

State of West Virginia
Source Water Assessment and
Protection Program
Source Water Assessment Report

Supplemental Report

Bluewell PSD
Mercer County
PWSID WV3302804



Prepared by:

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Environmental Health Services
Source Water Protection Unit

December 2010

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GROUND WATER PUBLIC SUPPLY SYSTEMS

SOURCE WATER ASSESSMENT AND PROTECTION (SWAP) PROGRAM

SUPPLEMENTAL REPORT

Prepared by: West Virginia Department of Health and Human Resources (WVDHHR), SWAP Program

INTRODUCTION

What is the Purpose of this Supplemental Report?

A Source Water Assessment Report was prepared for Bluewell PSD by West Virginia Department of Health and Human Resources, Bureau for Public Health, Office of Environmental Health Services, Source Water Protection Unit on April 2003. This initial report addressed the surface water supply from the Bluewell PSD primary impoundment.

A field review on October 22, 2009 by WVDHHR staff revealed that Bluewell PSD also uses water from a well to supplement their surface water source from the primary impoundment during periods of low water. When in use, the well contributes 16% of the total raw water inflow to the treatment plant. A second field review was conducted on March 22, 2010 to update the PCS inventory for both the ground water source (Well #1) and the existing surface water source (primary impoundment).

A review of current and proposed facility operations by WVDHHR consultant Tetra Tech, in preparation for development of a Source Water Protection Plan, revealed that Bluewell PSD is using Falls Mills Dam reservoir as a backup surface water source during dry weather. Falls Mills Dam is located near Falls Mills, Virginia.

This supplemental report addresses the ground water component of raw water production. It also provides updated information on the existing primary impoundment and the backup reservoir. Maps of the ZCC and Protection Watershed for both the primary impoundment (Figures 1 and 2) and the backup reservoir (Figures 3 and 4) are included for reference. These sources will be addressed in the Bluewell PSD Source Water Protection Plan.

This concept of source water protection is a preventative approach and complements the effort of proper treatment and disinfection by the individual water supply systems. This assessment is one step in a multilevel approach to ensure a safe future supply of water by understanding what potential threats exist.

This Source Water Assessment Public Summary is to provide information to support local and state efforts to protect public drinking water source and to maintain a safe and dependable water supply for the protection of human health by preventing contamination. The costs of these preventative measures will rarely exceed the cost of remediating a public water supply once it is contaminated.

The emphasis of this assessment is on “source” water rather than the “tap” water. Information on tap water quality is available in the Consumer Confidence Report, which can be obtained from your local water supplier.

This report identifies the significant potential contaminant sources that could threaten source(s) water quality. Your susceptibility ranking does not imply poor water quality. Actual water quality is best reflected by results of regular water tests. Please refer to Table 1 for an informational summary of your public water supply:

Table 1 Public Water Supply Information

PWS Name	Bluewell PSD
Address	P.O. Box 3066
City, State, Zip	Bluefield, WV 24701
PWSID#	WV3302804
County	Mercer County
System Type	Community

What is my Well's Source Water Protection Area?

A well(s) source water protection area (SWPA) is the land around the well where protection activities should be focused. The SWPA is the area that is likely contributing water to the well. Please refer to Figure 1 for your SWPA.

What is SWAP?

The SWAP, established under the Safe Drinking Water Act, requires every state to:

- Delineate the area from which a public water supply system receives its water;
- Inventory land uses within the recharge areas of all public water supplies;
- Assess the susceptibility of drinking water sources to contamination from these land uses;
- Publicize the results to provide support for improved protection of sources.

The WVDHHR SWAP will complete all of these components of a source water assessment.

What is Susceptibility?

Susceptibility is a measure of your well's potential to become contaminated by land uses and activities within the SWPA. The purpose of a susceptibility analysis is to provide an overview to actions a public water system may take to further reduce the susceptibility to their drinking water supply. Because public water supply wells have been constructed in various hydrologic settings and have a range of potentially significant contaminant sources, best professional judgment has been used in determining the susceptibility of each public water system to contamination. The possibility of a release from potential contaminant sources is greatly reduced if Best Management Practices (BMP's) are used. The susceptibility determination for your well did not take into account whether BMP's are being used.

Susceptibility of drinking water does not mean a customer will drink contaminated water. Water suppliers protect drinking water by monitoring and treating water supplies, and using BMP's and source water protection measures to ensure that safe water is delivered to the tap.

How Was my Well's Susceptibility Determined?

Your well(s) susceptibility is based on the following parameters:

- Review of the hydrologic setting (ease of contamination transport through each material present in the local hydrologic setting);

- Review of the physical integrity of the well;
- Review of available ground water quality data;
- Characterization of the potential significant contaminant sources identified in the SWPA;
- Integration of this information to identify the greatest threats to the source water and suggestions of appropriate protection strategies or activities.

Table 2 Source of Your Drinking Water - Hydrogeologic Setting

Well Name	Geologic Setting/Sensitivity
Well #1	Appalachian Plateau – Moderate Sensitivity
Well #2 (inactive)	Appalachian Plateau – Moderate Sensitivity

The Bluewell PSD water system serves a population of approximately 6,135 people. The supply is from an impoundment and one active well. Total raw water production is approximately 582,500 GPD. The well is pumped to provide approximately 16% of raw water inflow to the treatment system when in use. This water is blended with the surface water source prior to treatment.

The Appalachian Plateau Province areas consist of nearly horizontal shales, sandstones and coals. The aquifers may be porous or slightly fractured. The estimated land area (approximately 288 acres) that contributes water to the wells is depicted in the attached map (Figure 5) as the Source Water Protection Area (SWPA). The WVDHHR used an interim 2000 feet fixed radius delineation. This is generally based on water use for a five year period with consideration given to influencing hydrogeologic factors.

Table 3 Physical Integrity of well

Well Name	Source Integrity
Well #1	Unknown Construction
Well #2 (inactive)	Unknown Construction – casing collapsed

Wells may vary in their construction characteristics and in the geologic rock types in which they occur. The lack of an effective grout and sanitary seals are avenues by which contaminants from nearby surface water bodies or overland runoff can percolate to wells. Since all water produced from the well is blended prior to treatment, and is subjected to full treatment prior to distribution, no Ground Water Under the Direct Influence (GWUDI) assessment is required.

Table 4 Water Quality and Water Treatment Information

Well Name	Results
Well #1	Meets Standards
Well #2 (inactive)	Does Not Meet Standards

The GWUDI assessment evaluates contaminants that may enter the water drawn directly from the well.

The contaminants addressed in this assessment include those regulated under the Safe Drinking Water Act as well as those the WVDHHR has determined may present a concern to public health. Periodic analysis for a variety of bacterial, organic, nitrate, synthetic and inorganic contaminants in the water after treatment have consistently yielded values below the maximum contaminant level (MCL) as regulated by the Safe Drinking Water Act. Drinking water that meets MCL standards is associated with little or no health risk and is considered safe. Because sampling requirements are for treated water, the lack of water quality impacts does not necessarily indicate a lack of contamination. This determination is limited by the sampling that is performed for the water system.

All drinking water including bottled water may reasonably be expected to contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. For further information regarding the quality of the system's finished water, please refer to the Consumer Confidence Report or call the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791 or contact your local health provider for more information about contaminants and potential health effects.

EVALUATION OF SIGNIFICANT POTENTIAL SOURCES OF CONTAMINATION

The inventory for Bluewell PSD consists of approximately 14 Potential Contaminant Sources (PCS) of which 6 are considered higher threats to ground water. Please refer to Table 5 for a listing of these and the attached map (Figure 5) for the location of these in the SWPA.

Each significant potential source of contamination has been analyzed and prioritized (low, moderate, and high) in accordance with their potential to impact the water supply. It is important to note that the links between the PCS and the primary contaminant types are not intended to be comprehensive, but only those commonly associated with the PCS. Any potential source may have one or more types of contaminants associated with the chemicals indicated. Threat rankings are a combination of the perceived risk of the release of a contaminant from a land use area, the migration route of the contaminant to the well and the relative public health risk of the contaminant itself. The risk rankings are based on the general nature of their activities and the contaminants associated with them, not on facility specific information, such as management practices. This ranking does not take into consideration any unforeseen releases or the dynamics of new PCS's within the delineated SWPA.

A detailed risk assessment of PCS's was beyond the scope of what could be accomplished with available resources and data. A detailed risk analysis is more meaningful when prepared by local decision makers as the bridge from assessment work to protection strategies.

Table 5 Potential Contaminant Sources (PCS) for Well #1 and Primary Reservoir

Sequential No.	Map Code	PCS Name	PCS Category	Associated Chemicals	Threat to GW
1	M-5	Drinking Water Treatment Plants	Municipal	D	L
2	C-9	Cemetery	Commercial	M, SOC, PH	L
3	C-3	Auto Repair Shop	Commercial	PH, M, VOC, HM, SOC	H
4	C-3	Auto Repair Shop	Commercial	PH, M, VOC, HM, SOC	H
5	C-8	Car Wash	Commercial	PH, VOC	L
6	C-3	Auto Repair Shop	Commercial	PH, M, VOC, HM, SOC	H
7	C-3	Auto Repair Shop	Commercial	PH, M, VOC, HM, SOC	H
8	C-53	Other	Commercial		
9	C-15	Funeral Services and Crematories	Commercial	M, MP, SOC, HM, VOC	M
10	C-3	Auto Repair Shop	Commercial	PH, M, VOC, HM, SOC	H
11	C-35	Parking Lots/Malls	Commercial	VOC, PH	L
	M-30	Wells: Abandoned	Municipal	VOC, SOC, MP, PH, NN	H
	M-7	US Route 52	Municipal	PH, VOC, M	M
	M-7	County Route 11	Municipal	PH, VOC, M	M

Index to Associated Chemicals is as follows:

MP	Microbiological Pathogens: Total/Fecal Coliform, Viruses, Protozoa	PH	Petroleum Hydrocarbons
NN	Nitrate/Nitrite	D	Disinfection byproducts
VOC	Volatile Organic Compounds		
HM	Heavy Metals		
M	Metals		
SOC	Synthetic Organic Compounds		
TO	Taste and Odor precursors		
R	Radionuclides		

Based on this summarized narrative and susceptibility review for each well, the overall susceptibility ranking for Well 1 of the Bluewell PSD indicates a high susceptibility to the identified potential sources of contamination.

For this susceptibility analysis, the State combined the inventory results with other relevant information to decide how likely a water supply may become contaminated by the identified potential sources of contamination. This step makes the assessments useful for communities, since it provides information that local decision-makers use to prioritize approaches for protecting the drinking water supply. It does not mean that these wells are currently contaminated or that these wells are going to be contaminated in the near future, but the potential does exist.

RECOMMENDATION FOR YOUR SOURCE WATER ASSESSMENT AND PROTECTION ACTIVITIES

The following list provides specific recommendations for your source water assessment and protection activities.

- An aquifer protection management program should be developed for the well. Preferably, the protection plan should be developed for the entire SWPA with the cooperation of neighboring towns, county, and state agencies. It is recommended that protection and management efforts should focus on obtaining additional information on the sources present to evaluate their risk.
- Plan for and complete the proper abandonment of all inactive supply wells.
- Reduce existing chronic threats by obtaining further detailed information concerning Leaking Underground Storage Tanks (LUST's) or other Underground Storage Tanks (UST's) within the SWPA that are now in service or were in the past. This information should include the type of leak detection and corrosion protection currently being used at the facility.
- Investigate what types of preventative pollution measures are being conducted by the industrial or commercial facilities located within the SWPA. Some facilities may already have developed their Groundwater Protection Plan (GPP) for their facility.
- Inspect the SWPA regularly.
- Implement Land Use Planning tools to influence future developments within the SWPA. One way to accomplish this is to join forces with the county to adopt a zoning ordinance that would govern certain uses that are considered high threats to ground water.
- Provide maps of the SWPA to the County Planning Commission or other appropriate county agency to make them aware of the location of proposed development in relation to the water supply source.
- Establish funds to purchase land banks of critical areas (e.g. around sinkholes, wells, springs) to preserve the areas from future development.

- Support and encourage the implementation of Best Management Practices for agricultural areas including grazing lands, crop production farms, and orchards. In addition, support information can be provided to residents and commercial users to encourage the reduction in over use of common pesticides and fertilizers.
- Implement systems for regular collection of hazardous waste from residents. For example, the Eastern Panhandle Soil Conservation District and the Berkeley County Solid Waste Authority has helped organize amnesty days in the past where residents could bring in all types of hazardous wastes without threat of punishment.
- Encourage and implement public education about your water supply regarding its susceptibility to contamination and ways to protect. This could come in the form of brochures containing information and advice about ground water and the local terrain. For example, the Berkeley County Health Department has an on-going educational program that is presented to all fourth graders in the county.
- Support and encourage the identification of contamination incidents by citizens.
- Include information regarding contamination and source water protection in mailings to homeowners, including non-emergency contact information. Reduce the amount of septic systems in use by extension of the public sewer system or other approved systems.

NEXT STEP:

The next step in source water protection planning is to prepare or update a Source Water Protection Plan (SWPP) plan. These updates will take place during 2010 and 2011 under the Source Water Technical Help project. The SWPP plan incorporates this source water delineation and assessment report and the following additional sections:

Contingency Planning

A contingency plan documents the system's planned response to interruption of the source water.

Alternative Sources

Information pertaining to alternative water sources focusing on long-term source replacement should the system be required to develop a new source of water due to contamination (or other reasons). This section outlines the most likely sources that can be utilized.

Management Planning

Management planning is the most important element of SWAP. The management plan identifies specific activities that will be pursued by the system to protect their water resources. The system will benefit by taking a proactive approach to source water protection in their source water protection area. It is anticipated that most of the management effort will focus on coordination with government agencies and periodic surveys of the watersheds. It may be necessary to conduct a limited number of special studies to determine actual risk and consequences for selected contaminant sources. This information may be needed before decisions can be made on management activities.

NEED ADDITIONAL INFORMATION?

To obtain additional information and/or links, visit the WVDHHP Web site at <http://www.wvdhhr.org/oehs/eed/swap/> or call the SWAP Program at 304-558-2981.

***Disclaimer - The coverage presented in this program are under constant revision as new sites or facilities are added. They may not contain all the potential or existing sites or facilities. The West Virginia Bureau for Public Health is not responsible for the use or interpretation of this information.**

Please report any inaccuracies on either the map or inventory by calling the SWAP Program at 304-558-2981.

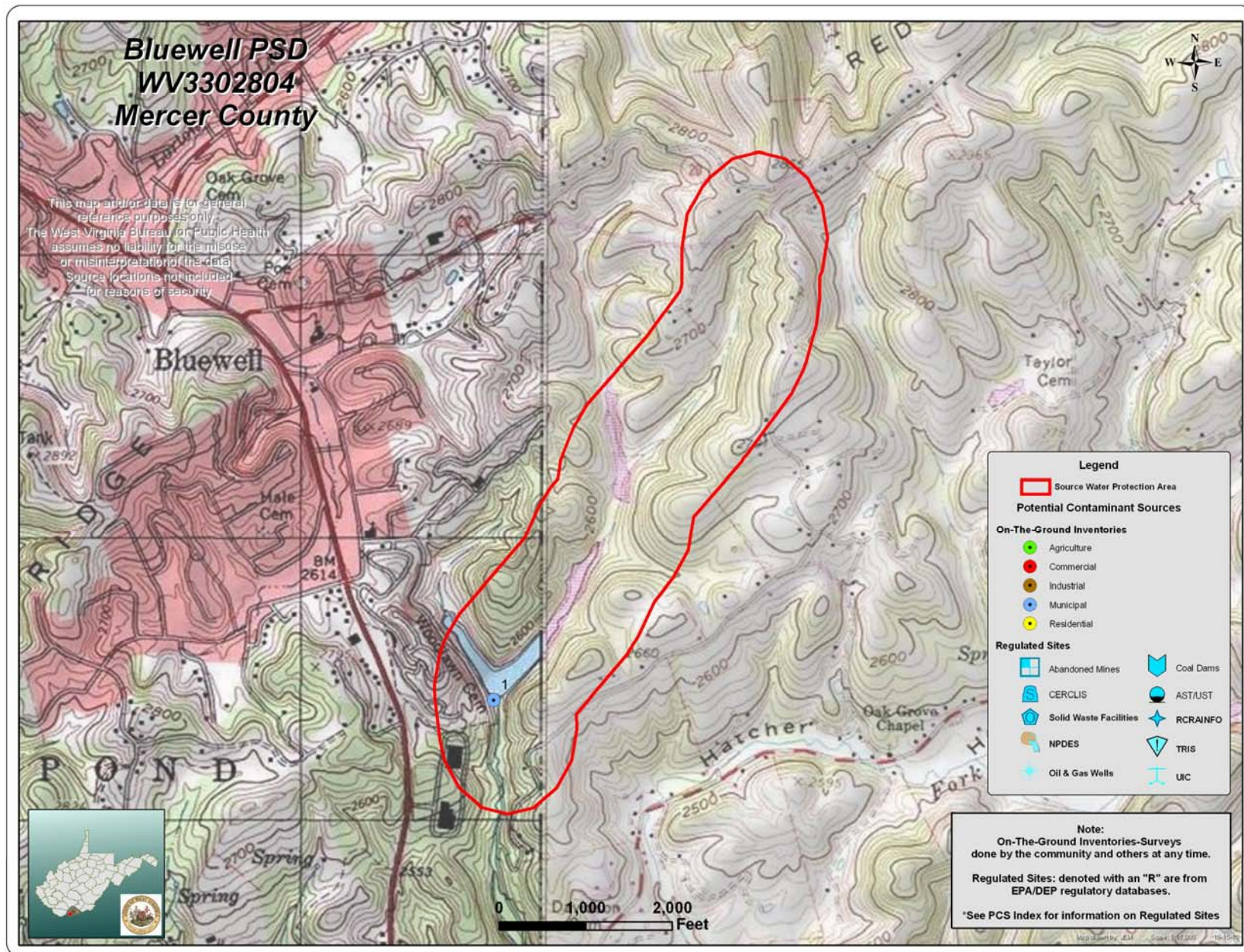


Figure 1: Zone of Critical Concern Primary Impoundment

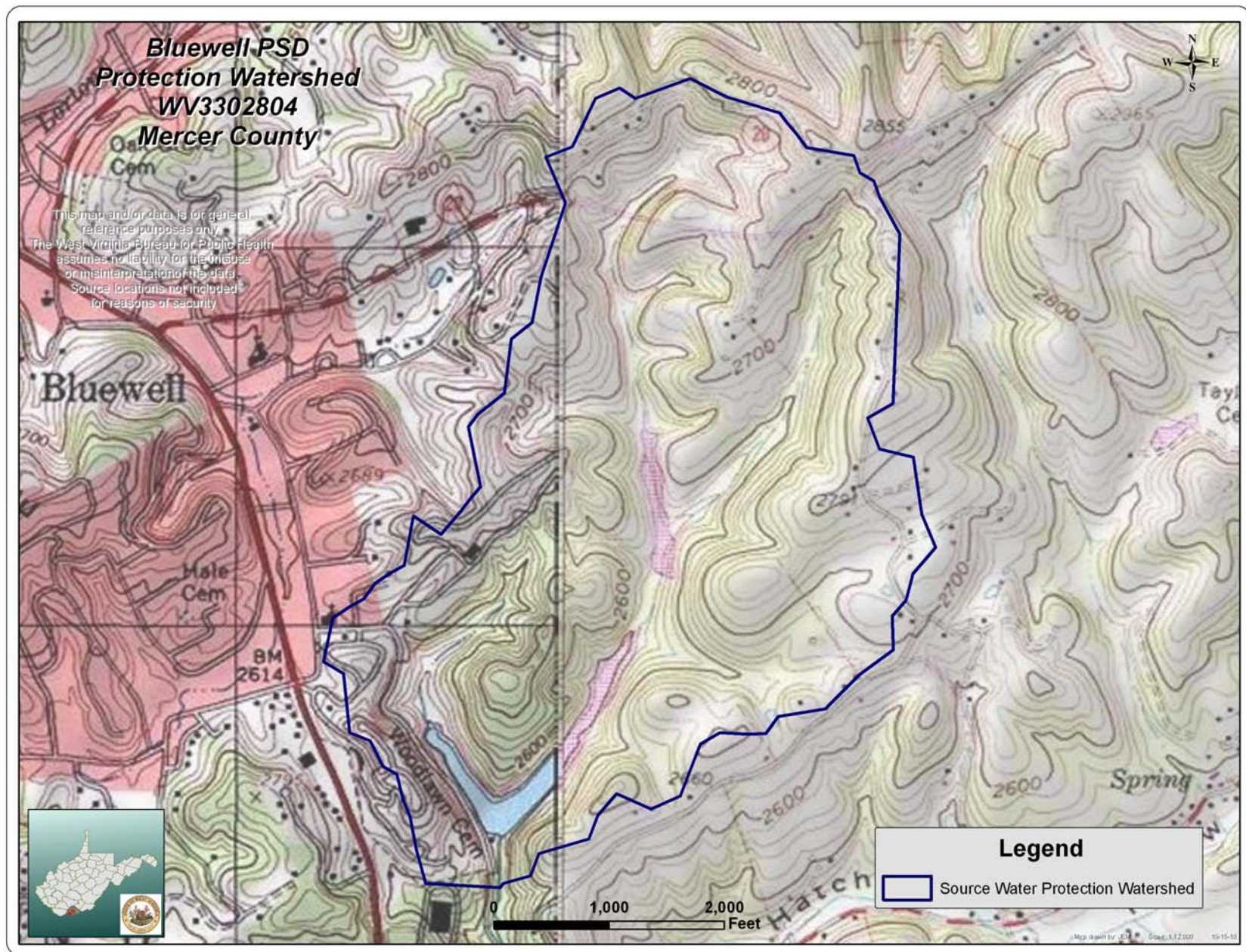


Figure 2: Protection Watershed Primary Impoundment
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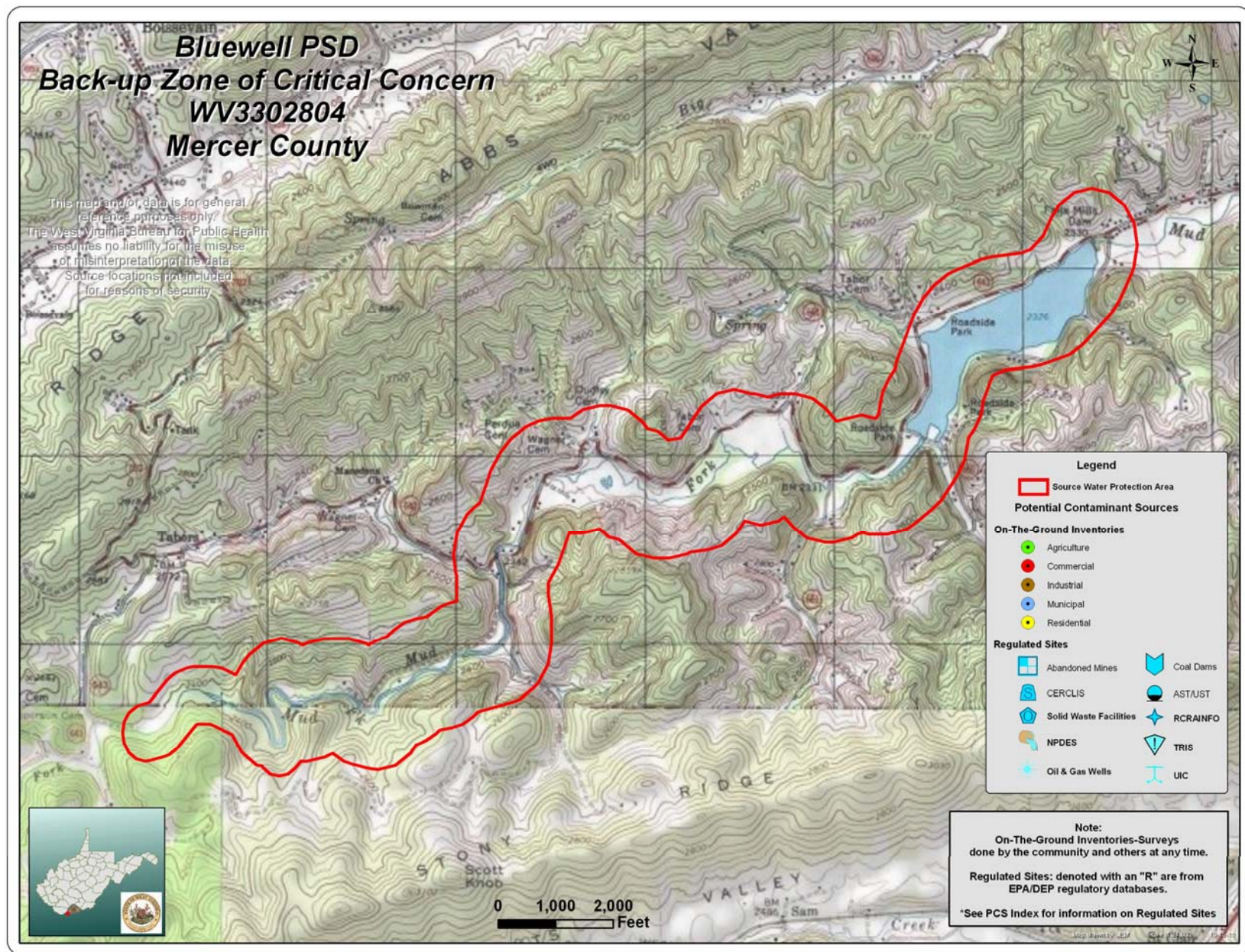


Figure 3: Zone of Critical Concern Backup Reservoir

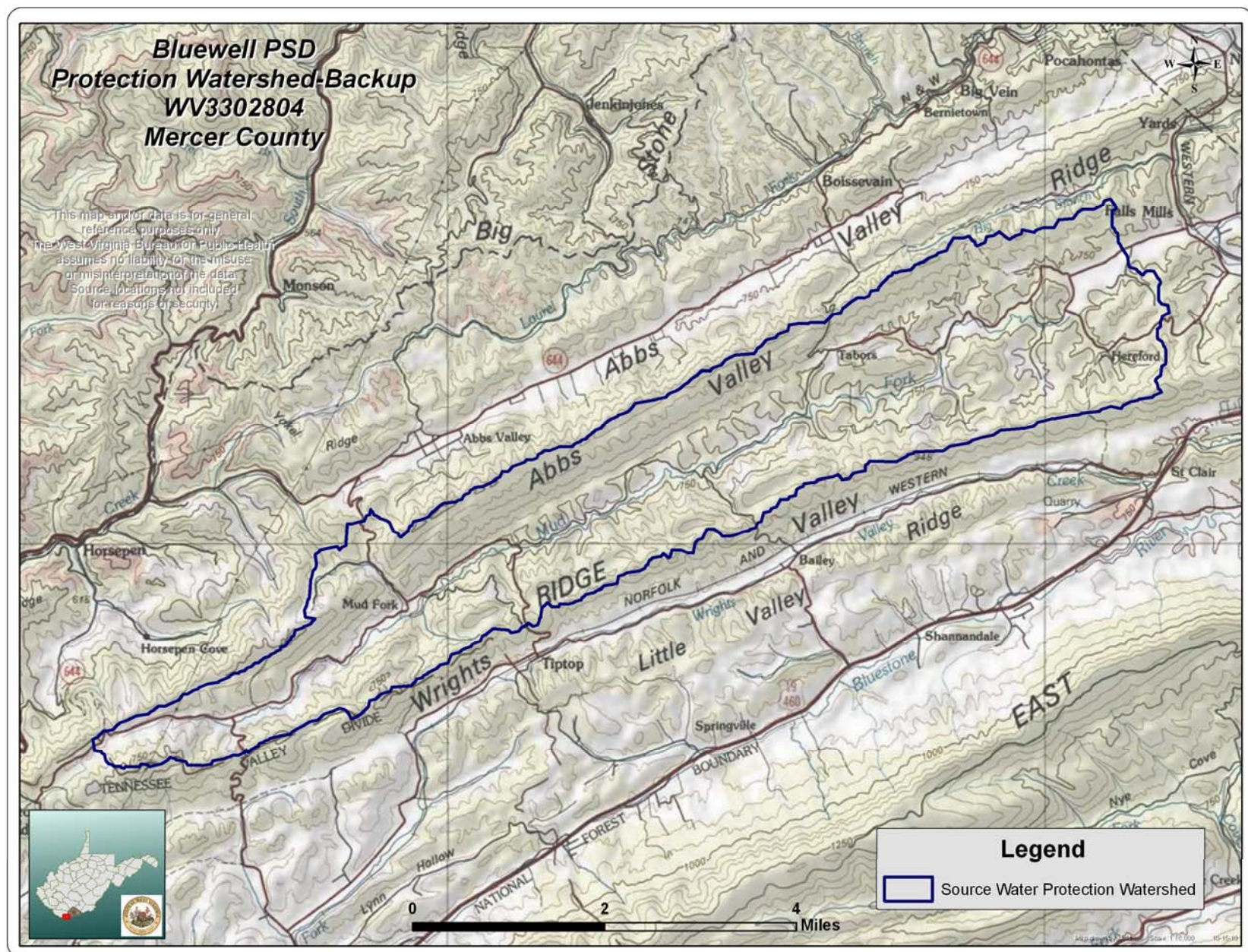


Figure 4: Protection Watershed Backup Reservoir

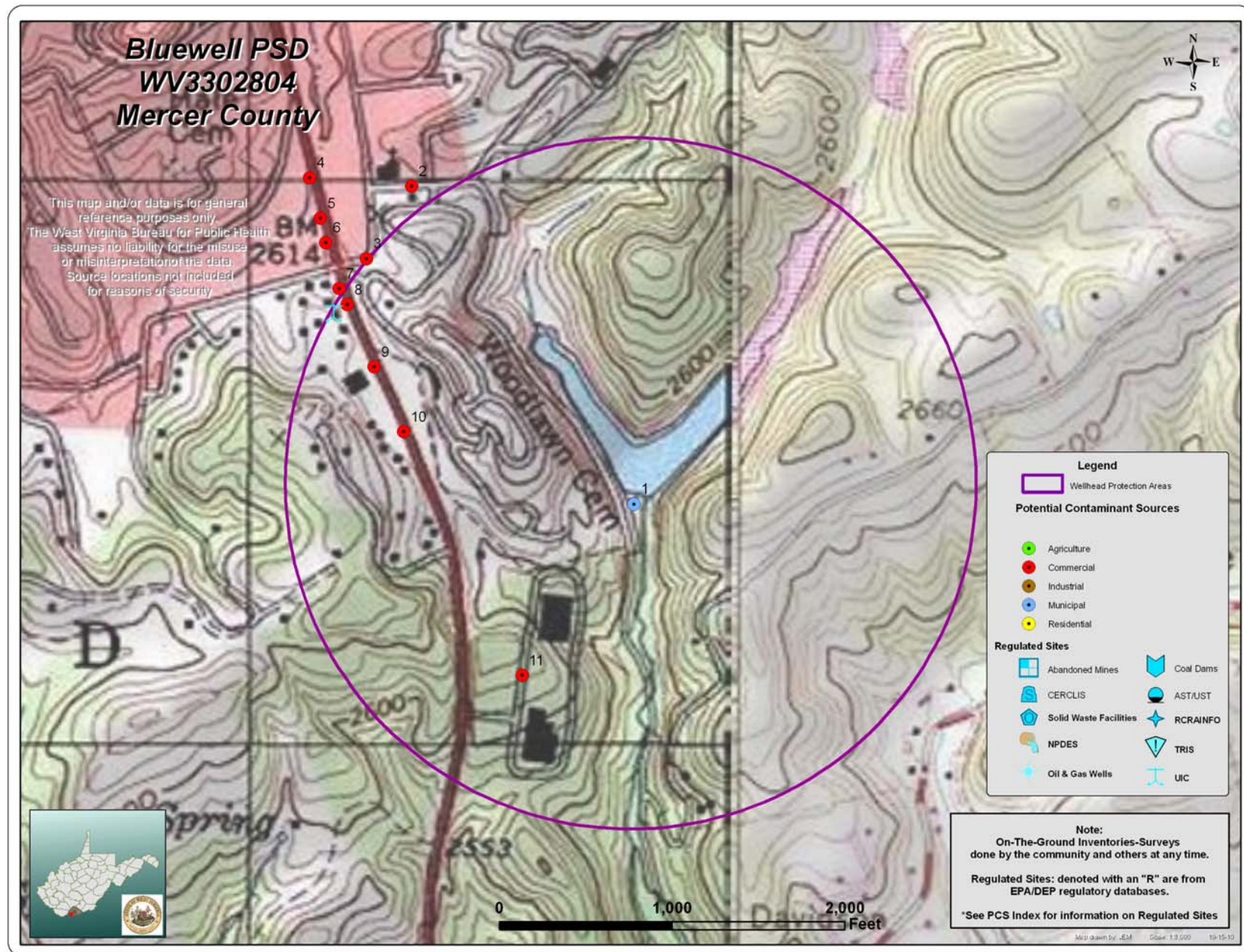


Figure 5: Source Water Protection Area Well #1

GLOSSARY OF TERMS

Alluvium - Sediments deposited by moving rivers.

Aquifer - A formation, group of formations, or part of a formation that contains sufficient saturated permeable materials to yield sufficient, economical quantities of water to wells and springs.

Conjunctive Delineation – In cases where a “ground water” source is designated as Ground Water Under the Direct Influence (GWUDI), an additional delineation in addition to the five (5) year time of travel/recharge delineation for ground water will be completed. The additional delineation will account for stream segments outside of the ground water delineation in cases where the area of surface influence is known or reasonably suspected. It should be noted in karst situations particularly, the surface link is not always an adjacent stream, but could come from a stream miles away. In these cases a conjunctive delineation may not always be performed.

Contamination - The addition to water of any substance or property preventing the use of reducing the usability of the water for ordinary purposes such as drinking, preparing food, bathing, washing, recreation, and cooling

Flood Plain - Any land area susceptible to inundation by floodwater from any source.

GWUDI or "Ground Water Under the Direct Influence" - is defined by the EPA as water beneath the surface of the ground with either a significant occurrence of insects or other macro organisms, algae, or large diameter pathogens such as Giardia lamblia or Cryptosporidium or other water characteristic such as turbidity, temperature, pH or conductivity.

Hydrogeologic Setting - Evaluates the sensitivity of an aquifer. The likelihood of a contaminant reaching a well or spring is a function of the ground water flows patterns, the rate of flow, the distance to the source and the hydraulic characteristics of the contaminant. The technical factors include the well(s) pumping rate and spring flow, the direction, slope and elevation of the water table, transmissivity and storativity characteristics of the aquifer, overlaying material and recharge rate for ground water systems.

100-year Flood Plain - The area adjoining a river, stream, or water course covered by water in the event of a 100 year flood.

100 -year Flood - The flood having a one percent chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief it is not a flood occurring once every 100 years.

Karst - A term denoting a formation containing soluble rocks, underground solution passages, sinkholes and springs.

Infiltration - The process of, or fluids, entering the soil and recharging aquifers rather than becoming runoff.

Maximum Contaminant Level (MCL) - Defined as the maximum permissible level of a contaminant in water, which is delivered to any user of a public water system.

Physical Integrity of the Well or Spring - This analysis evaluates and reviews the integrity of the well or spring structures needed to protect the water source from a potential contaminant source(s). It is recognized that protective well construction characteristics can prevent the occurrence of contamination even in the presence of potentially significant contaminant sources. The design and construction of a well should include casing without cracks; tight joints between lengths of casing; adequate grout between the casing and bore hole and location (floodplain or flooding area). A spring must be protected with “shoe box” type lid enclosure that is screened and locked to prevent unauthorized entry. Surface water runoff diversion and land use of the recharge area are paramount elements to evaluate. These features provide reasonable assurance that

contaminants will not enter the well or spring through any pathway, and allow operators to focus on the potential for contaminants to migrate through the aquifer and enter into the well(s) or spring. However, even a well(s) and springs constructed to the most exacting standards may lose structural integrity with time. Maintenance records of remedial improvements also will be reviewed in evaluation of integrity.

Potential Contaminant Source (PCS) - A facility or container or route of travel that could release a sufficient amount of a harmful contaminant that upon entering an aquifer or surface stream could contaminate it past the level of human health concerns.

Public Water System - is any water system or water supply which regularly supplies or offers to supply, piped water to the public for human consumption, if serving at least an average of twenty-five (25) individuals per day for at least sixty (60) days per year, or which has at least fifteen (15) service connections.

Recharge - Water entering the upper end of a groundwater flow system.

Remediation - The removal of contaminants from soil and/or ground water.

Sensitivity of the Source Water Protection Area (SWPA) - refers to the hydrologic or hydrogeologic characteristics that affect the transport of the contaminant from a source of contamination to a well or intake.

Source Water Assessment and Protection (SWAP) Program - The program established by the 1996 Amendments to the Safe Drinking Water Act (SDWA) which expanded the initial Wellhead Protection Program to all public drinking water supply systems including surface water systems. This program is to assess, preserve, and protect the source waters which are used to supply water for public drinking water supply systems and to provide a long term availability of an abundant supply of safe water in sufficient quantity for present and future citizens of the State. This program also enables the water supply owners, consumers, and others to initiate and promote actions to protect their drinking water supplies with the developed information.

Source Water Protection Area (SWPA) - refers to the area delineated by the State for a public water system, or including numerous public water systems, whether the source is ground water, surface water or both, as part of the West Virginia SWAP approved by the EPA under section 1453 of the Safe Drinking Water Act.

Susceptibility - The likelihood that a release from a PSCS would contaminate and render unusable a drinking water supply such as aquifers or surface streams.

Unconfined Aquifer - An aquifer over which there is no confining layer.

Water quality - Available data will be evaluated to help direct protection activities. If the water quality impact is known, evaluating the source(s) present may help to determine the origin of the contamination and where immediate protection efforts should be focused

Well(s) - refers to ground water intakes including the well structure (i.e., casing, etc) and wellhead.

Wellhead Protection Area (WHPA) - The surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field. This area is delineated by the State for ground water source public water systems. The former Wellhead Protection Program (WHPP) is now part of the Source Water Assessment and Protection (SWAP) Program.