

# THE GROUND-WATER MANAGEMENT PROGRAM OF THE GEORGIA GEOLOGIC SURVEY

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## INTRODUCTION

The Ground-Water Management Program is maintained by the the Geologic Survey Branch, Georgia Environmental Protection Division (EPD), to coordinate groundwater protection activities in the state. EPD is the principal state agency responsible for ground-water protection and allocation. This program is funded in part by the Office of Ground Water, U.S. Environmental Protection Agency. Two main continuing elements of the Program are the state-wide Ground-Water Monitoring Network and a recharge-areas mapping project.

## GEORGIA'S AQUIFER SYSTEMS

Ground water provides the drinking-water supply of nearly half of the population of Georgia, approximately 2.6 million people (Clarke and McConnell, 1988). The availability and quality of the state's ground water vary among the three major hydrogeologic settings.

Carbonate rocks and sands of the southern Georgia Coastal Plain Province form extensive confined aquifer systems in down-dip areas to the south and east. The most prolific, in order of amount of withdrawals, are: the Floridan aquifer system (carbonates) of the lower Coastal Plain, the Cretaceous-Tertiary aquifer systems (sands) of the upper Coastal Plain, and the Providence, Clayton, and Claiborne aquifer systems (carbonates and sands) of the western Coastal Plain.

Unconfined aquifers are predominant in north Georgia. Shallow local flow systems are developed in the crystalline rocks of the Piedmont and Blue Ridge Provinces. More extensive flow systems are present in the folded and faulted Paleozoic sedimentary rocks of the northwestern Georgia Valley and Ridge Province.

## GROUND-WATER MONITORING NETWORK

Ambient groundwater quality monitoring serves to detect point sources of groundwater pollution in a timely manner and to assess the cumulative effect of non-point sources, such as agricultural

pesticides. Annual water-quality analyses are available from 1984 for 123 wells and three springs. These monitoring stations represent seven major aquifer systems of the Coastal Plain Province and the less extensive unconfined ground-water systems of the Piedmont and Blue Ridge Provinces and the Valley and Ridge Province.

The majority of monitoring network stations are municipal and industrial wells that have reliable well construction data. Monitoring stations are located in three critical areas: (1) recharge areas of the state's primary aquifers, (2) other areas of potential pollution related to regional activities (agricultural and industrial areas), and (3) areas of significant ground-water use.

Ground water from all monitoring stations is tested for parameters included in a standard analysis: pH, specific conductivity, chloride, sulfate, nitrite/nitrate, twelve common pesticide and industrial organic compounds, and thirty metals. Where regional land-use activities have the potential to affect ground-water quality in the vicinity of a monitoring station, additional parameters are tested.

In the fall of 1988, the monitoring network was expanded to include 22 shallow wells in 17 counties of the Georgia Coastal Plain which have the greatest use of pesticides in the state. All of the wells are near fields where pesticides are being used. Most are less than 100 feet deep and are used as domestic water supplies. Water from these wells is being tested for 32 pesticides, including 22 of the priority pesticides in EPA's National Pesticide Survey (US EPA, 1987), in addition to the standard analysis. These monitoring stations will allow the monitoring network to more effectively characterize the ground-water quality of these settings.

## GEORGIA RECHARGE AREAS PROTECTION PLAN

Implementation of A Recharge Area Protection Plan for Georgia began in 1986 to identify areas of the state that are more susceptible to groundwater pollution. A 1:500,000 scale map identifying the state's most significant groundwater recharge areas has been completed

and prepared for printing. An ensuing four-year program of more detailed pollution-susceptibility mapping is currently in progress. The primary tool for identifying susceptible areas is a modified version of EPA's DRASTIC system (Aller, et al., 1987).

DRASTIC is an acronym representing seven parameters: (D) depth to water, (R) rate of recharge, (A) aquifer media, (S) soil media, (T) topography/slope, (I) impact of the vadose zone, and (C) hydraulic conductivity. Each of the seven factors are mapped independently and scored based on rating criteria. Areas of high susceptibility are then delineated through an overlay process of the seven maps. Representative areas are field checked for accuracy.

The Georgia Geologic Survey is currently working in cooperation with the U.S. Geological Survey to create a Geographic Information System (GIS) for Georgia's environmental programs. The GIS utilizes ARC/INFO software which is designed to facilitate mapping and overlay processes. Soils data for the entire state is currently being entered into the GIS data base. These maps and others in the EPD's GIS will be used to automate pollution-susceptibility mapping, as well as to assist other environmental management activities.

#### LITERATURE CITED

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