



WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

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

GROUND-WATER ISSUES

Ground water is the source of drinking water for about 50 percent of the population of Alabama, and is also used for industrial, livestock, and irrigation supplies. Most public water supplies in the coastal plain of Alabama are from ground-water sources, whereas most public supplies in northern Alabama are from surface-water sources. Nearly all self-supplied domestic uses are from ground-water sources. Of all ground water used, 55 percent is for public water supplies, 15 percent is for rural domestic supplies, 17 percent is for self-supplied industrial uses, 10 percent is for livestock, and 3 percent is for irrigation. Public water supplies provide ground water to about 2 million people in Alabama. Major issues related to ground water in Alabama are:

- Susceptibility to contamination from the surface;
- Water shortages caused by droughts;
- Saltwater encroachment along the Gulf Coast; and
- Competition for ground water.

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 Alabama are conducted by scientists, technicians, and support staff in offices at Tuscaloosa, Montgomery, and Cullman.

Hydrologic data stations are maintained at selected locations throughout Alabama to record data on stream discharge and stage, reservoir and lake storage, ground-water levels, well and spring discharge, and the 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 decisions that affect Alabama's water resources.

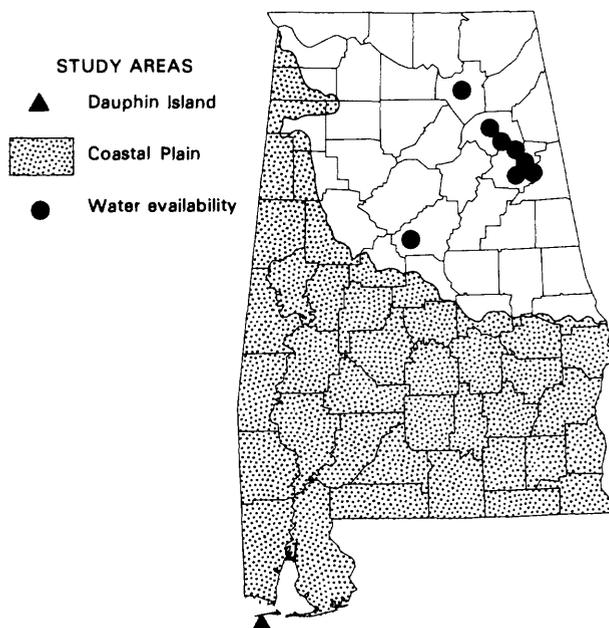
During 1987, the USGS, in cooperation with Federal, State, and local agencies, maintained a network of about 235 observation wells in Alabama to monitor fluctuations in water levels. In addition to these sites, the Geological Survey of Alabama measures about 500 wells and springs semi-annually as a part of the cooperative program with the USGS. These

measurements, combined with information compiled during other investigations, are used to monitor seasonal and long-term ground-water trends.

The USGS has conducted more than 400 geologic and hydrologic investigations in Alabama during the past 100 years. During fiscal year 1987, the USGS entered into agreements with 20 Federal, State, and local agencies involving 27 hydrologic investigations in Alabama; 12 investigations included ground-water quantity, quality, or use. Four examples of ground-water studies by the USGS that address specific ground-water issues in Alabama are discussed in the following sections.

Saltwater Encroachment, Dauphin Island

Saltwater encroachment has occurred in aquifers in coastal areas of Mobile and Baldwin Counties and the city of Mobile. The community of Dauphin Island in southern Mobile County had to find an alternate source of water when its existing wells showed signs of saltwater encroachment. One alternate source was a 30-foot-thick water-table aquifer on the barrier island. The USGS drilled 40 test wells in a shallow dune-sand aquifer on Dauphin Island and established a network of water-level and water-quality monitor wells. Aquifer tests were made and a



ground-water flow model was developed for evaluating water-management alternatives for optimum well depths, spacing, and production rates. The USGS, in cooperation with the Geological Survey of Alabama (GSA), is developing a similar water-management model for southern Baldwin County. The results of these studies are being used by the Alabama Department of Environmental Management (ADEM) and local water authorities to determine optimum techniques for the development of ground-water resources that will prevent future saltwater intrusion.

Delineation and Classification of Aquifers, Statewide

In 1985, the ADEM and the USGS entered into an agreement to delineate the major aquifers in Alabama, their recharge areas, and areas vulnerable to contamination. Maps and reports were prepared for each of 13 areas showing the aquifers, their recharge areas, areas vulnerable to contamination, and locations of all sources of ground water used for public water supplies. In 1987, the ADEM requested that the USGS classify those aquifers according to U.S. Environmental Protection Agency (EPA) and department guidelines for the use of aquifers and their vulnerability to contamination. This information will assist the ADEM in establishing an aquifer-protection strategy that will include a wellhead-protection program as proposed by the EPA.

Geohydrology of the Coastal Plain

The Southeastern Coastal Plain Regional Aquifer-System Analysis study is a federally-funded project that examines the coastal plain aquifers within the State. The main purpose of this study is to determine the extent to which major pumping centers affect one another. The USGS, aided by information from the GSA and the ADEM, mapped and described six aquifers and, through computer modeling, defined the hydraulic properties of these aquifers. The computer models are being used to study water-level declines around the major pumping centers and to estimate future declines for various projected pumpage increases.

Water Availability

Ground water is the source of supplies for about 50 percent of the people in Alabama. Ground-water levels in some parts of Alabama have declined substantially during the past 10 years. In southeastern Alabama, water levels have declined as much as 100 feet. Two factors have contributed to the magnitude of this decline: (1) The increased competition among municipal, industrial, and irrigation users for water from aquifers with small areal extent and (2) "the drought of the century" during 1986 in the east-central part of Alabama and parts of other southeastern States. In Alabama, the drought affected navigation, hydroelectric-power generation, crops, and municipal and rural water supplies. Many small communities in east-central Alabama experienced water shortages. In response to the needs of these communities, the USGS has entered into cooperative agreements with six community water suppliers to evaluate the availability of ground water in eight areas.

GROUND-WATER MANAGEMENT

The principal State agency responsible for ground-water management is the Alabama Department of Environmental Management. The department is the regulatory agency for protection of Alabama's water resources. The Alabama Oil and Gas Board is responsible for management of the disposal of oil-field brine through deep-well injection. Both agencies use ground-water data and the results of ground-water studies provided by the USGS. During fiscal year 1988, the following Federal, State, and local agencies entered into interagency or cooperative cost-sharing agreements with the USGS to conduct ground-water investigations in Alabama:

Alabama Department of Environmental Management
Alabama Highway Department
Calhoun County Water Authority
City of Alabaster
City of Arab
City of Jacksonville
City of Prattville
City of Southside
Dauphin Island Water, Sewer, and Fire Protection Authority
Geological Survey of Alabama
Montgomery Waterworks and Sewer Board
Reese City Water Authority
U.S. Corps of Engineers

SELECTED REFERENCES

- Scott, J.C., Cobb, R.H., and Castleberry, R.D., 1987, Geohydrology and susceptibility of major aquifers to surface contamination in Alabama; area 8: U.S. Geological Survey Water-Resources Investigations Report 86-4360, 65 p.
- Slack, L.J., and Planert, Michael, 1987, Alabama ground-water quality: U.S. Geological Survey Open-File Report 87-0711, 7 p.
- U.S. Geological Survey, 1984, National water summary 1983—Hydrologic events and issues: U.S. Geological Survey 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.
- Williams, J.S., Planert, Michael, and DeJarnette, S.S., 1986, Potentiometric surface, ground-water withdrawals, and recharge area for the Eutaw aquifer in Alabama, fall 1982: U.S. Geological Survey Water-Resources Investigations Report 86-4121, map.

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

District Chief
U.S. Geological Survey
Water Resources Division
520 19th Avenue
Tuscaloosa, Alabama 35401

State Geologist
Geological Survey of Alabama
P.O. Box O, University Station
Tuscaloosa, Alabama 35486

Open-File Report 88-141

J.C. Scott, M. Planert,
and D.B. Adams, 1988