered when preparing the Integrated Report and the TMDL plans. Often WAB staff members take part in state and regional commissions and workgroups to gather and share data and discuss topics that impact water quality. WAB staff participate in the Chesapeake Bay States PFAS Workgroup. This workgroup focuses on highlighting and discussing the different PFAS studies or efforts each of the states within the Chesapeake Bay watershed has worked or is planning to work. WVDEP and WVDHHR are funding USGS to conduct a statewide PFAS Study of all (280) public surface and groundwater drinking water sources. The WAB has contributed to discussions and plans. The WAB is also involved in the development of an Ohio River

PFAS study that started in 2021, led by Ohio River Valley Water Sanitation Commission (ORSANCO).

7. State Water Pollution Control Revolving Fund (SRF)

The SRF program's environmental goals are to reduce and/or eliminate water quality violations caused by sanitary wastewater and nonpoint sources in surface waters and groundwater. In FY22 and FY23 approximately $74 million dollars of assistance was expended from the SRF program to build and replace wastewater collection and treatment systems. In many of these projects, unsewered areas of West Virginia were provided with centralized or, in some cases, decentralized sewer systems that eliminated direct wastewater discharges and failing or marginally functional onsite septic systems. The failing systems and direct discharges contribute to polluting the groundwater in the state.

The majority of the funding continues to be used for actual construction while the remaining portion was used for planning, design, and administrative expenses related to the projects.

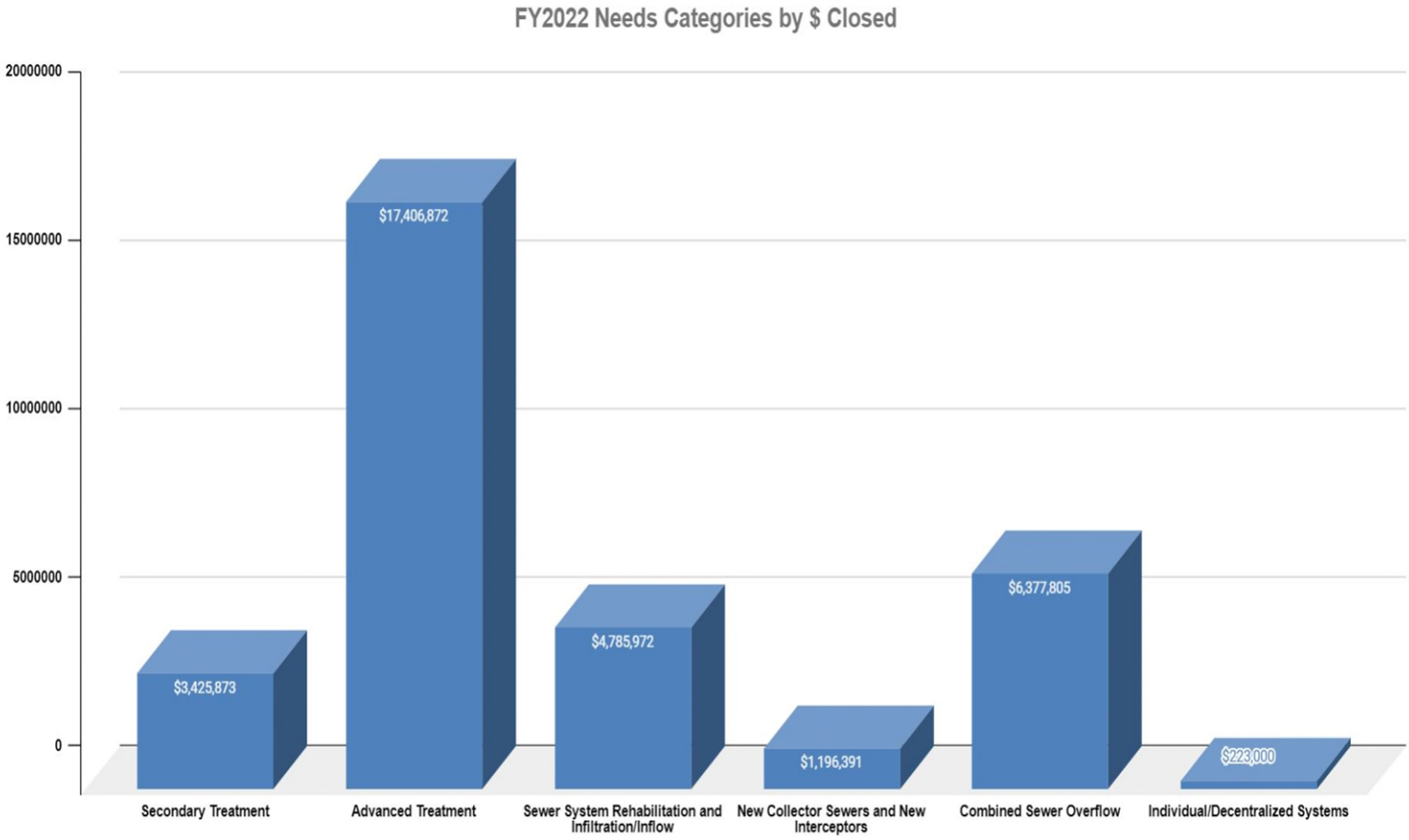
West Virginia’s CWSRF program provides financial assistance to improve and maintain water quality throughout the State. The projects financed are vital in protecting and improving water quality in rivers, lakes, and streams throughout the State used for drinking water, recreation, cold water fisheries, warm water fisheries, wildlife use, industrial use, and agricultural use. In addition to the normal projects addressing wastewater issues, the CWSRF provided funding to projects to reduce stormwater impacts.

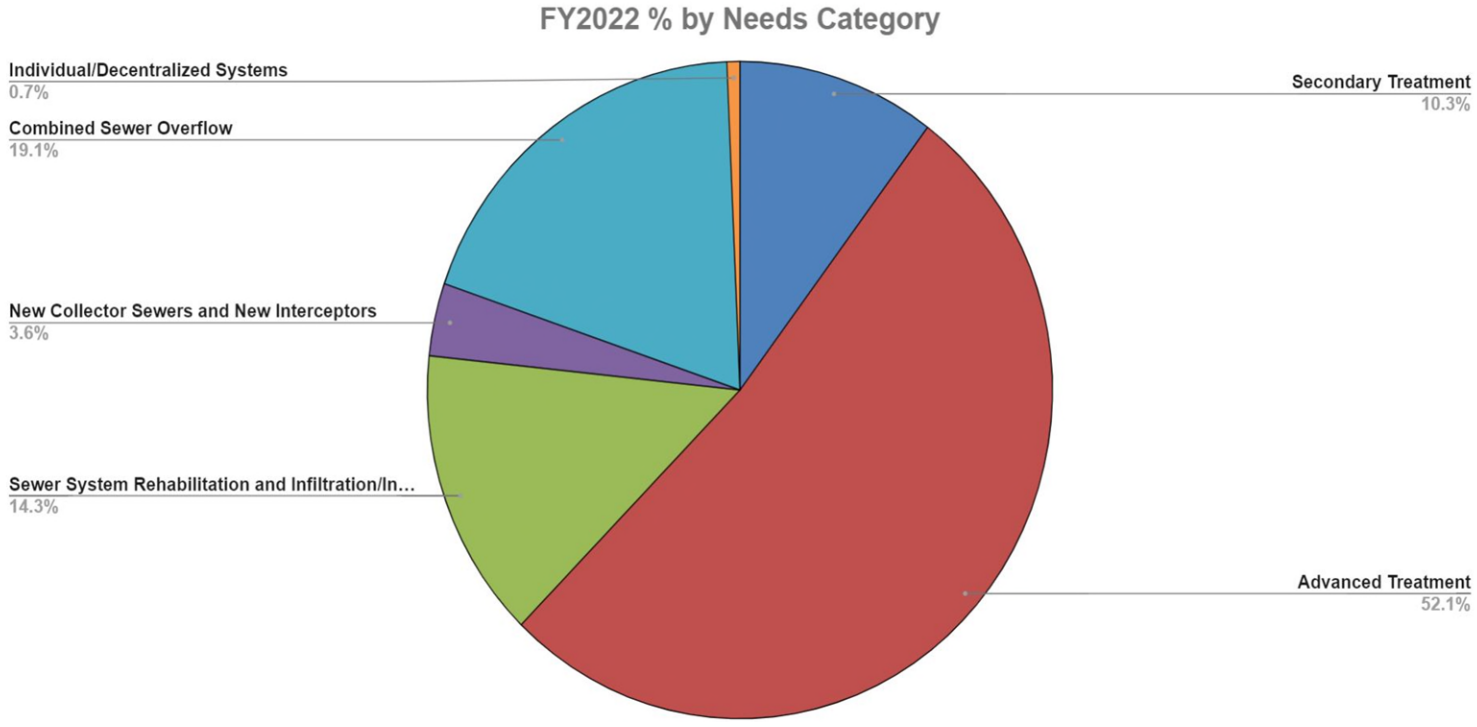
During FY22 and FY23, the CWSRF program contributed to the joint State/EPA mission of achieving clean and safe water by using the following goals:

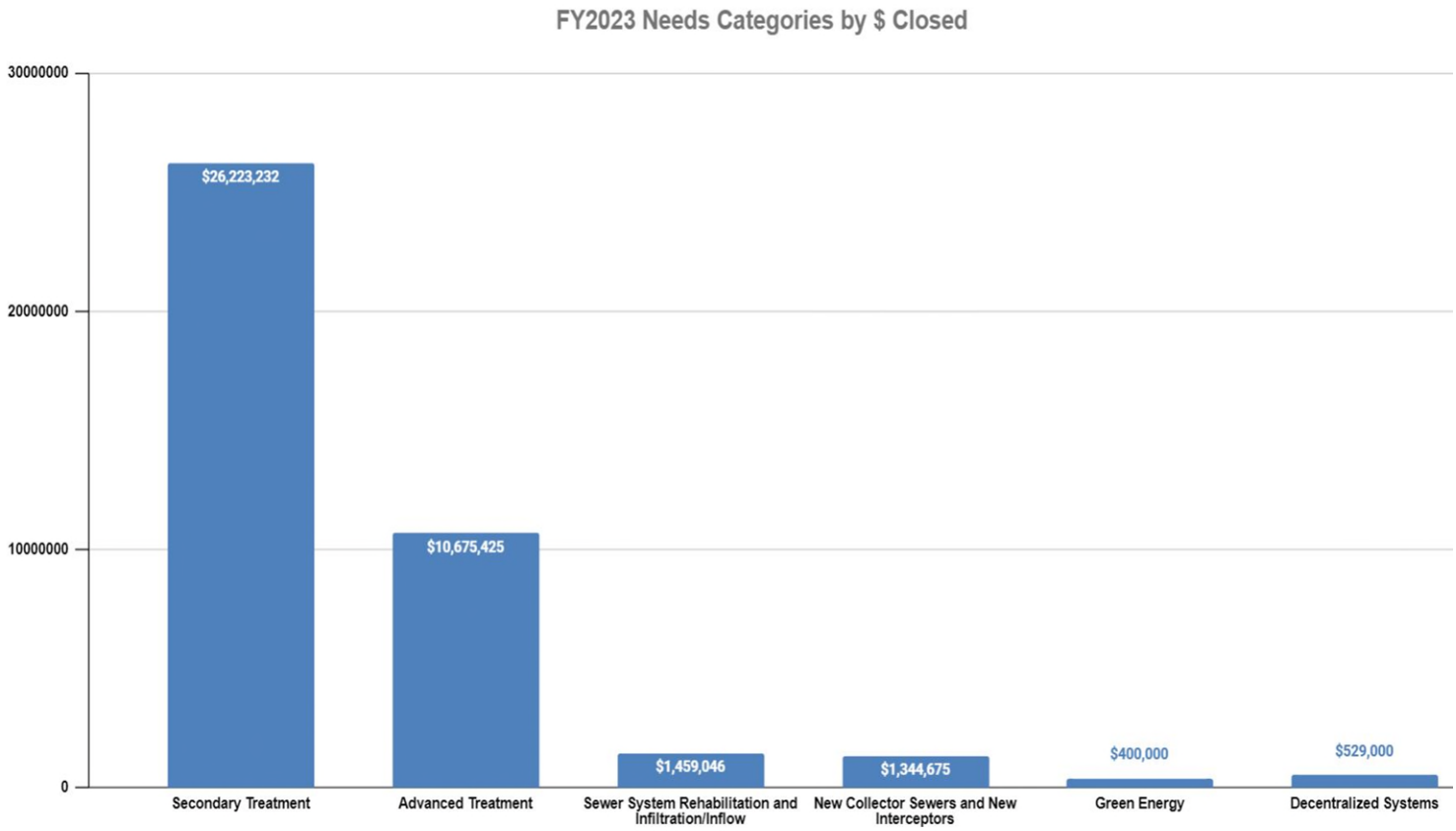
- Eliminate sewage overflows from combined sewer overflows (CSOs) and from separate sewer system overflows (SSOs),
- Improve and protect designated uses of water bodies and achieve and maintain CWA compliance.

Loan and Principal Forgiveness dollars closed in FY22 were predominately in the CSO Advanced Treatment category (52.1%) and CSO category (19.1%), leaving the rest of the dollars to be spread over 4 other needs categories. Loan and Principal Forgiveness dollars closed in FY23 were predominately in the Secondary Treatment

category (64.5%) and the Advanced Treatment category (26.3%), leaving the rest of the dollars spread over 4 other needs categories. (See graphs)


FY2022 Needs Categories by $ Closed
20000000
15000000
10000000
5000000
0
$3,425,873
$17,406,872
$4,785,972
$1,196,391
$6,377,805
$223,000
Secondary Treatment
Advanced Treatment
Sewer System Rehabilitation and Infiltration/Inflow
New Collector Sewers and New Interceptors
Combined Sewer Overflow
Individual/Decentralized Systems


FY2022 % by Needs Category
Individual/Decentralized Systems
0.7%
Combined Sewer Overflow
19.1%
New Collector Sewers and New Interceptors
3.6%
Sewer System Rehabilitation and Infiltration/In...
14.3%
Secondary Treatment
10.3%
Advanced Treatment
52.1%


FY2023 Needs Categories by $ Closed
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20000000
10000000
0
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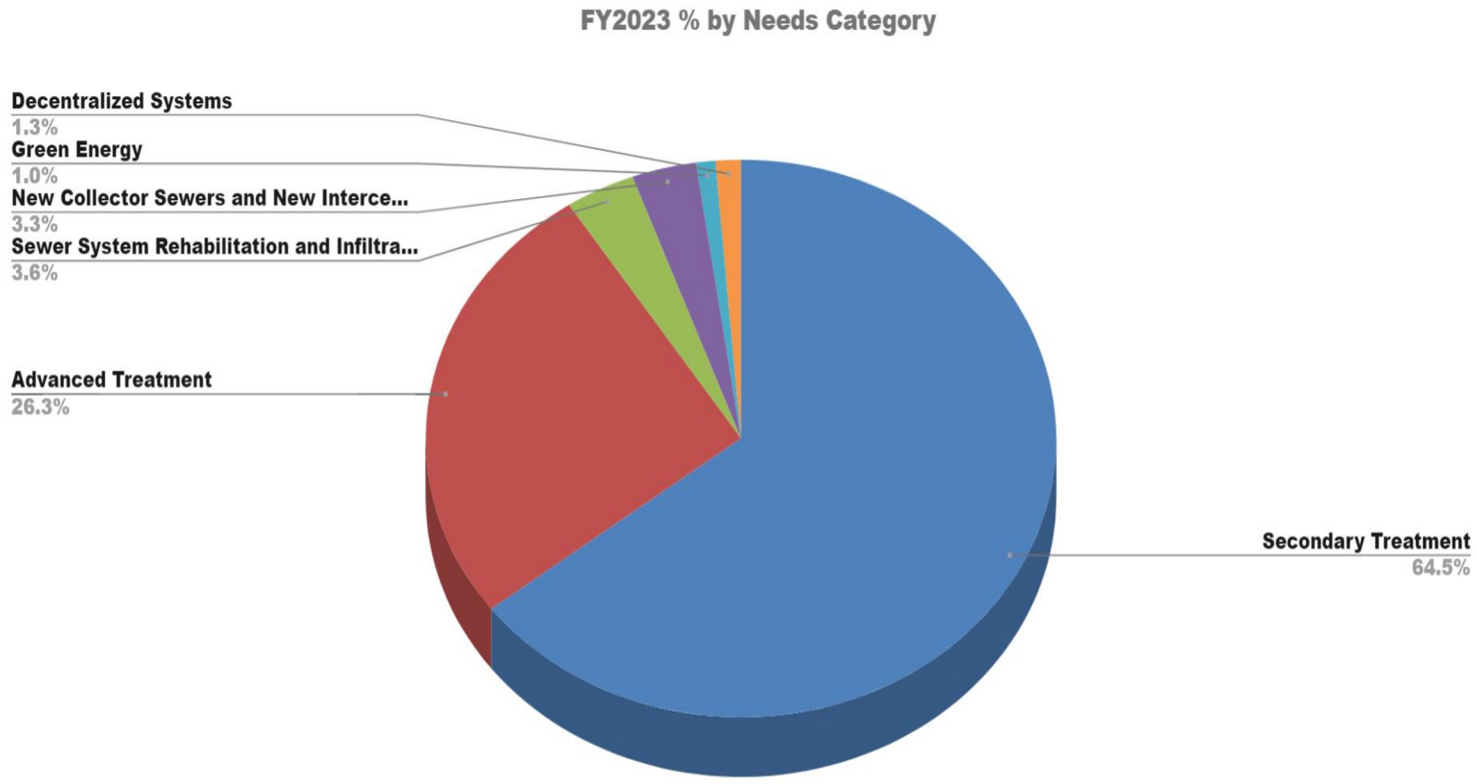
$10,675,425
$1,459,046
$1,344,675
$400,000
$529,000
Secondary Treatment
Advanced Treatment
Sewer System Rehabilitation and Infiltration/Inflow
New Collector Sewers and New Interceptors
Green Energy
Decentralized Systems


FY2023 % by Needs Category
Decentralized Systems
1.3%
Green Energy
1.0%
New Collector Sewers and New Interce...
3.3%
Sewer System Rehabilitation and Infiltra...
3.6%
Advanced Treatment
26.3%
Secondary Treatment
64.5%

Design standards for the SRF program are included in the Legislative Rules, Title 47 Series 31 and include restrictions on constructing sewer lines within 10 horizontal feet of a drinking water reservoir, 50 feet of any well or spring utilized for a public drinking water system, 50 feet of a private or individual homeowner's drinking water system, or within 10 feet of a homeowner's well. The enforcement of these regulations helps protect public and private water supplies.

The WVDEP's Agriculture Water Quality Loan Program is also administered through the SRF program. This program was established in 1997 and continues to offer loans to correct nonpoint source pollution. The program is set up as a cooperative effort between the WVDEP, WV Soil Conservation Agency (SCA), USDA Natural Resources Conservation Service (NRCS), local Soil Conservation Districts (SCD) and local banking institutions. As of June 30, 2023, more than $13 million had been loaned under this program for installation of best management practices. No new loans were made under this program during FY2021 and FY2022. This program is dependent on grant funds provided to the NRCS with a match provided by the CWSRF. The SRF will provide $500,000 as a set-aside for this program for FY2023.

A pilot program was started in 2000 called the Onsite Systems Loan Program. The purpose of this nonpoint source program is to eliminate existing health hazards and water quality problems due to direct sewage discharges from houses and malfunctioning septic tank systems. Many problems and barriers have prevented this program from being successful to date, but program revisions have been made to make it a more viable program. During the 2007 legislative session, the SRF statute was amended to allow other entities to act as an intermediary lender for this program. The WV Housing Development Fund and the SAFE Housing and Economic Development, Inc. (SHED) have entered into an agreement with the SRF to provide low interest loans to homeowners to correct failing onsite sewage systems. The program provided approximately 19 loans totaling more than $146,000 in FY 2021 and approximately 14 loans totaling more than $120,000 in FY2022 from this program and will provide $500,000 as a set-aside for this program for FY2023. To date over $3.4 million has been loaned under this program.

8. Environmental Enforcement

The Environmental Enforcement (EE) office is primarily responsible for inspection and enforcement of the state and federal solid waste, hazardous waste, underground and aboveground storage tank and water pollution control laws. EE's groundwater objective is to investigate all reports of contamination that fall within its jurisdiction and to refer all reports of contamination which are not under its jurisdiction to the appropriate authority.

EE's Water and Waste staff evaluate groundwater concerns during inspections of permitted and unpermitted facilities regulated by the Solid Waste Management Act and Water Pollution Control Act. This includes regular site inspections as well as responding

to spills and complaints reported by the public. In fiscal years 2023 and 2024, EE Water and Waste personnel investigated 1,401 spills and 2,709 complaints. When necessary to protect groundwater and achieve compliance with the Act, EE utilizes escalating enforcement using the mechanisms outlined in the Groundwater Protection Act.

EE's Pre-Closure Program continues the review of industrial facilities that are in the process of ceasing operations. The review process allows EE to ensure that all known contamination is remediated. Sampling of all groundwater wells present at the sites is required as a part of this process. When any contaminated soil is identified at the facility, remediation is required under the Groundwater Protection Act.

Training that focuses on the complex interaction of groundwater, geology, and chemistry is included in the Core Training List for EE inspectors. Courses on the Core Training List are available to all inspection staff but are focused on newer inspectors in the training progression. These courses include classroom style training accompanied with ample practical (hands on) training exercises with a focus on sample collection and preservation. This training program results in environmental inspectors that are both effective and safety conscious in their field work.

EE utilizes the WVDEP centralized database system that is accessible to all inspectors and other agency staff. WVDEP maintains files on groundwater complaints, investigations, Notice of Violations (NOV's), enforcement actions, spills, and monitoring well data for landfills and industrial sites in that system.

The Hazardous Waste Management Act, Underground Storage Tank (UST) Act and Aboveground Storage Tank Act are, in part, groundwater protection acts. The Hazardous Waste Management Act requires long term groundwater monitoring at permitted disposal sites. EE Inspectors conduct Operation and Maintenance inspections every three years at every hazardous waste land disposal facility in the State. These inspections involve evaluating the facility's groundwater monitoring methods and sampling protocols. Inspectors may split samples with the permit holder to conduct an independent analysis of the groundwater that has been sampled.

The UST Act and associated rule protect groundwater through imposing prevention and corrective action requirements. The UST program administers leak prevention activities and the leaking UST (LUST) program administers corrective action activities to ensure protection of the groundwater.

UST prevention activities include requirements for release detection, corrosion protection, overfill protection, and spill prevention at UST sites to ensure protection of the groundwater. West Virginia adopted the most recent Federal UST Rule on June 1, 2018. The modified rule provides additional protections for groundwater by requiring all new UST systems to have secondary containment, under dispenser containment, and additional testing of spill buckets, sumps and dispensers. Additionally, the rule requires all tank owners and operators to be trained concerning proper operation of their UST

systems and requires them to perform monthly inspections of their UST systems and release prevention devices.

LUST corrective action activities include the oversight of cleanups of petroleum releases by responsible parties and enforces cleanups by recalcitrant parties to ensure protection of the groundwater. The LUST section may utilize limited federal funds to pay for cleanups at sites where the owner or operator is unknown, unwilling, or unable to respond, or at sites which require emergency action. Remediation of sites may prevent groundwater contamination and/or return contaminated groundwater to beneficial usage.

The Aboveground Storage Tank (AST) Act was promulgated in 2014 in response to the Freedom Industries spill. The AST Act focuses on tanks that present the highest threat to water resources by virtue of the tanks size, contents and location. Protection of groundwater as well as surface water through comprehensive tank regulation is the focus of this statute and rule. The AST Act and associated rule protect groundwater and surface water through imposing prevention and corrective action requirements. The AST program administers prevention activities and the leaking AST (LAST) program administers corrective action activities to ensure protection of the groundwater.

AST prevention activities include requirements for tank registration, release detection, corrosion protection, overfill protection and spill prevention at AST sites to ensure protection of the surface water and groundwater.

LAST corrective action activities include the oversight of cleanups of releases from regulated ASTs by responsible parties and enforce cleanups by recalcitrant parties to ensure protection of the groundwater. The LAST section may utilize funds to pay for cleanups at sites where the owner or operator is unknown, unwilling, or unable to respond, or which require emergency action. Remediation of sites may prevent groundwater contamination and/or return contaminated groundwater to beneficial usage.

C. Division of Mining and Reclamation

The Division of Mining and Reclamation (DMR) oversees all mining activities. This includes reviewing permit applications for surface and underground coal mines, preparation plants, coal loading facilities, haulage ways, and coal related dams. DMR also reviews permit applications for non-coal quarry operations (sand, gavel, limestone, etc.) and for National Pollutant Discharge Elimination System (NPDES) permits for coal and non-coal mining operations. DMR enforces compliance through regular inspections and oversees site reclamation to ensure the integrity of land and water resources when disturbed by mining operations and related activities.

Groundwater Protection Rule for Coal Mining Operations — 38 C.S.R. 2F

Because mineral mining, both coal and non-coal, is ubiquitous in West Virginia, protecting the quality and quantity of the groundwater from adverse impacts from these activities is imperative to both the environment and to human health and safety. Groundwater protection at mine sites was established in West Virginia with the passage of the Legislative Rule entitled *Groundwater Protection Regulations for Coal Mining Operations* (38 C.S.R. 2), and the policies and practices established by DEP's DWWM and DMR to enforce it. The resulting changes in the handling of surface activities and substances at mine sites have already protected many public and private water sources, both existing and potential, from damage due to mining.

Today, the Groundwater Protection Program is an integral part of DMR's Permitting and Inspection & Enforcement procedures for mine sites. Groundwater Protection Plans (GPPs) are incorporated in and essential to mining permits. Further, all such permits contain terms and limits that provide for protection of the subsurface environment. The operator is required to submit GPPs, where applicable, with its initial permit application, which, when approved, becomes an enforceable part of its mining permit. These GPPs must be updated, if necessary, at each permit reissuance.

Where required, Groundwater Protection Plans are included in the National Pollutant Discharge Elimination Systems (NPDES) permit application. The GPP module requires the applicant to provide specific information, such as:

- All manmade potential contaminants and at the facility;
- The areas of the site where potential contaminants are stored and the type and size of container or storage system used;
- Existing protective controls for the contaminants at each site;
- Spill Response Plan that will be followed should a leak or spill of a potential contaminant be detected at the facility;
- Training requirements with procedures and schedules for initial and refresher training for employees, contract workers, and site visitors concerning their involvement and the requirements of the Spill Response Plan for the site; and
- Inspection procedures for inspections and routine maintenance operations to insure the Groundwater Protection Plan is in place and in good working order.

West Virginia Surface Mining Reclamation Rule — 38 C.S.R. 2

Each mining permit application contains baseline groundwater information used in the determination of the proposed operation's probable hydrologic consequences (PHC). The PHC identifies currently used or significant groundwater resources that may be impacted through the mining process. If the PHC indicates that adverse impact may occur to the hydrologic balance or that acid forming or toxic forming material is present that may result in contamination of surface or groundwater supplies, then the operator

shall provide additional information to evaluate such probable hydrologic consequences and to plan remedial and reclamation activities.

The location, ownership, and use of known existing wells, springs, and other groundwater resources, including discharges from other active or abandoned mines on the proposed permit area and adjacent areas, are identified in permit applications to make a reasonable approximation of the baseline groundwater conditions and use. The permit application also includes a groundwater monitoring plan consisting of parameters based on current and approved post mining land uses and all hydrologic balance protection objectives. Monitoring and analysis shall occur no less frequently than quarterly.

The PHC information is used to develop Hydrologic Reclamation Plans (HRPs), which identify remedial and reclamation activities concerning both surface and groundwater resources. The plan is specific to the local hydrologic conditions and addresses the potential adverse hydrologic consequences identified in the PHC determination. The HRP contains a description of the steps to be taken during the mining and reclamation phases to minimize disturbances to the hydrologic balance within the permit and adjacent areas, to prevent material damage outside the permit area, to meet applicable federal and State water quality laws and regulations, and to protect the rights of present water users. Components of the HRP include:

- Avoiding acid or toxic drainage;
- Preventing additional contributions of suspended solids;
- Providing for water treatment facilities when needed;
- Controlling drainage;
- Restoring, protecting or replacing water supply of present water users;
- Describing measures that will be taken to replace water supplies that are contaminated, diminished or interrupted; and
- Identifying water replacement, which includes quantity and quality descriptions including discharge rates or usage and depth to water

DMR completes a Cumulative Hydrologic Impact Assessment (CHIA) for each new mining operation. This evaluation determines whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. "Material damage to the hydrologic balance outside the permit area" means any long term or permanent change in the hydrologic balance caused by surface mining operations, which has a significant adverse impact on the capability of the affected water resource(s) to support existing conditions and uses. CHIAs are updated upon significant permit modifications that may pose an impact to surface water or groundwater.

Underground Injection Control Program — 47 C.S.R. 13

The Underground Injection Control (UIC) Program, as discussed above for non-coal industries and below for the oil and gas industry, also applies to mining, primarily through the permitting of Class 5 injection wells. Type 5X13 wells are used for the disposal of coal preparation plant slurry or acid mine drainage treatment sludge into abandoned underground mine voids, and Type 5G30 wells are used for the transfer of mine water. Information about the proposed injection activity comes from the permittee via the UIC - Mining Application form. This required data includes maps, drawings, narratives and laboratory analyses, among other information. When necessary, a field inspection by DMR's UIC personnel, accompanied by a DMR inspector and the applicant, confirms the submitted data and adds further information.

DMR has placed great emphasis on coordinated permit review across all Permitting and Inspection & Enforcement programs where underground injection control is concerned. All new proposed UIC permits as well as existing permit reissuances involve a coordinated review of the application. This involves the UIC staff located in the agency's headquarters location, as well as staff in the regional field office(s) from both the Inspection & Enforcement section and the Permitting section.

The operator is required to include Groundwater Protection Plans with its UIC permit application. This is the same plan as submitted with the associated Mining and NPDES permits and it is reviewed concurrently by these sections during permit review. Additionally, all draft UIC - Mining permits are submitted to the West Virginia Geologic and Economic Survey (WVGES), the West Virginia University Hydrology Research Center (WVU), and the Federal Mine Safety and Health Administration (MSHA) for review and comment. Finally, input from the public via the 30-day public comment period and from the WVGES, MSHA, and WVU completes the data necessary to issue the permit. After issuance, continued monitoring as required by the permit plus observations by DMR's inspectors assure a continuous influx of information about the site so that adjustments can be made to GPPs, if necessary.

Use of the ERIS Database:

Every UIC – Mining application will continue to be tracked in the ERIS Database. As information is received it is added into the database by members of the Division of Mining and Reclamation.

Statistics:

- Permitted Coal Slurry Injection Sites: 22
- Permitted AMD Sludge/Water Treatment Injection Sites: 79
- Permitted Water Transfer Sites: 4

Proposed Programs and Projects

Currently, DMR is working with the agency's Information Technology Office to implement a central data repository, which will provide access to data across divisions within WVDEP. This will streamline data analysis and reporting functions for comprehensive permit review. DMR is transitioning the UIC review process from being exclusively issued via paper permits to electronic submissions of applications and other required documentation as directed by permit conditions. This allows for more timely permit review coordination between UIC staff located in the agency's headquarters location and staff in the regional field offices.

D. Office of Abandoned Mine Lands and Reclamation

In reviewing surface mining legislation in the mid-1970s, Congress found that more than 1.5 million acres of land had been directly disturbed by coal mining and more than 11,500 miles of streams were polluted by sedimentation or acidity from surface or underground mines. In response to the problems associated with inadequate reclamation of coal mining sites, Congress enacted the Surface Mining Control and Reclamation Act of 1977 (SMCRA).

The two main purposes of SMCRA are (1) to establish a nationwide program to protect society and the environment from the adverse effects of surface mining operations while assuring that the coal supply essential to the nation's energy requirement is provided and (2) to promote the reclamation of mined areas left without adequate reclamation before SMCRA was passed. Title V of SMCRA deals with active mining, Title IV deals specifically with the problems associated with inadequate reclamation of abandoned mine lands (AML).

In Title IV, Congress established the Abandoned Mine Reclamation Fund to be used for the reclamation and restoration of areas affected by past mining. The fund is derived from a reclamation fee collected from coal mining operators on each ton of coal mined since SMCRA was enacted.

West Virginia received primacy of the AML program February 21, 1981, and the WVDEP was designated by the governor to operate this program with funding provided from the AML Reclamation Fund. The Office of Abandoned Mine Lands and Reclamation (AML&R) was established within the WVDEP.

The mission statement of the Office of AML&R is "to protect public health, safety, and property from past coal mining and enhance the environment through reclamation and restoration of land and water resources".

The program's vision statement is to, "efficiently and effectively use all available resources to achieve a long term benefit to public health, safety, property and general welfare while restoring the environment to pre-mining conditions.

AML&R Organizational Structure

AML&R is divided into groups: Administration & Financial, Realty, Planning, Design and In - House Design, Construction and Emergency. The state is divided into northern and southern regional offices. The responsibilities of those groups are:

1. *Administration & Financial* - This group performs the accounting function for the office. The group tracks expenditures as they relate to administrative and construction functions responsible for management of grants, budgets and financial administration of AML&R.

***2. Realty* -** This group gains rights of entry from property owners so that exploration and construction can be conducted to address abandoned mine land problems. Also, the group's responsibility includes determining if before and after appraisals are necessary for the purposes of lien actions.

***3. Planning* -** The Planning group identifies abandoned mine land problems, maintains the West Virginia Abandoned Mine Land Inventory, creates a description of each project, and develops a preferred alternative for correcting the problems. Each project requires the preparation of an environmental assessment to be in compliance with the National Environmental Policy Act (NEPA). Furthermore, the group oversees the Stream Restoration (AMD Set-Aside) section that is mandated to perform all program pre-construction, post-construction and compliance, and water monitoring functions. The group is also in charge of the treatment of Acid Mine Drainage resulting from pre-law mining activities.

***4. Design & In - House Design* -** This group approves all consultant plans and specifications involving abandoned mine land projects. It also evaluates and selects a design consultant to perform all necessary preparation of plans and specifications for projects. This group also administers exploratory drilling, aerial mapping, surveying contracts, and prepares plan and specification on selected projects in-house.

***5. Construction* -** The main task of the Construction group is contract administration and oversight of abandoned mine land construction projects. This includes site inspections during construction. The group conducts pre-bid and pre-construction conferences and performs final inspections.

***6. Emergency* -** This group administers and conducts the Emergency Reclamation program. Emergency projects abate the sudden occurrence of health and safety hazards created by pre-law mining activities. A few examples include subsidence, mine fires, landslides, and blowouts.

AML Public Health and Safety Issues

SMCRA defined eligible sites under Title IV as those sites which were mined for coal and left in an inadequate state of reclamation prior to August 3, 1977, and for which

there is no continuing reclamation responsibility under state or federal law. The definition of eligibility was extended in 1992 to include sites where surface coal mining occurred during the period between August 4, 1977 and the date on which the secretary of the United States Department of the Interior approved a regulatory program for the state in which the sites are located. The WV AML State Plan was approved January 23, 1981.

The expenditures of monies from the fund on lands and water eligible shall reflect the following priorities stated in Section 403 (a) in the Surface Mining Control and Reclamation Act Amendments of 2006:

1. (A) The protection of public health, safety, and property from extreme dangers of adverse effects of coal mining practices;

(B) the restoration of land and water resources and the environment that –

(i) have been degraded by the adverse effects of coal mining practices; and

(ii) are adjacent to a site that has been or will be remediated under subparagraph (A)

2. (A) The protection of public health and safety from adverse effects of coal mining practices;

(B) the restoration of land and water resources and the environment that -

(i) have been degraded by the adverse effects of coal mining practices; and

(ii) are adjacent to a site that has been or will be remediated under subparagraph (A); and

3. The restoration of land and water resources and the environment previously degraded by adverse effects of coal mining practices including measures for the conservation and development of soil, water (excluding channelization), woodland, fish and wildlife, recreation resources, and agricultural productivity.

The SMCRA Amendments of 2006 stated that any state or tribe may extend funds allocated to such state and tribe in any year through the grants for the purpose of protecting, repairing, replacing, constructing, or enhancing facilities related to water supply, including water distribution facilities and treatment plants, to replace water supplies adversely affected by coal mining practices.

The U.S. Office of Surface Mining (OSM) maintains an inventory of abandoned mine problems known as the Abandoned Mine Lands Inventory System (AMLIS). OSM maintains the system to provide information to meet the objectives of Title IV specified in Section 403(a).

When a problem area is entered into AMLIS along with the estimated cost of repairing the area, not including design, inspection, and program administration costs, the estimated cost is entered in the unfunded category. When a problem area on the inventory is funded, it is moved to the funded category. Later, when the actual construction is completed, the problem is again moved, this time to the completed category. In this manner, a complete history of the abandoned mine land problems are maintained in AMLIS.

AML&R Accomplishments

AML&R has completed the problem areas (PA) and the associated problem types from July 1, 2021 through June 30, 2023. The PA and the problem type accomplishments have been entered into AMLIS and moved from the funded to completed category. The Problem Types, Completed Units and Completion Costs are shown below.

Problem Type	Completed Units	Completion Costs
Clogged Streams (Miles)	0.17	$161,958.58
Clogged Stream Lands (Acres)	9.30	99,345.11
Dangerous Highwalls (Feet)	3,290	$264,450.00
Dangerous Impoundments (Count)	17	$1,396,667.47
Dangerous Piles & Embankments (Acres)	4	25,000
Dangerous Slides (Acres)	17.6	4,072,156.99
Hazardous Water Bodies (Count)	1	$86,823.00
Industrial/Residential Waste (Count)	1	$26.257.00
Polluted Water: Human Consumption (Count)	113	$1,674,000.00
Portals (Count)	73	$1,221,677.52
Spoil (Acres)	0.1	$10,000.00
Subsidence (Acres)	9.35	$2,623,354.48
Surface Burning (Acres)	0.4	$113,246.80
Vertical Opening (Count)	7	$836,832.40
Water Problems (Gallons)	322,794	$1,742,997.52
Total Cost		**$14,354,766.87**

E. Division of Land Restoration

The Division of Land Restoration's mission is to reclaim and remediate contaminated and disturbed land to a condition protective of public health and safety and suitable for productive reuse and economic development.

Office of Environmental Remediation

Through its various environmental cleanup programs outlined below, the Office of Environmental Remediation (OER) provides for clean, safe, and productive West Virginia communities by assessing and remediating environmental resources and restoring contaminated properties to beneficial use.

Voluntary Remediation Program

The Voluntary Remediation Program encourages voluntary cleanup and redevelopment of abandoned or under-utilized contaminated properties by providing certain environmental liability protections under West Virginia law to parties completing remediation under WVDEP oversight. During FY22 and FY23, the program:

- Accepted fifteen (15) new applications for voluntary remediation projects.
- Issued twenty-one (21) Certificates of Completion for 441.45 remediated acres of land ready for reuse. Cumulatively, 253 Certificate of Completions have been issued for 4,153 remediated acres of land since inception of the program.

UECA-LUST Program

The Uniform Environmental Covenants Act–Leaking Underground Storage Tank (UECA-LUST) Program is an alternative remediation option for releases from underground storage tanks (USTs). Similar to the Voluntary Remediation Program, responsible parties may remediate LUST sites to risk-based standards utilizing engineering and institutional controls, such as covers, caps, and land use restrictions, in accordance with the Uniform Environmental Covenants Act. However, this program only addresses contaminants associated with the LUST release, rather than all contaminants associated with historic use of the site.

During FY22 and FY23, the program:

- Accepted seven (7) LUST sites to participate in the program.
- Issued five (5) No Further Action letters to sites which successfully completed risk-based remediation.

Superfund Program

WVDEP is mainly a support regulatory agency for the U.S. Environmental Protection Agency at removal, pre-remedial, and remedial sites subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which requires meaningful state participation. The WVDEP Superfund Program represents state interests; ensures compliance with applicable state laws and regulations; provides oversight of data and data collection activities; and acts as a liaison between the U.S. EPA and the citizens of West Virginia, local officials,

community representatives, property owners, industry, and nonprofit organizations. WVDEP also leads some CERCLA activities within the state, including operations and maintenance at remedial sites.

During FY22 and FY23, the program:

- Supported EPA's Remedial Program and led O&M efforts at eleven (11) Superfund National Priorities List (NPL) sites.

- Assisted EPA Response Program On-Scene Coordinators with removal assessments and actions at nine (9) sites.

- Led or supported pre-remedial assessments for EPA's Site Assessment Program at eleven (11) sites.

- Took over lead agency role for continued assessment at one (1) CERCLA removal action site.

Federal Facilities Restoration Program

WVDEP serves as the lead regulatory agency at Department of Defense (DOD) restoration sites not on the Superfund NPL. The Federal Facilities Restoration Program oversees the investigation and cleanup of active, closing, and formerly used military installations at which hazardous substances and/or petroleum products were used, stored, or disposed of during past operations, as well as military munitions response sites known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents.

The DOD—including the Air Force, Air National Guard, Army National Guard, and Navy components—has initiated site investigations for the emerging contaminant PFAS throughout the State, with WVDEP serving as the lead regulatory agency responsible for the oversight, proper characterization, and delineation of PFAS contamination caused by a federal facility.

During FY22 and FY23, the program:

- Collaborated with the U.S. Air Force, U.S. Army, U.S. Army Corps of Engineers, U.S. Army National Guard, U.S. Navy, and U.S. Department of Energy to actively assess and remediate nine (9) Formerly Use Defense Sites (FUDS), Military Munitions Response Program (MMRP) sites, and Installation Restoration (IR) sites, Legacy Sites, and PFOS/PFOA special assessment sites.

Long-Term Monitoring of Institutional Controls

Institutional controls are administrative and legal controls (such as restrictive covenants or city ordinances) that minimize the potential for human exposure or contamination and protect the integrity of the cleanup. WVDEP generally utilizes Land Use Covenants (LUCs)—also referred to as environmental covenants—as institutional controls on sites where removal and treatment of all contamination is not possible or practical. LUCs are legal instruments that impose activity and use limitations (AULs) where residual contamination is present on a property. AULs may include use or extraction of groundwater for any purpose, except for groundwater monitoring and/or remediation; any activity that may interfere with the groundwater monitoring well network; and construction of a building without a sub-slab vapor barrier and/or ventilation system adequate to prevent exposure to vapors in soil and groundwater.

WVDEP continuously monitors and regularly inspects properties with recorded LUCs to protect citizens from coming in contact with contamination at a site.

During FY22 and FY23, WVDEP:

- Received and processed 2,507 notifications of excavation from WV811 to monitor sites with established environmental controls that contain AULs and/or engineering controls.

F. Office of the Environmental Advocate

Rehabilitation Environmental Action Plan (REAP)

This plan was a strategic initiative signed into law by Governor Joe Manchin in 2005. The governor's bill combined elements of the WVDEP and the Division of Natural Resources into a more effective and streamlined system for the direction of environmental remediation programs. The REAP Program, housed within the Office of the Environmental Advocate, provides oversight of litter removal, statewide recycling, and open dump cleanups which protects West Virginia’s surface and groundwater from contamination.

During the FY 2022 and 2023 period (July 1, 2021 - June 30, 2023), REAP has accomplished the following:

The REAP Program eliminated 1,509 dumps from West Virginia’s landscape, cleaned over 3,700 miles of roadway, and awarded over $4.2 million in grants for recycling and litter control initiatives. These actions contributed to the proper disposal of 9,728 tons of litter/waste across all programs. REAP was also responsible for the proper disposal of over 478,000 waste tires. Many of these tires were pulled from the 316 miles of rivers and streams that REAP cleaned during this time.

- REAP's Pollution Prevention Open Dump Program (PPOD) reclaimed 1,500 acres of land through the eradication of 1,336 dumps. PPOD removed 9,122 tons of litter/waste from the landscape while recycling 13 tons of scrap metal. PPOD stream cleanup projects removed trash and tires from 196 miles of our state's waterways.

- REAP's Make It Shine Program coordinated the efforts of 7,544 volunteers. These volunteers worked to remove 365 tons of litter/waste from public lands and waters. The volunteers cleaned 120 miles of streams while also eradicating 173 dumps. Volunteers for the WV Make It Shine Program logged 18,788 hours of participation in these cleanups.

- The Adopt-A-Highway Program registered and received reports from 1,001 groups utilizing 12,342 volunteers. The volunteers worked to remove 241 tons of litter from nearly 3,743 miles of roadway. The Adopt-A-Highway Program logged 82,009 volunteer service hours during these two years.

- The REAP Litter Control Grant Program, which provides grants to counties and municipalities for litter control and cleanup programs, funded 50 projects totaling $182,689.00.

- The REAP West Virginia Recycling Assistance Grant Program, which provides grants for recycling to public and private entities, awarded 56 grants totaling $3,836,345.80.

- The REAP Covered Electronic Device Grant Program, which offers grants to counties and municipalities wishing to implement electronic device recycling programs or e-cycling events, issued 31 grants totaling $233,087.00.

- The REAP West Virginia Public Employees Office Paper Collection Program collected over 408.51 tons of paper from state offices.

- The Youth Education and Outreach Program conducted 1285 educational presentations regarding litter and recycling. Volunteers for this program cleaned 189 acres of parks, 56 miles of trails, and 536 miles of roadways.

G. Information Technology (IT) Support

Technical Applications and Geographical Information Systems (TAGIS) Unit

The TAGIS unit provides central support for all DEP units involved in groundwater activities in the form of geographical database creation and update, analysis, web-based services and applications, and software support.

TAGIS maintains the agency ArcGIS license server that provides access to advanced desktop GIS software. It also has developed automated processes for creating and updating geographical datasets critical for agency programs, including NPDES permits and outlets (which also include underground injection permits), voluntary remediation sites, oil and gas development permits, active mining operations, above ground storage tanks, and others. TAGIS also has developed or obtained a wide range of additional GIS data products related to stream networks, flow estimation, high resolution surface elevation data, soil data used for runoff analysis, public water sources and protection areas, toxics release inventory, and others. Additional work has extended the National Hydrology Dataset to allow stream network traversal in karst areas by linking sinking streams and emergent springs based on dye trace data and karst basin maps.

The TAGIS unit continues to expand the agency's web-based mapping capability, maintaining and developing a range of interactive mapping applications and ‘story maps’ that quickly bring together data resources from many organizations to a single place, which then can be shared with anyone via a simple web address.

DEPARTMENT OF HEALTH AND HUMAN RESOURCES
H. Office of Environmental Health Services

Source Water Assessment and Protection & Wellhead Protection Program

Groundwater Protection Goals

As of June 30, 2023, the West Virginia Bureau for Public Health, Office of Environmental Health Services (OEHS), Source Water Assessment and Protection (SWAP) Program encompasses both the wellhead “groundwater” protection and the surface water protection efforts. The Wellhead Protection (WHP) Program works with the groundwater community, non-community transient and transient public water supply systems (PWS) to develop their wellhead protection programs. Implementation of the wellhead protection program began in the early 1990’s, as part of West Virginia groundwater protection strategy. This protection strategy was extended to surface water sources with the 1996 Safe Drinking Water Act (SDWA) amendments. The SDWA requires states to develop and implement a SWAP program designed to evaluate the vulnerability of PWS to possible sources of contamination and encourages states to work with the PWS owners to develop protection and management plans.

The requirement for a WV Source Water Protection Plan (SWPP) was enacted during the 2014 WV Legislative Session which revised W.Va. Code §16-1 et seq., Public Health and W.Va. Code of State Rules §64-3 et seq., Public Water Systems to

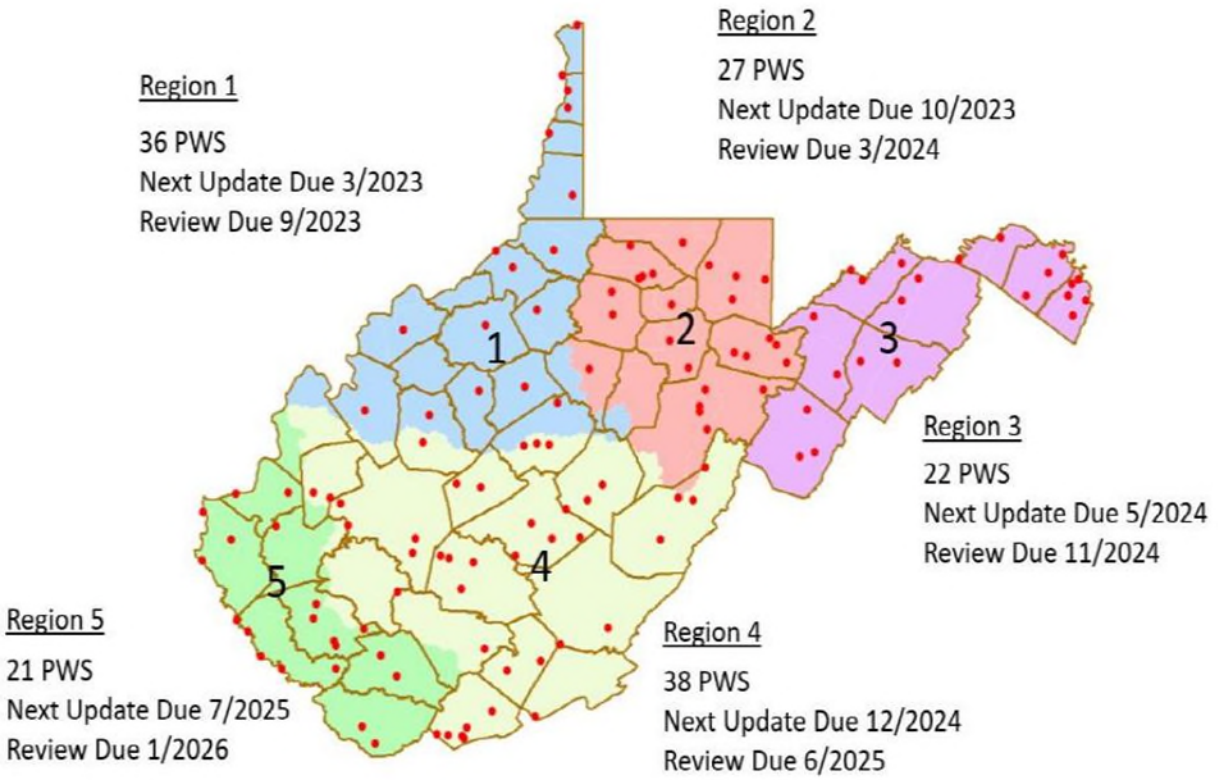
include requirements for PWS to update their existing or file a new comprehensive SWPP for surface water and surface water influenced groundwater (SWIG) systems. As of June 30, 2023, there are 144 surface and SWIG PWS that have submitted an updated SWPP.

W.Va. Code of State Rules §64-3 et seq., Public Water Systems was revised in 2020 to allow the PWS to submit the required 3-year update for the SWPP on a staggered basis. The catchment basins for streams in the United States are divided into Hydraulic Unit Code (HUC) watersheds based on their area ranging from 2 digit to 14 digit, 2 being the largest. WV has 32 HUC-8 Watersheds. Those 32 HUC-8 watersheds were further consolidated into five hydrologic regions (Regions 1 to 5) for purposes of grouping the PWS for submission of their SWPPs. All PWS required to submit a SWPP are assigned to one of the five regions enabling the SWAP Program to collect and review their updated SWPP in manageable groups.

The watershed designations are as follows:

- Region 1 Watershed – Contains the Upper Ohio North, Upper Ohio South, Middle Ohio North, Middle Ohio South and Little Kanawha HUC-8 watersheds.
- Region 2 Watershed – Contains the Dunkard, Monongahela, West Fork, Tygart Valley, Cheat and Youghiogheny HUC-8 watersheds.
- Region 3 Watershed – Contains the North Branch Potomac, South Branch Potomac, Cacapon, Shenandoah Hardy, Potomac Direct Drains and Shenandoah Jefferson HUC-8 watersheds.
- Region 4 Watershed – Contains the Lower Kanawha, Upper Kanawha, Elk, Gauley, Greenbrier, Coal, Lower New, Upper New, and James HUC-8 watersheds.
- Region 5 Watershed – Contains the Lower Ohio, Lower Guyandotte, Upper Guyandotte, Big Sandy, Twelvepole and Tug Fork HUC-8 watersheds.

All public water utilities in region 1 through 5 are required to submit their SWPP update to the WV Bureau for Public Health, SWAP program every three years. The current submission due dates are depicted below with the watershed regions overlain on the county lines:



In many communities, groundwater is the only source of drinking water. Once the groundwater is contaminated and it is very expensive to treat. The WHP program incorporates public participation, source water delineations, inventory of potential sources of significant contamination and contingency planning to accomplish the program goals. One of the WHP programs goals is to assess the quality of our water resources and to implement practices that reduce pollutants and chemical contaminants which could potentially negatively impact these resources. Protecting our water resources from contamination can help reduce the need for supplementary treatment procedures and infrastructure upgrade costs that drive increases in public drinking water rates. It is our hope that the work accomplished by the West Virginia SWAP and WHP programs will be an asset to the public water supply community and will help in planning and building future capacity for economic growth.

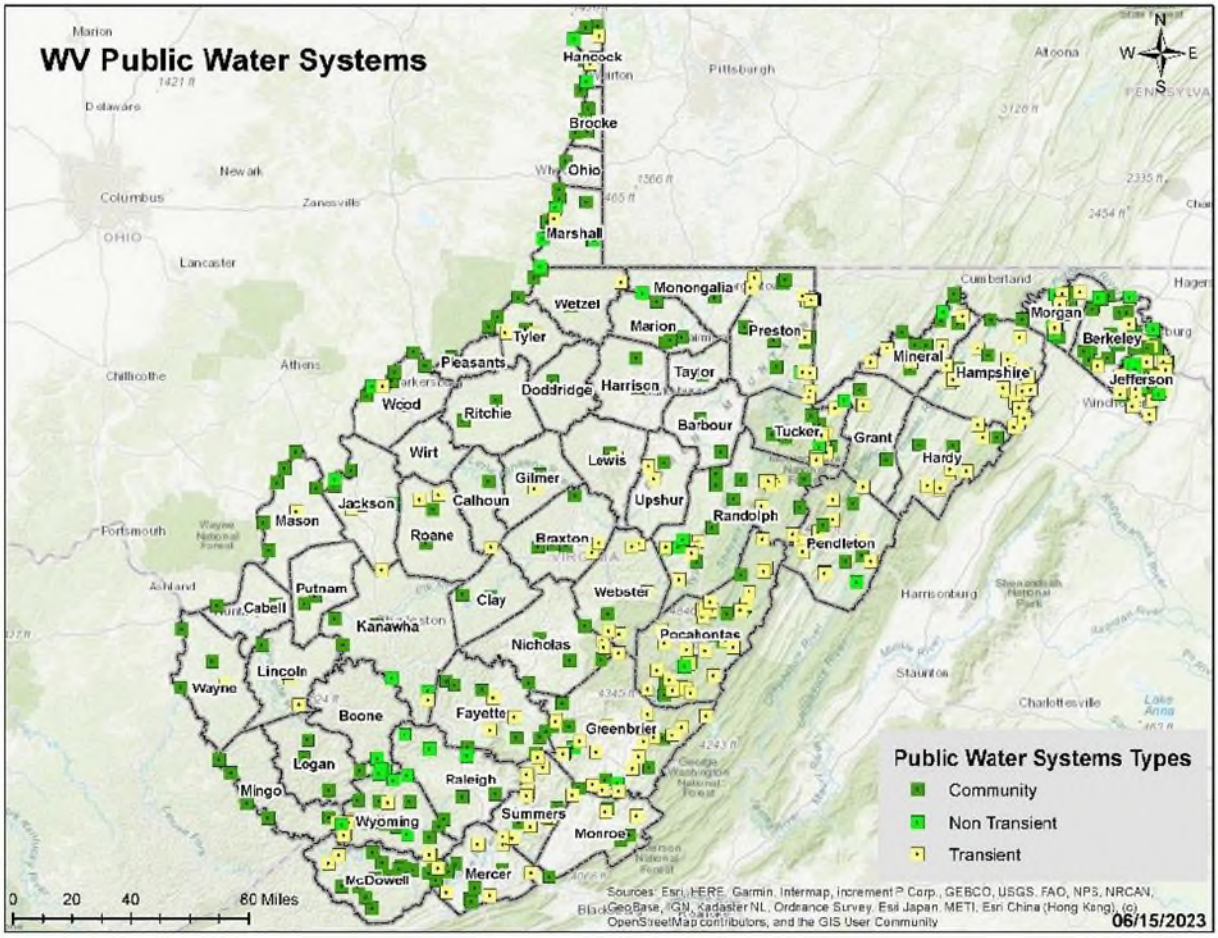
The SWAP program relies on participation and involvement of federal, state, local agencies, industry, environmental groups, public water supplies, and the public at many levels to protect the water resources and the health of the people of West Virginia. Implementation of the SWAP and WHP programs build on other environmental assessment and protection programs and requires integrated linkage and cooperation of the WV Department of Environmental Protection (DEP). Sustained source water

protection requires a multifaceted approach that will require continued financial support from the State of West Virginia.

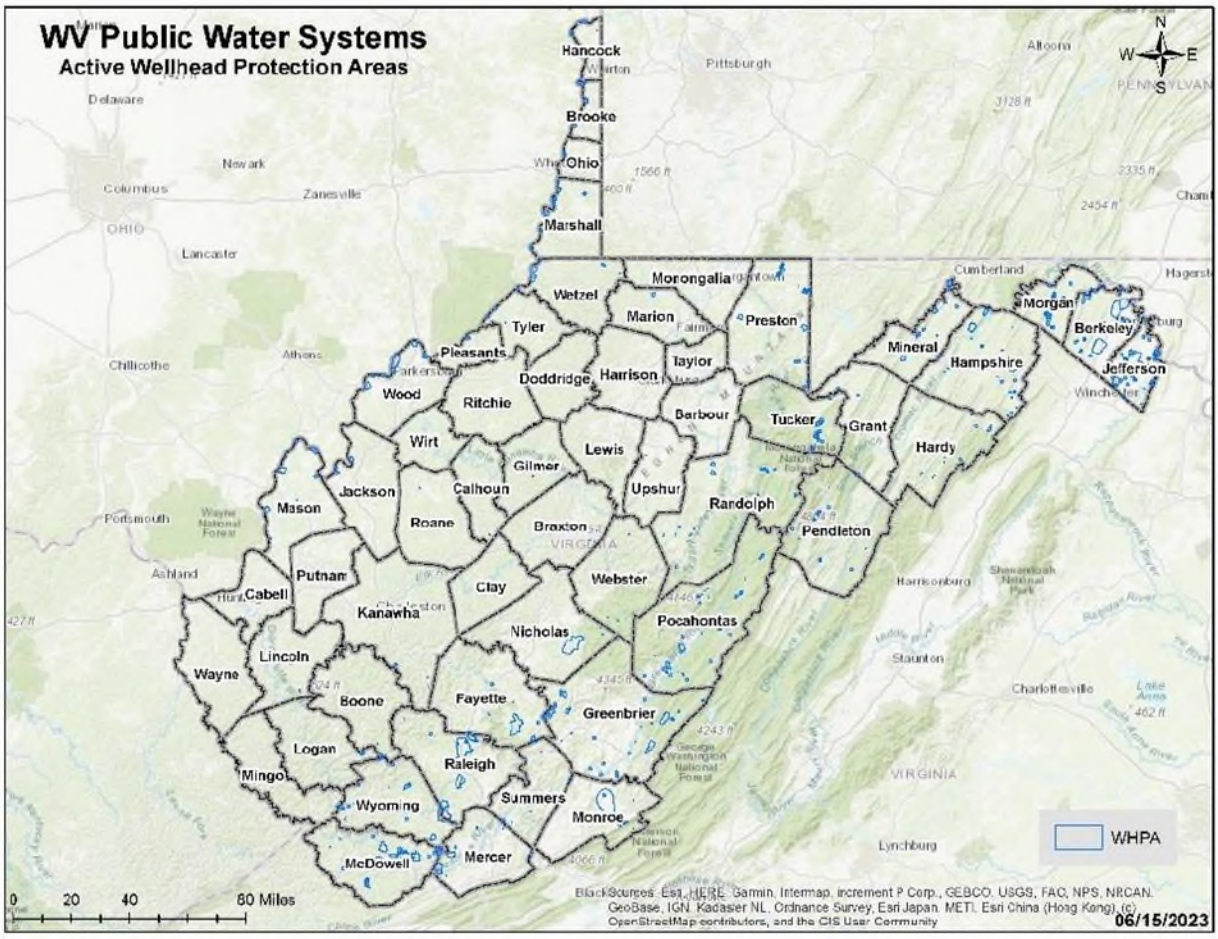
Groundwater Data Collection and Management

The WHP program collects a variety of data including characteristics of public water supply sources, locations of the PWS intakes, potential significant sources of contamination, description of watersheds, delineation of hydrogeologic settings, and other aquifer parameters. This data continues to be collected through field activities, contractor services, local stakeholder input and by incorporating data from other federal, state, and local agencies. The WHP program maximizes the use of the data collected and provides it to our stakeholders by integrating it into a Geographic Information System (GIS) and posting it online.

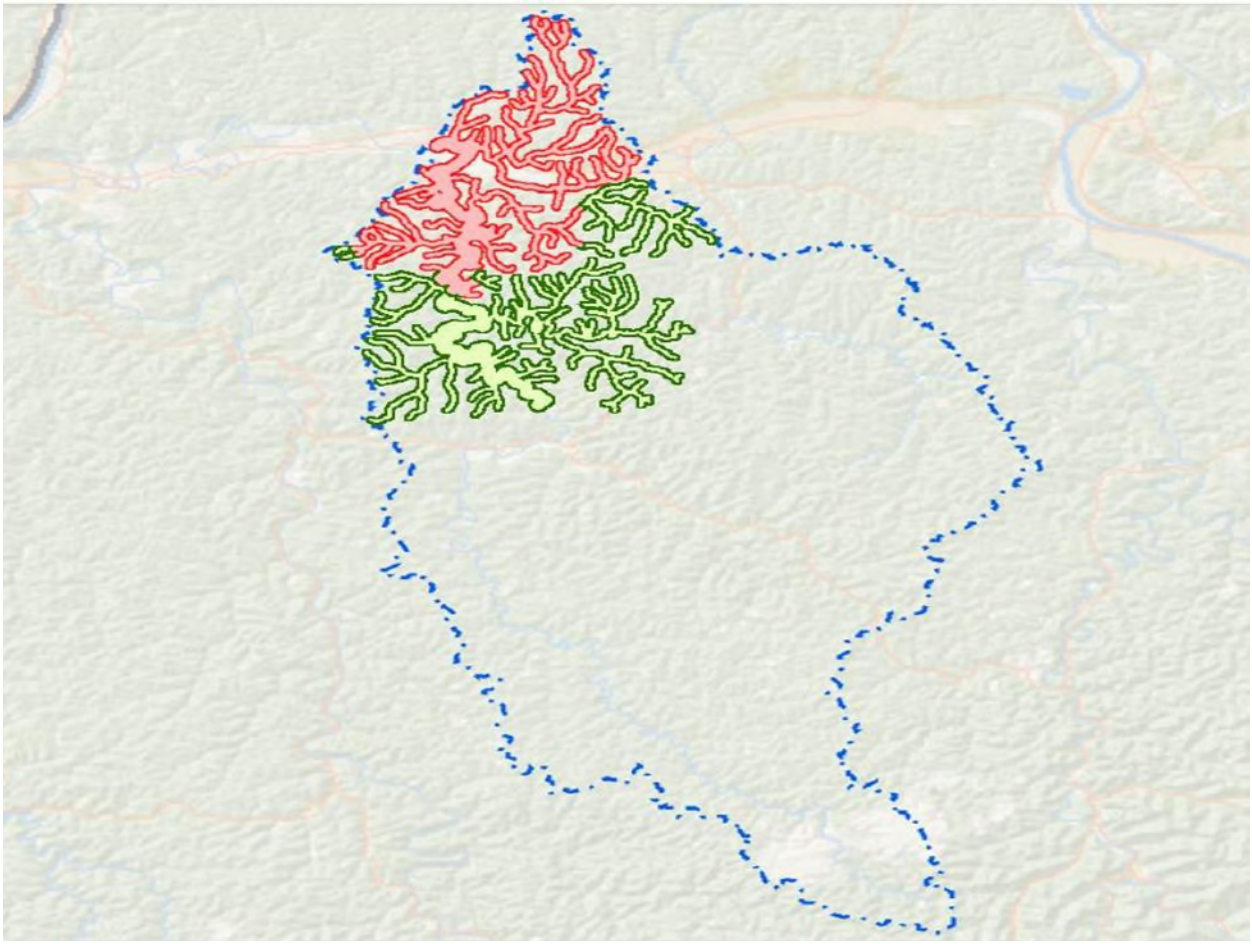
There are approximately 801 active community and non-community PWS currently in West Virginia. This number varies based on closure of PWS, consolidation of existing PWS and the addition of new PWS.



There are currently 820 active wellhead protection areas (WHPA) surrounding the PWSwater wells or well fields through which contaminants could reach the well within a five-year time of travel.



The SWAP Program provides the PWS's a watershed (--), zone of critical concern (--) and zone of peripheral concern (--) delineation for each of their intakes. The Zones of concern are based on a modeled 5-hour time of travel with a 1,000-foot buffer from each bank of the main stem stream and a 500-foot buffer from each bank of its tributaries.



The SWAP program provides a public map viewer of Potential Sources of Significant Contamination (PSSC) with details for each in an attribute table which is posted on a website at https://oehsportal.wvdhhr.org/wvswap/index.html. A password protected confidential website that can only be accessed by the PWS provides the USEPA Tier II sites, Aboveground Storage Tanks (AST), Underground Storage Tanks (UST), and Leaking USTs in their watershed.

Program Milestones and Future Priorities

During this reporting period, the SWAP and WHP programs continued to pursue the following:

SWAP and WHP Program General Responsibilities:

- Review and approve the WV PWS Source Water Protection Plan submissions.

- Maintain the Wellhead Protection Program for public drinking water wells and the associated wellhead protection areas, including GWUDI and SWIG Classification.
- Manage the WV Source Water Protection Grant Program for the PWS.
- Assist in the permitting of PWS groundwater wells and other geothermal well systems.
- Oversee the Geographic Information Systems data management and sharing with other state agencies, PWS and the public.
- Maintain interagency partnerships and facilitate public education for wellhead and source water protection.
- Participate and fund scientific studies and research projects to enhance our knowledge of the complex hydrology of West Virginia.

Building Partnerships, Interagency cooperation and other alliances:

- Continued to participate and build voluntary protection efforts by prioritizing efforts, program resources, education, and outreach efforts in developing and implementing voluntary protection measures not only to the local water systems but also to local governments, councils, planners, and other stakeholders.
- Provided funding for the WVDEP's Underground Injection Control (UIC) Class 5 program to locate UIC Class 5 wells in source water protection and sensitive hydrological areas within West Virginia.
- Continued participation and funding for the Potomac Drinking Water Source Protection Partnership (DWSPP). This partnership is composed of water utilities and the various governmental agencies responsible for drinking water protection in the Potomac River Basin.
- Continued participation with the Ohio River Valley Water Sanitation Commission (ORSANCO) work group on source water protection. This work group is composed of water utilities and the various governmental agencies responsible for drinking water protection in the Ohio River basin.
- Continued a working relationship between the federal Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) programs within the state to provide the most accurate and representative assessment of source waters, based on available data which the state believes best reflects the quality of the resources.
- Continued to cooperate with the United States Geological Survey (USGS) to use hydrogeologic information provided from the multiple USGS state water science centers to help define WHP delineation areas utilizing the most current scientific methods.

Public Outreach/Educational Activities:

- The WHP and SWAP programs work with the WV Rural Water Association, WV Rivers and the Rural Community Assistance Partnership to provide source water protection educational materials to the public.
- OEHS Staff provides PWS help in developing a protection program and assessing potential sources of contamination.
- The WVBPH website (http://www.wvdhhr.org/oehs/eed/swap/) continues to provide information on the SWAP/WHP programs (educational materials, posters and brochures) and guide municipalities, water suppliers, or other groups through developing a local SWP program. In addition, a link is available to a website that provides copies of the initial SWAP/WHP susceptibility assessment reports for the community PWS.
- Our SWAP GIS website (https://oehsportal.wvdhhr.org/wvswap/index.html) disseminates relevant source water information to public water supplies, state agencies, federal agencies, and local governments to further source water protection efforts.
- Installation of protection signage along the perimeter of wellhead protection areas. PWSs can use the signs for municipality and non-highway use.

Other Actions for Protection of Sources of Drinking Water:

- Continue to evaluate new public water supply water wells or intakes to assure they are in areas where contamination threats are minimal. Permits for new public water wells now require an initial survey for potential sources of contamination within 2000 feet of proposed well location with site-specific information used when available.
- Continuing to use the Alternative Monitoring Strategy Program (AMSP), which determines future monitoring frequency reductions, is dependent on having a SWAP/WHP program in place, which requires consistent revisions and updates.
- Continue to participate in the development of regulations and design standards for water supply wells, private water wells and monitoring wells for the prevention of groundwater contamination.
- Continue to evaluate public water supply wells to determine whether groundwater sources are under the direct influence of surface water (GWUDI) and/or SWIG.
- Continue to support the efforts of the WVDEP - Division of Water and Waste Management (DWWM) and the USGS with groundwater water quality studies. This program has strived to benchmark raw water quality data for West Virginia aquifers. West Virginia is trying to identify the

impacts of various land uses on water quality. This information will help West Virginia avoid future contamination events.

- Continue to implement the regulations and design standards for private water wells for the protection of groundwater.
- In 2019 the West Virginia Legislature tasked the DHHR and DEP with determining which PWSs had detectable concentrations of selected Per- and polyfluoroalkyl substances in their raw water sources. (PFAS) are several thousand man-made chemical compounds found in the environment worldwide that are linked to adverse health effects.
- In 2020 and 2021, SWAP and DEP employed the USGS to sample raw water sources for 279 PWSs for PFAS and a USGS report was published in July 2022.
- In 2022 SWAP tested 37 PWS's finished water and the results were posted in May of 2023 on the USGS website.
- SWAP has created and posted a website showing the finished water study test results and will add any future finished water test results as they are received.

Future Program Needs:

The SWAP program has hired additional staff and spent a significant amount of time in developing the WHP programs. The SWAP program has created a GIS program for the storage and display of geologic, hydrologic, and regulatory site data, delineations, and existing potential significant sources of contamination. Potential future WHP program needs are as follows:

- Source water education materials to identify, assess, prioritize, and address local source water protection and contamination prevention needs.
- Pollution prevention technical assistance to small businesses located within wellhead protection areas to balance local water protection and restoration efforts.
- Continued groundwater quality monitoring to support activities mandated by the Safe Drinking Water Act and the Clean Water Act.
- Funding to continue to sustain our staff and the grant program for PWSs that utilize groundwater. The PWS source water protection grants are used to improve source water protection efforts, decrease their vulnerability to potential contamination events and to provide enhanced security for source water protection areas and PWS facilities.

APPENDIX A
Regulatory Agencies with Groundwater Responsibility and Authority

Department of Agriculture

1900 Kanawha Blvd., E
Charleston, WV 25305
304-558-3708

Department of Environmental Protection

601 57th St., SE
Charleston, WV 25304

Division of Water and Waste Management
304-926-0495

Division of Mining and Reclamation
304-926-0490

Division of Land Restoration
304-926-0455

Office of Oil and Gas
304-926-0450

Office of Abandoned Mine Lands and Reclamation
304-926-0485

Office of Environmental Enforcement
304-926-0470

Department of Health and Human Resources

350 Capitol St.
Charleston, WV 25301

Office of Environmental Health Services
304-558-2981