



(After Ground Water and Wells, UOP Johnson Div., 1966)

WELLHEAD PROTECTION: Keeping Our Drinking Water Safe

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Over 95 percent of the liquid fresh water on earth is not found within surface lakes and streams, but beneath the land surface as ground water. Because the quality of ground water is generally better than surface water, demands for it are steadily increasing.

Alabama is blessed with an abundant supply of good quality ground water. About three-fourths of our public water systems use ground water to supply the needs of over half our citizens. And, ground water use for public water is increasing at a rate of

about 4 percent per year. Another 15 percent of our citizens have private water systems that also rely on ground water. Thus, the importance of preventing ground water pollution in Alabama should be readily apparent.

Basic Ground Water Facts

Ground water is stored primarily within underground layers of rock, sand, or gravel. These layers are known as *aquifers*. Rarely is ground water found in large underground

lakes or streams. However, in areas of karst geology where underground rocks of limestone may have partially dissolved over years, ground water may be found in a network of rather large caverns.

We now know that ground water can become polluted just like surface water, but some aquifers are easier to pollute than others. Shallow aquifers, especially those associated with sink holes in karst areas, are very susceptible to contamination. Those aquifers recharged directly from downward flow of surface water because they have no restrictive soil or geologic layers between them and the surface, are also very vulnerable to pollution. Aquifers with layers above them, and maybe even below them, which confines their boundaries and restricts downward flow of water into them, except in exposed recharge areas, are much less vulnerable. However, any aquifer can be polluted in its surface recharge area.

Who Pollutes Ground Water?

Virtually all those that use ground water are also its potential polluters. This includes individual families, farm operations, businesses, industries, and municipalities. Most potential polluters do not intentionally contaminate their ground water, they simply do not understand the full ramifications of their actions. This is why pollution prevention education is so important in any ground water protection program.

Prevention is Better Than the Cure

Cleaning up contaminated ground water is expensive, difficult, and sometimes impossible. Since ground water moves slowly, sometimes only a few inches or few feet each year, contaminants do not mix or spread quickly. Instead they remain concentrated in slow moving plumes that may persist for many years. When ground water becomes contaminated, surface water systems are also at risk because the contaminants may eventually spread into

springs, rivers, lakes, or other surface water bodies.

Wellhead Protection (WHP) Program

Mandated in the 1986 amendments to the Safe Drinking Water Act (SDWA), this program relies on community efforts to protect drinking water supplies. The program is coordinated by the Ground Water and Water Supply Branches of Alabama's Department of Environmental Management.

Regulations in Alabama require water utilities using ground water to delineate two zones of susceptibility, one being that area where recharge is expected to reach the well site within 180 days and another zone within which recharge is expected to reach the well site within 10 years. For areas with karst geology, the delineation is slightly different. The two zones are a 1000 ft. fixed radius and a larger area based on the characteristics of flow through the subsurface channels. Both delineated areas are assessed for potential impacts from point and nonpoint sources of pollution.

Extension Role

The Alabama Cooperative Extension System has published a three-part series that allows agricultural producers, homeowners, and small businesses to perform a *self environmental assessment* of how their own activities may contribute to water quality problems (Cir. ANR 801, 802 and 803). This type of assessment should be an effective tool for educating such groups within delineated wellhead protection zones in pollution prevention, thereby, reducing ground water contamination.