88-121

WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

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

GROUND-WATER ISSUES

Ground water is an important resource in Kentucky. Excluding water used for power generation, about 22 percent of the water used in the State is from ground-water sources. About 31 percent of the population is served from ground-water sources. In the central part of the State where streams are sparse, ground water is the only source of supply. In rugged coal-field areas, residents depend on ground water because surface flows generally are not reliable. The major issues related to ground water in Kentucky are:

- Effects of mining and oil and gas production on ground-water quality;
- Availability and quality of ground water;
- Contamination from solid- and hazardous-waste sites, underground storage tanks, septic tank systems, improper application and disposal of agricultural chemicals, and accidental spills; and
- Vulnerability of ground water to contamination in karst terrane.

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 hydrology, geology, and cartography. The mission of the Water Resources Division of the USGS is to develop and disseminate scientific information on the Nation's water resources. The activities of the Water Resources Division in Kentucky are carried out by scientists, engineers, technicians, and support staff in offices in Louisville, Paducah, Williamsburg, and Van Lear.

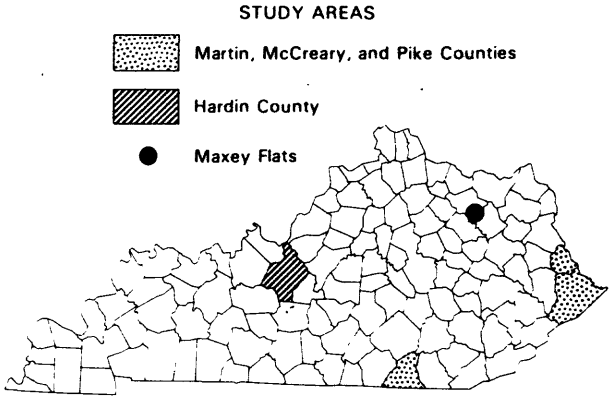
Hydrologic-data stations are maintained at selected locations throughout Kentucky to record stream discharge and stage, reservoir and lake storage, ground-water levels, and water quality. Water-resources data are stored in the USGS National Water Data Storage and Retrieval System data base. These data are used by water planners and managers to make decisions that affect Kentucky's water resources.

During 1988, the USGS, in cooperation with Federal, State, and local agencies, maintained a network of 240 observation wells in Kentucky to monitor water levels. Most of these wells are used for water-level and water-quality monitoring in the Louisville area, and at a radioactive-waste burial site in Fleming County. These data provide water-management information and are used as data bases for more comprehensive studies.

Since 1946, the USGS has conducted about 100 ground-water investigations in Kentucky. During fiscal year 1988, the USGS entered into agreements with 14 Federal, State, and local agencies to conduct 17 hydrologic investigations in Kentucky; 11 of these included studies of ground-water quality and quantity. Three USGS studies that address specific ground-water issues are discussed in the following sections.

Effects of Coal Mining on Ground Water in Martin, McCreary, and Pike Counties

Coal mining is a major industry in Kentucky and, therefore, has the potential to degrade much of the State's water resources. For example, coal mining causes water levels to decline and increases concentrations of minerals and heavy-metals in ground water. The USGS, in cooperation with the U.S. Office of Surface Mining Reclamation and Enforcement and the Kentucky Geological Survey, is studying the effects of coal mining on ground water. Dye-tracing techniques are being used to determine the movement of water down steep slopes in coal-bearing rocks in Pike County. Results from this study will give insight into ground-water degradation from mines on slopes and ridge tops. Another investigation addresses water-quality and hydrologic impacts, including potential problems from flooded underground abandoned mines. For example, flooding may increase seepage downslope from sealed underground mine openings, may increase the potential for landslides owing to saturated soils caused by the increased seepage, and may increase the potential for a "blow out" of sealed underground mine openings or outcrop barriers along the downgradient outcrop that could suddenly flood the adjacent valley. The results from these studies will be used by Federal and State regulatory and management agencies to evaluate mine-permit applications.



Ground-water Availability and Quality in Hardin County

Maintaining adequate supplies of potable ground water is a problem for some users in Kentucky. During summer and fall, especially in years of less-than-average precipitation, many ground-water supplies diminish in quantity and quality. The Hardin County Water District Number 1 entered into a cooperative agreement with the USGS to investigate deteriorating ground-water quality in their public-supply well field in an alluvial aquifer along the Ohio River and to investigate potential ground-water sources. The USGS is investigating the effects that water levels and land use have on water quality in the well field. The USGS also is investigating the potential of a karst aquifer system in Hardin County to supply additional water. The results of this study will give the Hardin County Water District Number 1 an improved understanding of the availability and quality of ground water within their district.

Contamination from Solid- and Hazardous-Waste Sites

Ground-water contamination associated with solid- and hazardous-waste sites is a concern in Kentucky. The USGS has worked for many years at the Maxey Flats Low-Level Radioactive Waste Burial Site in cooperation with several Federal and State agencies. The USGS also has worked at other hazardous-waste sites, mainly in cooperation with the U.S. Environmental Protection Agency (EPA). For example, research by the USGS at the Maxey Flats burial site has provided information on the accumulation of water in the burial trenches and on ground-water movement and quality. The USGS monitors water levels and water quality in about 113 wells and 12 trenches at the site. The study results are being used by the State and the EPA to evaluate remedial action alternatives for this site.

GROUND-WATER MANAGEMENT

The three principal State agencies responsible for ground-water protection and management in Kentucky are the Natural Resources and Environmental Protection Cabinet, the Department of Mines and Minerals, and the Department of Health Services. These agencies use ground-water data and the results of ground-water studies provided by the USGS to protect and manage Kentucky's ground-water resources. During fiscal year 1988, the following Federal, State, and local agencies entered into interagency or cooperative agreements, many on a cost-sharing basis, with the USGS to conduct ground-water investigations in Kentucky:

City of Elizabethtown
Hardin County Water District Number 1
Jefferson County
Kentucky Geological Survey
Kentucky Natural Resources and Environmental Protection Cabinet
Lincoln Trail District Health Department
U.S. Environmental Protection Agency
U.S. Office of Surface Mining Reclamation and Enforcement
University of Louisville

SELECTED REFERENCES

Faust, Robert J., compiler, 1986, Water resources activities in Kentucky, 1986: U.S. Geological Survey Open-File Report 86-71, 58 p.

U.S. Geological Survey, 1984, National Water Summary 1983—Hydrologic events and issues: U.S. Geological Water-Supply Paper 2250, 243 p.

_____1985, National water summary 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, 467 p.

Information on technical reports and data related to ground water in Kentucky can be obtained from:

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