

The Inspector SpeaksSM

Water Pollution Down Under: The causes of groundwater contamination

What is groundwater?

Groundwater is simply water that has percolated down through the soil from melting snow and rain. Where it collects underground is the zone of saturation, the top of which is the water table. The collection formation is called an aquifer. Aquifers occur at different depths depending on the geologic formation, but most groundwater is found within 2,500 feet of the earth's crust. Generally, groundwater moves in slowly flowing, tightly packed sand and gravel, although some forms in channels, lava tubes and igneous rock crevices.

How does it get contaminated?

Every state in the U.S. has experienced some level of groundwater contamination, most often caused by:

1. Natural pollutants – mineralization and saltwater encroachment. In arid areas, mineralization may result via leaching from the higher ground through which the water passes. Evaporation further concentrates these mineral salts.

In fact, in the southwest and southcentral areas of the country, natural contamination is the primary cause of groundwater pollution. In coastal areas, particularly where aquifers have been overdrafted, saltwater from the ocean may also invade and contaminate the water.

2. Human waste disposal activities – industrial waste impoundments and landfills, municipal landfills, underground injection operations and residential septic tank systems.

- The EPA has identified more than 180,000 liquid waste impoundments at some 80,000 sites. Of the 1,100 industrial sites evaluated in the agency's 1980 Surface Impoundment Assessment, 50% were located over aquifers used as sources of drinking water and 98% were located within one mile of a water supply well.
- The EPA estimates there are more than 93,000 landfills in the United States,

75,000 of which are industrial and 18,500 municipal. As of 1986, the EPA considered over 25,000 of these sites as potentially hazardous.

- In the U.S. there are more than 261,000 underground injection wells, naturally occurring spaces deep underground into which chemical wastes are being injected and stored. The practice is based on the assumption that wastes can be safely contained in confining geologic strata or saline aquifers, but existing knowledge of the implications of underground injection is scant. Groundwater contamination has occurred near injection wells, and shifting within the geologic strata has the potential of freeing confined wastes into surrounding groundwater.
- An estimated 19.5 million U.S. homes use septic tank systems, and their total estimated discharge of liquid wastes into the ground exceeds one trillion gallons per year. Until recently a popular way to clean out septic systems instead of pumping was to use a solvent containing trichloroethylene, also known as TCE. It is one of the most common pollutants of groundwater.

3. Human activities other than waste disposal – runoff from agriculture, mining, oil and gas, and logging operations, roadway de-icing agents, acid precipitation, and accidental spills, including leakage from underground tanks. Many of these contaminants are what are known as non-point sources (that is, not coming from a specific location) of pollution. Because their point of entry into an aquifer is very difficult to determine, methods to control this pollution are complex.



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