

## SOUTH CAROLINA GROUND WATER CONDITIONS

**Ground Water Importance:** Ground water is the water lying beneath the surface of the earth in pore spaces between mineral grains of soil and sediment, in somewhat larger solution openings in limestone, and in fractures or cracks in hard nonporous bedrock such as granite. Geologic materials that contain sufficient ground water for practical uses and are sufficiently permeable to allow effective flow to pumping wells are called aquifers. About a half dozen major recognized aquifers occur in the state and every area possesses one or more (multiple aquifers are stacked vertically). Ground water is extracted for use by wells and some springs. In South Carolina nearly 1400 public water systems (e.g., municipal systems, businesses, school, mobile home parks) supply drinking water to about 780,000 users. In addition, about 630,000 residents obtain drinking water from home wells. Finally, clean ground water is a very inexpensive source of supply, which not only is beneficial to consumers but is also attractive to new industry. Thus it is critically important to protect the water quality and safety of ground water as a drinking-water source and economic advantage.

**How good is it?** Most ground water in South Carolina is still at or near its natural excellent quality and is suitable for drinking with no treatment whatsoever. This is of enormous economic as well as public-health benefit. With a few exceptions, ground waters that are poorly suited for use without treatment are limited by natural constituents that affect aesthetics rather than health (e.g., dissolved iron or manganese that will stain clothes, odiferous hydrogen sulfide). Among the exceptions, a few areas locally contain natural dissolved radioactive constituents at troublesome concentrations. Most areas of seriously contaminated ground waters (with dissolved chemicals above the US EPA drinking-water limits, the MCL or "maximum contaminant level") are related to artificial contamination by human accident or error and lack of foresight (most), but occasionally by intentional illegal dumping in the past.

**Costs of Contamination:** Ground water contamination has enormous costs. It costs to

relocate and replace contaminated supply wells, to transfer from low treatment-cost ground-water systems to high required treatment surface-water supplies, to intensively treat slightly contaminated ground water where no other source is feasible (few instances yet), and to remediate ground water at specific sites of contaminant release. Approximately 3,619 sites of ground-water contamination caused by human action are known to exist in the state (August 1998). In the last category alone, millions of dollars have already been spent in South Carolina to partially clean ground waters at contamination sites, even though most known sites have not received active remediation.

**Efforts to Protect Ground Water:** Ground water protection efforts combine prevention and clean up or remediation. Prevention includes such obvious aspects as more stringent construction requirements for potential contamination sources such as underground gasoline storage tanks, wastewater lagoons, or landfills, for example. Prevention also includes public education and related activities, for instance engine-oil recycling. More targeted prevention efforts focus on public supply wells. An ongoing program is estimating (by technical means) the approximate areas, around each well, that contribute the water in a decade of pumping. This area (wellhead protection area or WHPA) is identified as deserving more special planning and care by water-system managers and operators of facilities with potential contaminants within the mapped area (e.g., gas stations, dry cleaners, etc.). The least efficient protection activity, but one that is critically important where prevention or care have failed, is clean up or remediation of ground water that is acutely contaminated (above an MCL). Of the 3,619 sites of known artificial contamination of ground water, about 20% are in active remediation (by energetic means, such as pumping and treating the contaminated ground water) and the remaining sites are being assessed or routinely monitored in their water quality (which is predicted to be slowly improving by natural processes).

***What Else is Needed?***

1. More intensive assessment / understanding of conditions and trends at many known contamination sites.
2. Ground-water quality assessment of especially vulnerable / susceptible areas.
3. Wellhead protection (Source Water Protection) implementation funds.
4. Out-reach person for Source Water Protection implementation, plus BMP materials for main types of potential sources.