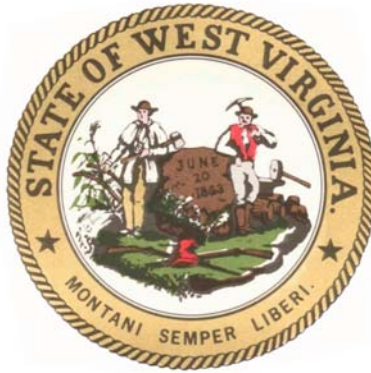


**State of West Virginia
Source Water Assessment and
Protection Program
Source Water Assessment Report**

**Duo Water Works
Greenbrier County
PWSID: WV3301304**



Prepared by:

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

Date: September 2002

Ground Water Public Water Supply Systems Source Water Assessment and Protection (SWAP) Program

Prepared by the West Virginia Bureau for Public Health, SWAP Program

What is the purpose of this Report?

This report identifies the most significant Potential Contaminant Sources (PCS) that could threaten your well's water quality. Your susceptibility ranking does not imply poor water quality. Actual water quality is best reflected by results of regular water tests. The purpose of completing the source water assessment is to provide information that each public water system (PWS) can use to develop a plan to protect their drinking water supply from contamination. The development of a source water protection plan is strongly recommended by West Virginia Bureau for Public Health (WVBPH).

What is my well's Source Water Protection Area (SWPA)?

A 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 source. Please refer to the attached map for your SWPA.

Table 1: Public Water Supply Information

PWS Name	Duo Water Works
Address	Route 2 Box 215
City, State, Zip	Rupert, WV 26984
PWSID#	WV3301304
County	Greenbrier
System Type	Community

What is the Source Water Assessment and Protection (SWAP) Program?

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 WVBPH is undertaking this task. Your well's susceptibility to potential contamination is listed in Table 2. The WVBPH Central Office conducted the susceptibility analysis for your water source.

Table 2: Well/Spring Information

Well/Spring Name	SWPA (Acres)	GWUDI	Susceptibility of Intake
Mine	18	Yes	High

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 information a public water system may use to reduce the susceptibility of their drinking water supply.

How was my well's susceptibility determined?

Your well's susceptibility is based on the following parameters:

- Review of the hydrogeologic setting (ease of contamination transport through each material present in the local bedrock).
- Review of the physical (structural) integrity of the well.
- Review of available groundwater quality data.
- Characterization of the Potential Contaminant Sources (PCS) identified in the SWAP area.
- Integration of this information to identify the greatest threats to the source water and suggestions of appropriate protection strategies or activities.

Source of Your Drinking Water - Hydrogeologic Setting

Well/Spring Name	Geologic Setting/Sensitivity
Well 1	Mines: High

An interim circular radius for your source(s) was calculated based on population and accepted rates of water usage for your facility. These range from a minimum of 500 feet to a maximum of 2,000 feet. The radius for your well is 500 feet and covers an estimated land area of 18 acres that contributes water to the well. The delineated circular radius for the well is depicted in the attached map as the Source Water Protection Area (SWPA). The SWPA may be redone using other delineation techniques later, if the necessary information is available or special needs for this system arise.

Physical Integrity of Well or Spring

Well/Spring Name	Structural Integrity
Mine	Not Constructed to Standards

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. Based on WVBPH file, your intake does not meet state construction specifications regarding ground water well location, casing and pressure grouting in order to prevent the entrance of surface water. The State has also determined that this well is GWUDI or Ground Water Under the Direct Influence of surface water.

Water Quality and Water Treatment Information

Well/Spring Name	Results
Mine	Does not meet standards

Water Quality Information

This 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 WVBPH has determined may present a concern to public health. Duo water is not in compliance with State and Federal regulations. The system does not perform any testing and is on a permanent boil water advisory issued by the WVBPH.

Evaluation of Potential Contaminant Sources (PCS)

The area around your source was not visited by the West Virginia Bureau for Public Health due to safety concerns.

SWAP Susceptibility Conclusion:

The hydrogeologic setting, the well's structural integrity, GWUDI designation, and the lack of system maintenance indicate that your source has a High susceptibility to contamination.

Specific Recommendations

- ✓ Comply with State and Federal Drinking water quality requirements.
- ✓ Replace all the line coming from the mine.
- ✓ Seal the mine.
- ✓ Regrade around the seal and chlorinate.

- ✓ Inspect the SWPA regularly; work with the WVBPH and other local officials to make sure your source is included in local regulations and inspections efforts.
- ✓ Restrict access to the well or spring.
- ✓ Remove oil/hazardous materials storage tanks, hazardous materials use or storage from near the source.
- ✓ Check for Underground Storage Tanks (UST) that might have contaminated the soil and groundwater. If a UST is located within the SWPA and near the wellhead, check for signs of previous spills or leaks. If you need to store fuel to power an emergency generator, use natural gas or propane.
- ✓ Address any septic system issues.
- ✓ Regularly inspect activities in the Protective Radius.
- ✓ Clearly label any hazardous materials (essential to your treatment system) located near the well or spring.
- ✓ Cap and/or screen all vents, access ports, and other openings of the source.
- ✓ Check the condition of sanitary seals and replace those that are not intact.
- ✓ Slope parking areas and concrete pads under storage areas away from the source, periodically check their condition, and repair any permeable area.
- ✓ Safeguard chemical feeders from inadvertent physical disturbances or tampering.
- ✓ Use a properly constructed sample tap and take other measures to avoid cross-connections.
- ✓ Don't allow the installation of floor drains that discharge to a drywell or any surface leaching system.
- ✓ Don't use pesticides, fertilizers or road salt near the well or spring.
- ✓ Don't store any type of chemical in or near the well house; or risk cross-connections by using a hose bib as your sample tap or allowing hoses to be submerged in swimming pools.

Next Step - SWAP Protection (Management and Contingency Planning) Plan

The next step in source water protection planning is maintaining or updating your SWAP protection plan. Check with your water systems to see if they currently have a protection (Management and Contingency Planning) plan in place? The SWAP protection plan incorporates this source water delineation and assessment report and 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?

Visit the WVBPH Web site at www.wvdhhr.org/bph/swap or call 304-558-2981 to obtain additional information or sources of information.

***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 revisions or updates on either the map or inventory in writing to the WVBPH within 15 days of receipt of this report.

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 “groundwater” source is designated as groundwater under the direct influence (GWUDI), an additional delineation in addition to the five (5) year time of travel/recharge delineation for groundwater will be completed. The additional delineation will account for stream segments outside of the groundwater 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, lambia or Cryptosporidium or other water characteristic such as turbidity, temperature, pH or conductivity. Systems need to determine the corrective action to comply with SWTR requirements, either filter, infect and monitor in accordance with the SWTR, abandon the source and develop a replacement source, rehabilitate the source to prevent surface water influence.

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.

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

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

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 years. Contrary to popular belief it is not a flood occurring once every 100 years.

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 (Structural) 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 a Potential Contaminant Source. 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 a “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 activity that stores, uses, or produces chemicals or elements, and that has the potential to release contaminants within a source water protection area.

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 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.

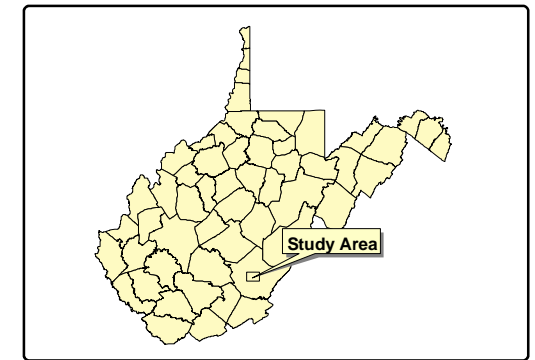
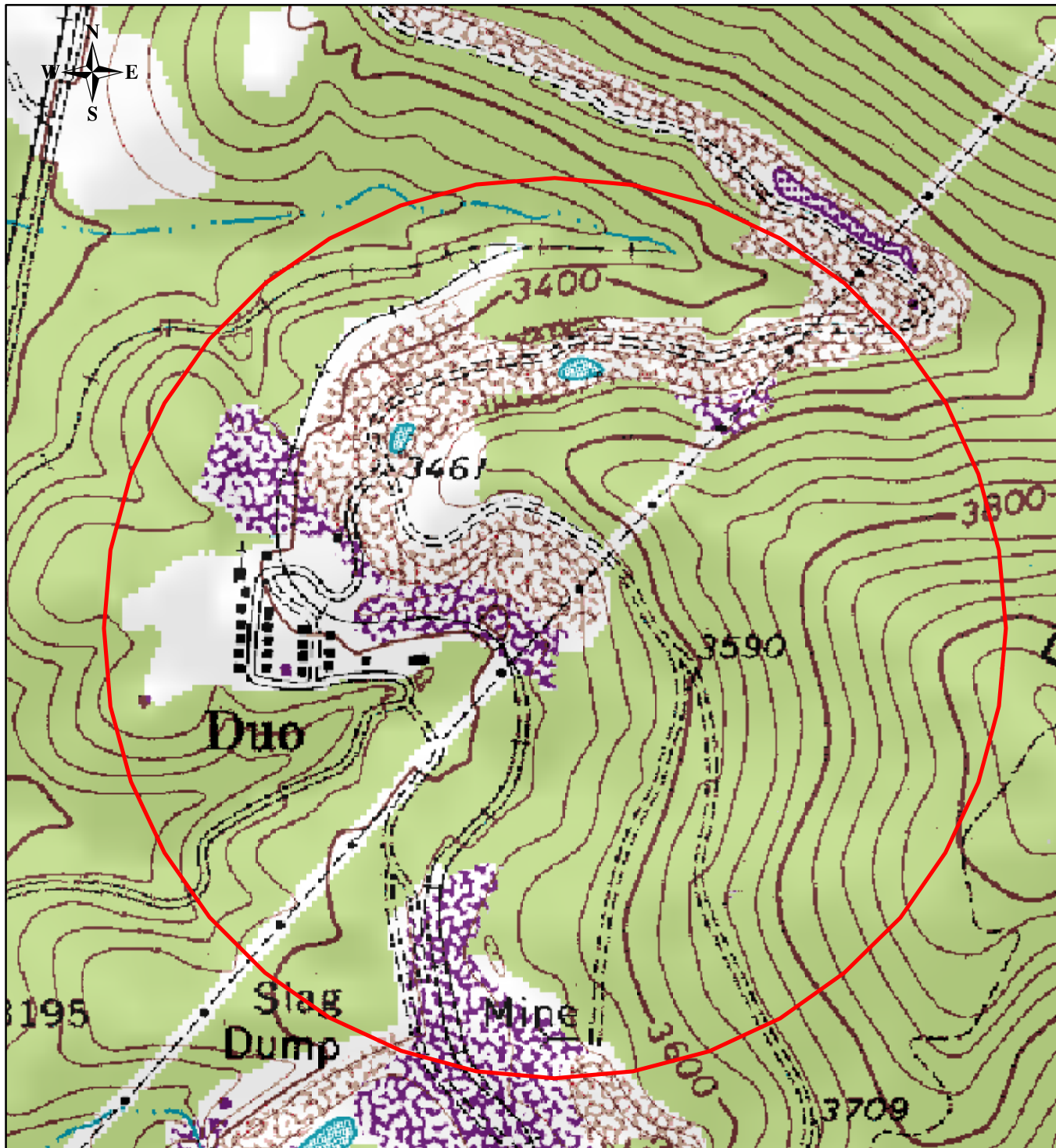
Susceptibility - The likelihood that a release from a PSCS would contaminate and render unusable a drinking water supply such as aquifers or surface streams.

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 wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield. 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.



Map Key

Potential Contaminant Sources

- ◆ Agriculture
- Commercial
- ◆ Industrial
- Municipal
- Residential
- Source Water Protection Area



This map is provided as a public service by the West Virginia Bureau for Public Health. The Bureau makes NO representation regarding completeness or accuracy of the data hereon. Efforts are made to verify and update the data used to generate this map. However, with data sets of this size and nature, eliminating all errors is difficult. Thus, the user assumes total responsibility for verification.

Source locations not included for reasons of security

Duo Water Works WV3301304 Greenbrier County

Scale: 1:8,000
Drawn by: JEM
08/18/05

