

## West Virginia Water Conditions

### Importance of Ground Water as a Resource:

West Virginia's ground water is vital to the quality of life and is a critical resource, serving as a source for drinking water to thousands and providing support to commercial, industrial, and agricultural activities. Protection of this resource is critical to West Virginia's economy, public health, and environment. Ground water discharging to surface water is a significant component in maintaining wetlands, surface water flows, and potential recreational uses. The importance and fragile nature of ground water was spotlighted in the Eastern Panhandle of West Virginia in 2002, where springs and wells were severely affected by prolonged drought conditions. Spring flows and water levels in wells used for drinking water, agricultural, industrial, and recreational uses were adversely impacted, causing conservation measures to be implemented.



Public Water Supply Wells

### Where does West Virginia's Ground Water Come From?

West Virginia's ground water resources exist within a variety of geologic and hydrogeologic conditions across the state. The three principle high yield aquifer types are: unconfined river alluvial deposits, carbonate areas, and abandoned mine systems. High yielding alluvial deposits are typical of the Ohio River Valley that comprises West Virginia's northern and western border. In eastern West Virginia, significant karst developments can provide very large ground water yields from wells and springs. In the southern part of West Virginia, mined areas provide significant ground water from flooded abandoned coal mines. Such mines collect water forming underground lakes - sometimes with vast quantities of useable water.



Major Aquifers

### How Good is the Ground Water?

West Virginia has developed a ground water monitoring program to measure the ambient ground water quality. Analysis of the data gathered indicates that the ground water is typically good; however, some of West Virginia's aquifers have been contaminated due to their high vulnerability to contamination. A common problem is elevated levels of iron and manganese in ground water most likely associated with extensive mining. In certain areas, the ground water has been affected by human activities such as illegal underground injection wells, improperly installed or failing septic systems, mining, illegal dumps, underground storage tanks, and agricultural activities. In certain areas, municipalities, the state, and the United States Environmental Protection Agency (US EPA) have spent millions of dollars cleaning up contaminated water. In some cases, the aquifers were so contaminated that the public water supply systems had to abandon their wells and install new wells.

### Efforts to Protect Ground Water:

Within West Virginia, the Department of Environmental Protection (DEP), Department of Health and Human Resources (DHHR), and the Department of Agriculture work closely at many levels to protect the ground water and the health of the people. Ongoing efforts are as follows:

- Source Water Assessment and Protection (SWAP) and Wellhead Protection (WHP) programs have been developed to protect the public drinking water resources and are an integral part of the drinking water program. Over 266 community water systems are already involved in wellhead protection activities to deliver a safe potable drinking water supply to the citizens at minimal cost.
- The Ground Water Under the Direct Influence (GWUDI) program has been developed to determine the extent of public water supplies using ground water resources that may be under the direct influence of surface water.
- The Ground Water Protection Program includes developing the ambient ground water monitoring network, providing assistance to remediation efforts, and requiring facilities or activities that

may impact ground water to install a series of pollution prevention practices.

- An underground injection control program designed to ensure that fluids injected underground will not endanger drinking water sources has been developed.
- Water and monitoring well driller certification programs to certify drillers who wish to operate in the state.
- Activities associated with the voluntary cleanup of contaminated sites and establishing funds to cleanup Brown field sites.
- Efforts to inspect underground storage tanks and properly clean up releases.
- Coordination with the US EPA on Superfund cleanups sites.

### **Program Needs:**

Additional resources for West Virginia's ground water program are needed for the protection of the ground water resource and human health of the citizens. Several areas are as follows:

- Continued emphasis on ground water protection efforts to prevent contamination.
- Increased ground water education efforts and outreach programs to citizens, children, industry, and agriculture concerning the importance and vulnerability of ground water resources.
- Further monitoring and characterization of current ground water quality and quantity. This is especially needed to establish residential water well quality information for bacteria and nutrients. Funding for this program is critical and needs to be enhanced.
- Increased education and funding for addressing the thousands of abandoned and/or orphaned wells in the state.