88-135

WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY GROUND-WATER STUDIES IN VIRGINIA

GROUND-WATER ISSUES

Virginia is a water-rich State; nine major river basins and abundant ground water provide ample supplies to most parts of the State. Ground-water sources account for about 30 percent of the total freshwater withdrawals (excluding withdrawals for thermoelectric power generation) and provides at least some freshwater, by means of public and rural water-supply systems, for about 41 percent of Virginia's 5.3 million residents. About 1.5 million Virginians rely entirely on ground water for drinking and domestic purposes. Although the average annual replenishment by precipitation meets current needs, ample water supplies are not always available when and where they are needed. Major issues related to ground water in Virginia are:

- Management of supplies,
- Contamination by hazardous materials, and
- Effects of land-use on quality.

U.S. GEOLOGICAL SURVEY PROGRAMS

The U.S. Geological Survey (USGS), established in 1879, is the principal source of scientific and technical expertise in the earth sciences within the Federal government. USGS activities include research and services in the fields of geology, hydrology, and cartography. The mission of the Water Resources Division of the USGS is to develop and disseminate information on the Nation's water resources. The activities of the Water Resources Division in Virginia are conducted by scientists, technicians, and support personnel in Richmond, Charlottesville, and Marion.

Hydrologic-data-collection stations are maintained at selected locations throughout Virginia and constitute a water-resources-data network to record stream discharge and stage, reservoir and lake storage, ground-water levels, well data, spring discharge, and quality of surface and ground water. Water-resources data are stored in the USGS National Water Data Storage and Retrieval System data base. These data are used by water planners and others involved in making decisions that affect Virginia's water resources.

During 1988, the USGS, in cooperation with the Virginia Water Control Board, maintained a network of about 370 observation wells in Virginia to monitor fluctuations of water levels within the unconsolidated Coastal Plain aquifers and the sedimentary and crystalline bedrock aquifers. Water-level measurements from wells are used to monitor ground-water trends and to provide specific data for ground-water investigations.

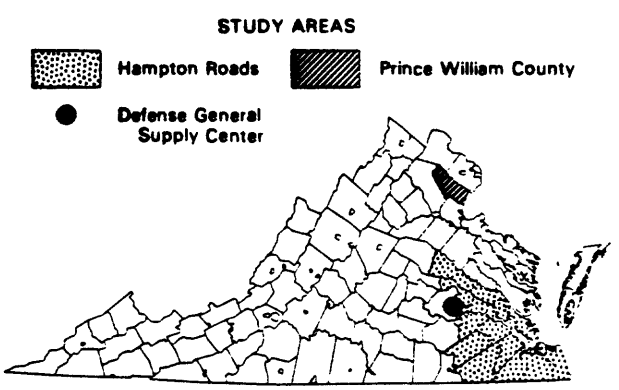
The USGS has conducted more than 100 hydrologic studies in Virginia. Recently, the USGS has entered into cooperative agreements with 25 Federal, State, and local agencies in Virginia. Three examples of investigations by the USGS designed to address major ground-water issues in Virginia are discussed in the following sections.

Coastal Plain Aquifers of the Hampton Roads Area

Substantial increases in ground-water demand are anticipated for the Coastal Plain aquifers of the Hampton Roads area. Additional development of ground-water resources may result in increased drawdowns in wells and induced saltwater into sources of potable water. The USGS, in cooperation with the city of Newport News, the city of Williamsburg, James City County, the Southeast Virginia Planning District Commission, the Virginia Water Control Board, and York County, has been conducting projects to address these problems. The projects are evaluating the effects of ground-water withdrawals on induced recharge, water-level declines, and salt-water intrusion. Water users are being surveyed to determine ground-water withdrawals, and test wells have been drilled to obtain the data needed to develop a computer model of ground-water flow. The model will be used by the cooperators to evaluate alternative water supplies.

Contaminated Ground Water, Defense General Supply Center

Volatile organic compounds are present in the ground water at the Defense General Supply Center. Knowledge of the degree and extent of the area of contamination and the hydrology of the area are required before the responsible agency can evaluate



remedial alternatives. The USGS, in cooperation with the U.S. Defense Logistics Agency (DLA), is conducting a study to determine the extent and movement of contaminants in ground water. Observation wells were installed downgradient from the area to determine the extent of contamination. These wells are used to obtain water-quality samples at various depths within the affected aquifers and to evaluate the movement of water in the zone of contamination. Aquifer tests were conducted to estimate rates of ground-water movement. The DLA and their technical consultants are using the results of the study to determine the degree and extent of the area of contamination and to evaluate remedial alternatives.

Volatile Organic Contamination, Prince William County

Volatile organic compounds are present in the ground water of Prince William County. Contamination from an industrial area has migrated along fractures in the sedimentary bedrock into public-supply wells. Local authorities are concerned that hazardous materials associated with industrial land use may threaten future development of additional ground-water resources. The USGS, in cooperation with the Prince William Health District, is conducting a study to evaluate the potential for additional ground-water contamination. Data on water chemistry, geology, fracture zones, land use, locations of wells, and possible sources of contamination are being stored in computer files. The Health District is using the data base to plan sampling for volatile organic compounds and, eventually, for land-use planning and ground-water development.

GROUND-WATER MANAGEMENT

The principal State agencies responsible for ground-water management are the Virginia Water Control Board, the Virginia Department of Health, and the Virginia Department of Waste Management. The Virginia Water Control Board exercises control where development of ground-water resources may result in declining water levels, well interference, mining of ground water, and (or) contamination of ground water. The Virginia Department of Health cooperates with the Virginia Water Control Board and regulates the use and quality of ground water to protect public health. The Department of Waste Management directs the management of ground-water-contamination assessment and remedial-action studies. Local agencies have the authority to regulate land-use planning that affects ground-water quality and supply. The following Federal, State, and local agencies have entered into interagency cooperative cost-sharing agreements with the USGS to conduct various ground-water investigations in Virginia.

Charles City County
City of Newport News
City of Norfolk
City of Williamsburg
Clarke County
Hanover County
Henrico County
James City County
James City Service Authority
Lord Fairfax Planning District Commission
Loudoun County
New Kent County
Northampton County
Prince William Health District
Southeast Virginia Planning District Commission
U.S. Army Corps of Engineers
U.S. Bureau of Land Management
U.S. Defense Logistics Agency
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. National Park Service
Virginia Division of Mined Land Reclamation
Virginia Polytechnic Institute & State University
Virginia Water Control Board
York County

SELECTED REFERENCES

Hamilton, P.A., and Larson, J.D., 1987, Hydrology and analysis of ground-water flow in the Coastal Plain of southeastern Virginia: U.S. Geological Survey Water-Resources Investigations Report 87-4240, 267 p.

Kull, T.K., 1983, Water use in Virginia, 1980: Virginia State Water Control Board Basic Data Bulletin 59 [map].

McGreevy, L.J., Hyatt, G.J., and Cockey, E.J., 1986, Water resources activities of the U.S. Geological Survey Mid-Atlantic District 1984–1986: U.S. Geological Survey Open-File Report 84-490, 129 p.

Information on technical reports concerning ground water may be obtained from the following:

Office Chief
U.S. Geological Survey
Water Resources Division
3600 West Broad Street, Room 606
Richmond, Virginia 23230

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Virginia Polytechnic Institute and State University
617 N. Main Street
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