PENNSYLVANIA GROUND WATER CONDITIONS

Importance of Ground Water: Pennsylvania's ground water is a critical resource that provides environmental benefits and contributes to the well being of the citizens and the economic growth potential of the Commonwealth. Ground water is an important source of the drinking water for our population of nearly 12 million. High quality ground water is important to industry and agriculture. Ground water also is important to the protection of Pennsylvania's surface streams since it provides the sustaining baseflow to the approximately 83,000 miles of streams and rivers.

There are nearly one million private water supplies (wells and springs) while community water systems supply ground water to nearly two million people. This indicates that over one-quarter of the population in Pennsylvania uses ground water daily for drinking water purposes. However, when the number of people who visit restaurants, churches, schools and parks (which most rely on ground water) are factored in, the number of Pennsylvanian who use ground water is closer to 50 percent. Moreover, in many areas of the state, ground water serves as the sole source of water and 100 percent of the population relies on ground water.

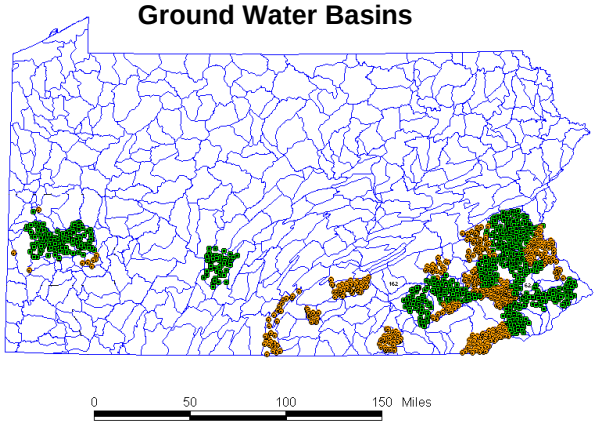
How Good is the Ground Water? Ground water has been affected by human activities in Pennsylvania. Mining, waste storage and management, underground storage tanks, and agricultural activities have all contributed to the degradation of the ground water quality.

Pennsylvania monitors numerous activities that can potentially affect ground water quality. For example, this includes monitoring wells at municipal landfills, spray irrigation sites, storage tanks, coals mines and hazardous waste sites. In addition, Pennsylvania has developed a ground water monitoring program that has the following goals:

- measure ambient ground water quality;
- provide an indication of long-term ground water quality trends resulting from land use practices;
- Assess the success or failure of land management practices.

Pennsylvania's ground water monitoring program was developed following division of the State into 478 ground water basins. Although the basins are not true hydrologic units, each basin considers similarities in hydrologic and physical features. The 478 ground water basins were prioritized for monitoring purposes in 1985 based on socio-environmental significance. Prioritization was accomplished using three main factors: ground water use, potential unmonitored sources of ground water pollution, and environmental sensitivity. The 50 highest-ranking basins were selected for monitoring.

Ground Water Basins



Ambient monitoring supplements other data collection efforts and provides a general picture of ground water quality in the watershed. Fixed Station Network (FSN) monitoring is used when long-term data are required. Fixed Station monitoring involves collecting two rounds of ground water samples per hydrologic year for a minimum of five years. Despite nearly 15 years of monitoring, only half of the top 100 priority ground water basins have been monitored. Nearly 90 percent of the ground water basins have not been characterized.

Analysis of the data gathered to date indicates that ground water quality in Pennsylvania is typically good. Ground water samples from 1,089 wells and springs were analyzed for 27 different analytes including basic inorganic

constituents, nutrients and metals. Nearly 10,000 sample results were reviewed and compared to existing ground water quality (Pennsylvania public drinking water) standards such as maximum contaminant levels. The ground water report is entitled *Summary of Ground Water Quality Monitoring Data (1985 - 1997) from Pennsylvania's Ambient and Fixed Station Network (FSN) Monitoring Program: Selected Ground Water Basins in Southwestern, South-central and Southeastern Pennsylvania* (Publication 3800-BK-DEP2246).

For pH, TDS, nitrate, iron, manganese and turbidity, 10 to 25 percent of the samples analyzed for each constituent exceeded ground water quality (drinking water) standards. For the metals cadmium and lead, two to three percent of the samples exceeded their respective standards. For nitrite, chloride, sulfate, arsenic, barium, chromium, copper, zinc and mercury, less than one percent of the samples for each constituent exceeded an associated drinking water standard. Some exceedances of drinking water standards are the result of naturally elevated concentrations of substances such as iron, total dissolved solids (TDS) and manganese or low pH.

However, trend analyses of nitrate; sodium, chloride, and total hardness suggest that ground water quality in Pennsylvania is undergoing some change. Increases in TDS, chloride, calcium, potassium, total hardness and sodium at many monitoring points may be the result of increased nonpoint source pollution such as road salting and sprawling paved developments and suburbs. It is most likely that human activities are affecting the ground water quality on a regional scale.

Protection Efforts: Pennsylvania is developing its Source Water Assessment Protection Program (SWAPP) to protect its public drinking water resources. The Wellhead Protection Program is the cornerstone of the SWAPP. Over 160 community water systems are already involved in wellhead protection activities.

Also, the Ground Water Protection Program is proceeding in Pennsylvania. Pennsylvania is continuing to develop its Comprehensive State Ground Water Protection Program, and educational documents on ground water. These efforts, however, are largely on a state government level, away from the activities at the local level.

Needs: Pennsylvania spends over $400,000 each year in the Ground Water Protection Program. Most of this money goes to the ambient and Fixed Station Network monitoring of ground water and the administration and the development of ground water policies and educational materials. Yet only 10 percent of the aquifers in Pennsylvania have been characterized.

Characterization of the resource is thus a critical need for Pennsylvania. Ground water resource reports by the Pennsylvania Topographic and Geologic Survey are of great assistance and cover much of the state, but most of the reports are based on political boundaries such as counties and most are over 15 years old. Trends in ground water quality are typically not addressed by these studies.

In addition, a large gap exists between the development of ground water protection and the actual implementation of protection measures at the level of local governments. An added complexity in Pennsylvania is the nearly 2,600 local governments. Ground water protection efforts need to be funded to bridge these gaps and make implementation more effective. It is difficult to estimate the cost of this effort because of the complexity of government structure and issues of ground water protection. However, it is critical that ground water protection efforts be advanced in Pennsylvania for both the protection of the resource and human health of our citizens.

With the emphasis on the watershed approach and a new state initiative of environmental measures, Pennsylvania's ambient ground water program is being driven to provide state wide monitoring. The state has been divided into 34 watersheds and has adopted a number of environmental measure and one is for ground water quality. Monitoring for this measure is essentially non-existent in most parts of the state.