GROUND-WATER QUALITY AND AVAILABILITY IN GEORGIA FOR 1987

by

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GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

CIRCULAR 12D

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INTRODUCTION

PURPOSE

Circular 12D is the fourth in a continuing series of annual summaries of ground-water quality and availability in Georgia. This report is to be used by the Georgia Environmental Protection Division (EPD) to assess the effectiveness of its ground-water management activities. EPD is the principal State agency responsible for management of ground-water quality and allocation. The Division's management activities include issuance of permits for large ground-water withdrawals, mining, wastewater discharges, sanitary landfills, and facilities that treat, store, and/or dispose of hazardous materials. EPD also monitors potential sources of ground-water pollution and ambient ground-water conditions.

Ground-water quality data in this report were derived from the State's Ground-Water Monitoring Network, maintained by the Georgia Geologic Survey Branch of EPD. Ground-water use data were obtained from the State's Water Use Program, a cooperative project of the Georgia Geologic Survey and the U.S. Geological Survey. This summary was prepared through the Georgia Ground-Water Management Program, a project of EPD, funded in part by a grant from the U.S. Environmental Protection Agency, for the purpose of coordinating ground-water related management activities throughout the State.

Ground-water levels in Georgia are monitored through a cooperative project of the Georgia Geologic Survey and the U.S. Geological Survey. Water level trends are summarized annually as Open-File Reports of the U.S. Geological Survey. U.S. Geological Survey Open-File Report 88-323 (Joiner and others, 1988) presents ground-water data for 1987.

HYDROGEOLOGIC PROVINCES OF GEORGIA

The hydrogeologic provinces in Georgia are defined by their general geologic properties. They are the Coastal Plain Province of southern Georgia, the Piedmont/Blue Ridge Province occupying most of northern Georgia, and the Valley and Ridge/Cumberland Plateau Province of northwestern Georgia. Ground water in the Coastal Plain Province flows through interconnected granular pores of the host rocks and through solution-enlarged voids. Fractures and joints provide the permeability for ground-water flow in the Piedmont/Blue Ridge Province. The permeable features of the Valley and Ridge/Cumberland Plateau Province are principally fractures, joints, and solution voids. Intergranular porosity is also important in places.

Georgia's Coastal Plain Province is underlain by a wedge of loosely consolidated sediments that gently dip and thicken to the south and east. The oldest, outcropping, sedimentary formations (Cretaceous) are exposed along the Fall Line, which is the northern limit of the Coastal Plain Province. Successively younger formations occur at the surface to the south and east.

The Coastal Plain contains the State's major confined (artesian) aquifers. Confined aquifers are those which are overlain by a layer of impermeable material and contain water at greater-than-atmospheric pressures. Water enters confined aquifers in their updip outcrop areas where the permeable rocks of the aquifer are exposed. Ground-water flow through these aquifers is generally to the south and east, in the direction of dip of the the rocks.

The seven major confined aquifers in the Coastal Plain range in age from Cretaceous to Miocene. The thickness and extent of these aquifers are determined by horizontal and vertical changes in the permeability of the rock units that form them and by the quality of ground water they contain. Several aquifers may be present in a single geographic area, forming a vertical 'stack.'

The Cretaceous and Jacksonian aquifer systems (primarily sands) are commonly used as a source of drinking water within a 35-mile wide band that lies adjacent to and south of the Fall Line. Southwestern Georgia relies on three vertically stacked aquifers (sands and limestones) for drinking-water supplies: the Providence, Clayton, and Claiborne aquifer systems. A large area of south-central and southeastern Georgia is served by the Floridan aquifer system (mainly limestone). The Miocene aquifer system (sands and limestones) is the principal, 'shallow,' unconfined aquifer system occurring in the broad area underlain by the Floridan aquifer system. It becomes confined in the coastal counties and locally in the Grady-Thomas-Brooks-Lowndes Counties area.

Crystalline rocks of metamorphic and igneous origin (primarily Paleozoic) underly the Piedmont/Blue Ridge Province. The principal water-bearing features are fractures and joints in the rock and the overlying soil/saprolite horizons. Thick soils and saprolites are often important as the 'reservoir' to the water-bearing fracture/joint systems. Ground-water flow is typically directed from local highlands towards discharge areas along streams. However, during prolonged dry periods or in the vicinity of heavy pumpage, ground water may flow from the streams into the fracture/joint systems.

The Valley and Ridge/Cumberland Plateau Province is underlain by consolidated Paleozoic sedimentary formations. Dolostones and limestones of the Knox Group are the principal aquifers where they occur in the axes of broad valleys. Ground-water and surface-water systems are locally closely interconnected. The greater permeabilities of thick carbonate sections in this Province, in part due to solution-enlarged joints, permit development of more extensive aquifer systems than in the Piedmont/Blue Ridge Province.

In addition to geologic setting, ground-water quality and availability are also functions of the proximity of areas of recharge and discharge. Water levels and quality vary widely in response to rainfall, river/reservoir levels, evapotranspiration, and land use in recharge areas where surface water enters the ground-water flow system. Water availability and quality is relatively stable in downflow discharge areas, in contrast, but the waters tend to be more mineralized.

GROUND-WATER QUALITY

Experience has shown that the quality of shallow ground water is generally suitable for domestic use throughout the State. Iron and manganese are the only constituents that commonly occur in concentrations higher than those allowed by State drinking-water standards. These naturally occurring metal cations can cause staining of objects but do not pose a health risk. Both iron and manganese can be readily removed during the treatment process.

No areally extensive occurrences of polluted or excessively contaminated ground waters are known from north Georgia. Waters containing high levels of total dissolved solids (salt water) are present in the deepest confined aquifers underlying most of south Georgia and in the lower section of the Floridan aquifer system along the coast. Shallower aquifers, with acceptable water quality, are present almost everywhere in the Coastal Plain.

Both ground-water quality and availability are restricted in the Gulf Trough area of south Georgia. The Gulf Trough is a linear hydrogeologic anomaly that extends from southwest Decatur County through central Bulloch County. Naturally occurring ground-water contaminants associated with the Gulf Trough area include barium, sulfate, and radionuclides. These contaminants can be eliminated from drinking water, in most cases, by proper well construction (i.e. casing off certain geologic horizons) or treatment.

EPD has identified critical-use areas at Savannah and Brunswick where increased withdrawals could affect ground-water quality. Ground-water withdrawals for municipal and industrial use have created large cones of depression in the potentiometric surface of the Floridan aquifer system at Savannah and Brunswick and in other places in the coastal counties. These cones of depression increase the potential for contamination from deeply buried brines as well as ocean water. Both the Savannah and Brunswick areas are being monitored by EPD with a dense network of monitoring wells. Except for a small area on the Brunswick Peninsula, where upconing of salt water apparently has been ongoing for several decades, EPD's monitoring shows no evidence of further upconing or encroachment in coastal Georgia.

Increased use of ground water for agricultural irrigation in the Dougherty Plain and adjacent Sand Hills area of southwestern Georgia will potentially increase hydraulic gradients through the unsaturated, or vadose, zone. Agricultural chemicals may not be effectively attenuated in such a situation because of increased flow rates in the vadose zone. Ground-water quality monitoring by EPD in the Dougherty Plain has not detected any traces of pesticides. However, more shallow monitoring wells in agricultural areas were added to the Monitoring Network in 1988.

GROUND-WATER USE IN GEORGIA, 1987

INTRODUCTION

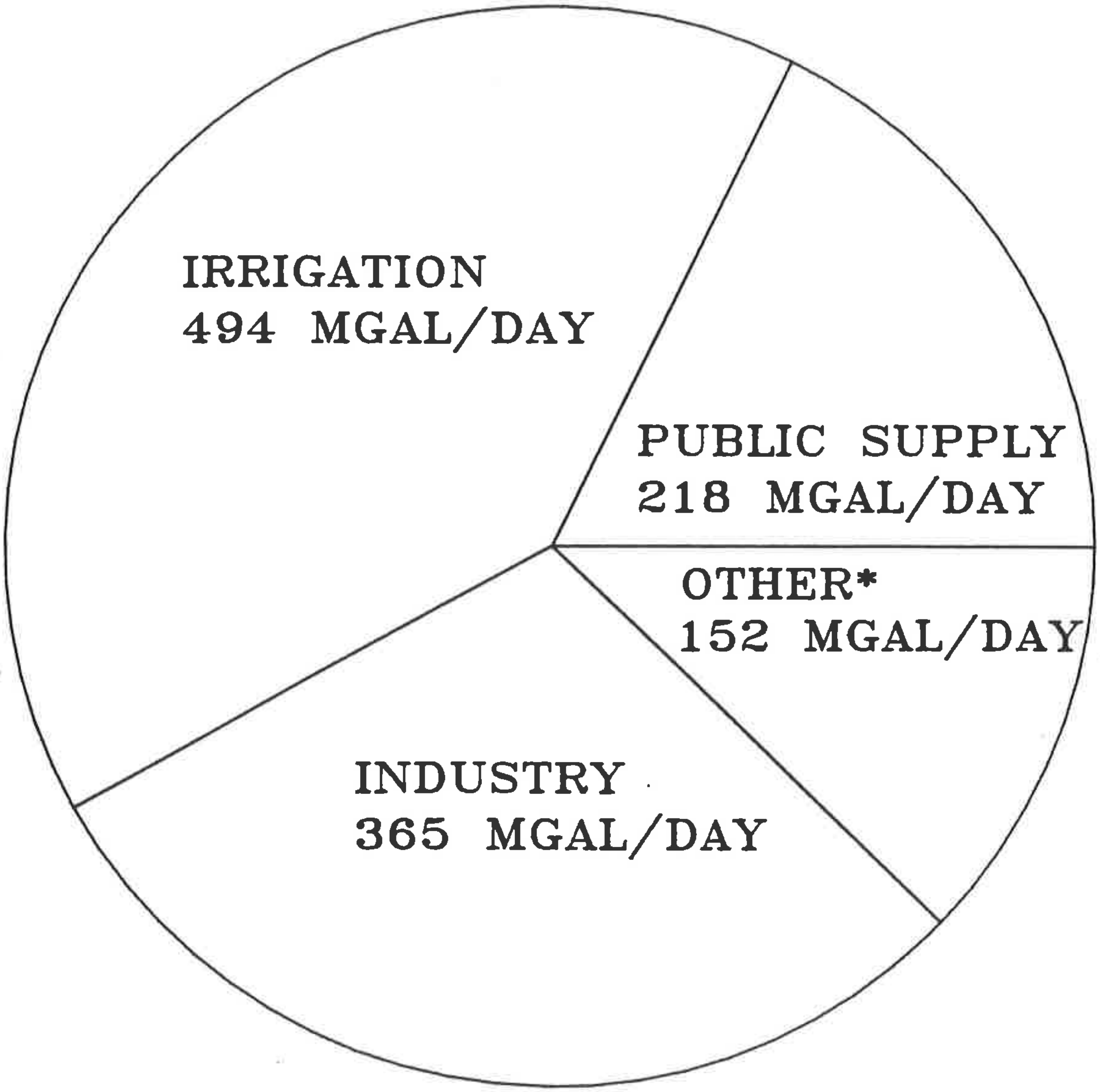
Ground water is an abundant natural resource in Georgia, especially in the Coastal Plain Province. Ground water is the source of over 18% of all fresh water used in the State and 47% of all offstream use. Recharge to the ground-water system in Georgia is derived almost entirely from precipitation. The average annual precipitation is about 50 inches state-wide. It is estimated that 88% of rainfall runs off to streams or is lost to evapotranspiration, and about 12% enters the ground-water system as recharge (Carter and Stiles, 1983). A recent history of precipitation at specific sites across the State, along with the departure from normal for 1987, is given in Table 2-1. From this limited data, it is apparent that much of the State has suffered from a drought since 1986.

Estimated ground-water withdrawals for 1987 totaled 1,229 million gallons per day (Mgal/day), an increase of slightly over 1% from the reported figure of 1,215 Mgal/day for 1986. Industrial ground-water withdrawals increased 5% from 349 Mgal/day in 1986 to 365 Mgal/day in 1987. Due to the prolonged drought, irrigation withdrawals remained high at 494 Mgal/day. Public supply withdrawals were 218 Mgal/day, showing no increase from 1986. Other withdrawals, including self-supplied domestic, commercial, livestock, and thermoelectric uses, dropped slightly from 154 Mgal/day in 1986 to 152 Mgal/day in 1987 (Figure 2-1). Irrigation remained the largest use category at 40.2% of all ground water withdrawn, whereas industrial withdrawals totaled 29.7%, public supply 17.7%, and other uses 12.4%.

Table 2-1. - Annual precipitation for selected sites in Georgia (inches)

City	1980	1981	1982	1983	1984	1985	1986	1987	Departure
Athens	48.06	32.89	49.60	53.78	49.85	38.40	36.01	35.84	-14.31
Atlanta	46.94	41.91	56.21	51.62	55.39	49.80	40.50	46.24	- 2.37
Augusta	39.24	44.38	41.09	52.67	44.27	38.28	43.74	41.17	- 1.90
Columbus	48.81	47.54	51.62	55.27	38.12	39.65	44.96	48.53	- 2.56
Macon	38.51	48.09	48.74	51.10	44.01	35.92	38.49	38.12	- 6.74
Rome	56.11	44.75	70.54	59.51	58.23	44.76	43.53	36.62	-17.59
Savannah	37.84	40.06	52.26	54.51	50.66	38.64	45.33	56.70	+ 7.00

From: Climatological Data, Annual Summary, Volumes 86-92, National Oceanic and Atmospheric Administration



* Other includes self supplied domestic, livestock, commercial, and thermoelectric uses.

Figure 2-1. - Ground-water use in Georgia, 1987

For this report, permitted ground-water use was calculated from withdrawal amounts reported by users to the Water Resources Management Branch of Georgia's Environmental Protection Division (EPD). Permitted users are those who use 100,000 gallons or more per day. Small industries, communities, and subdivisions that supply water for at least 25 people or that have a minimum of 5 hookups must also obtain permits. Irrigation estimates were calculated using the Cooperative Extension Service's 1986 Irrigation Survey. Estimates for withdrawals by nonpermitted users (such as livestock and self-supplied domestic uses) were based on user surveys, population figures, and previous studies by the Georgia Water Use Program.

GROUND-WATER USE IN GEORGIA

The largest ground-water users are concentrated in the Coastal Plain Province of south Georgia (Figure 2-2), where the State's most productive aquifers are located. Farming is essential to the economy of the counties in the southwestern corner of the State, where irrigation use is highest. Along Georgia's coast, the paper and chemical industries are the largest ground-water users. In central Georgia, kaolin mining (i.e., mainly mine dewatering) is the largest ground-water use. Along with the industries, there are major population centers where public supply constitutes large withdrawals. A summary of permitted ground-water use by county is given in Table A-1, and estimated ground-water use by county for 1987 is presented in Table A-2 of Appendix A.

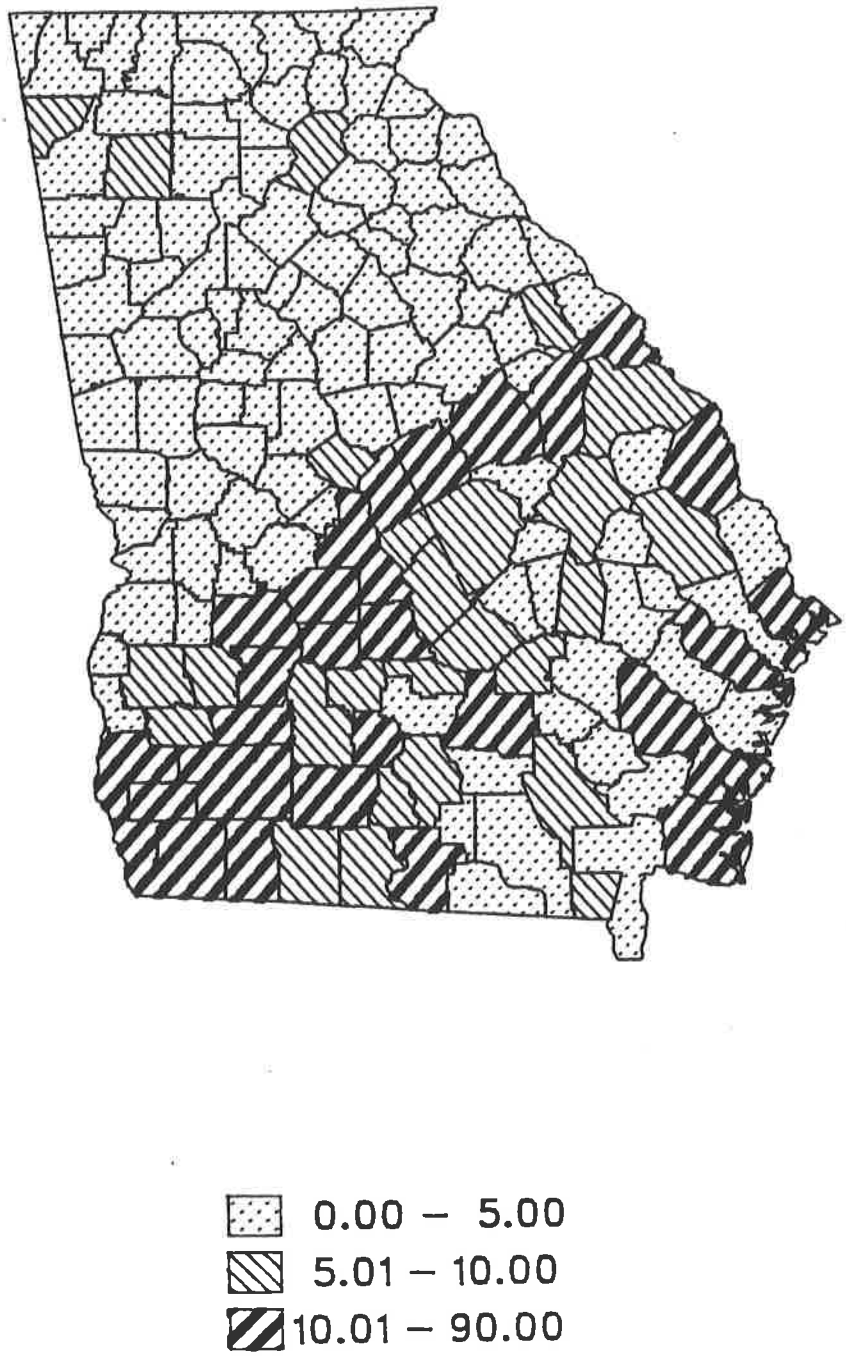


Figure 2-2. - Total ground-water withdrawals by county, Mgal/day, 1987

GROUND-WATER USE FOR PUBLIC SUPPLY

The public supply category includes water withdrawn by public and private water suppliers and delivered to users. Total water withdrawn by public suppliers in Georgia for 1987 was estimated to be 880 Mgal/day, 25% of which was ground water. Data collected as of fall 1988, indicates that permitted public suppliers withdrew 156 Mgal/day in 1987. However, these data are incomplete, and the true withdrawal rate is expected to be close to the reported total for 1986 of 176 Mgal/day. A summary of permitted public supply withdrawals is presented in Table A-3. The 1987 estimated ground-water withdrawal rate for public supply was 218 Mgal/day, which includes water used by the permitted public suppliers and by smaller systems such as mobile home parks, trailer parks, and subdivisions. The counties withdrawing the largest amounts of ground water for public supply are scattered throughout the Coastal Plain Province (Figure 2-3). The high withdrawal rates in the counties correspond to the highly populated cities of Augusta, Warner Robins, Albany, Tifton, Thomasville, Valdosta, Brunswick, Savannah, and Douglas.

GROUND-WATER USE FOR INDUSTRY AND MINING

Self-supplied industrial and mining withdrawals were estimated at 365 Mgal/day for 1987, an increase of almost 5% over the 349 Mgal/day reported for 1986. Industrial withdrawals totaled 29.7% of all ground water withdrawn in 1987. Permitted industries and mines withdrew 298 Mgal/day (Table A-4). The counties having the largest ground-water withdrawals for industry are scattered throughout the Coastal Plain (Figure 2-4), except for Chattooga County in the northwest, which has a large textile industry. The high-use counties along Georgia's

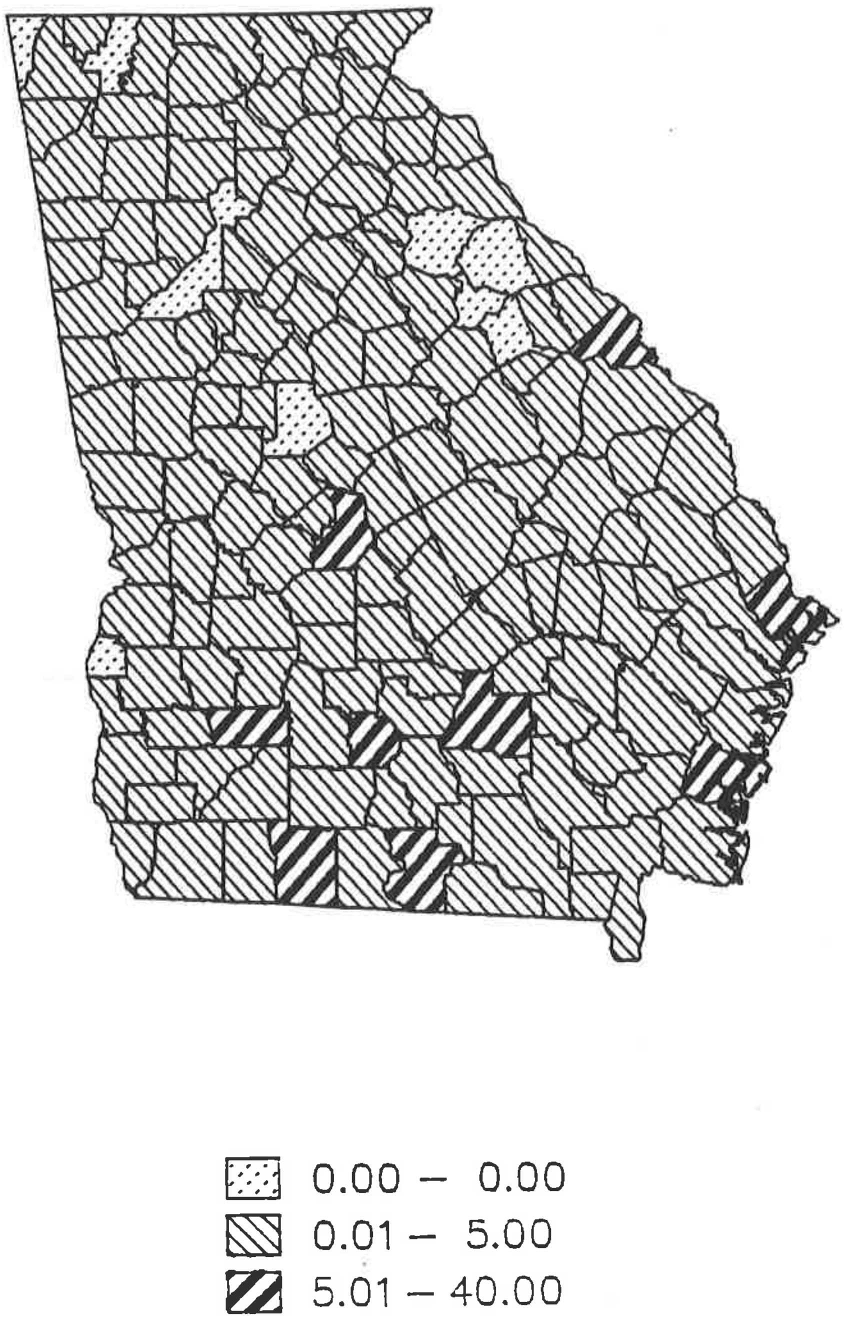


Figure 2-3. - Ground-water withdrawals for public supply, Mgal/day, 1987

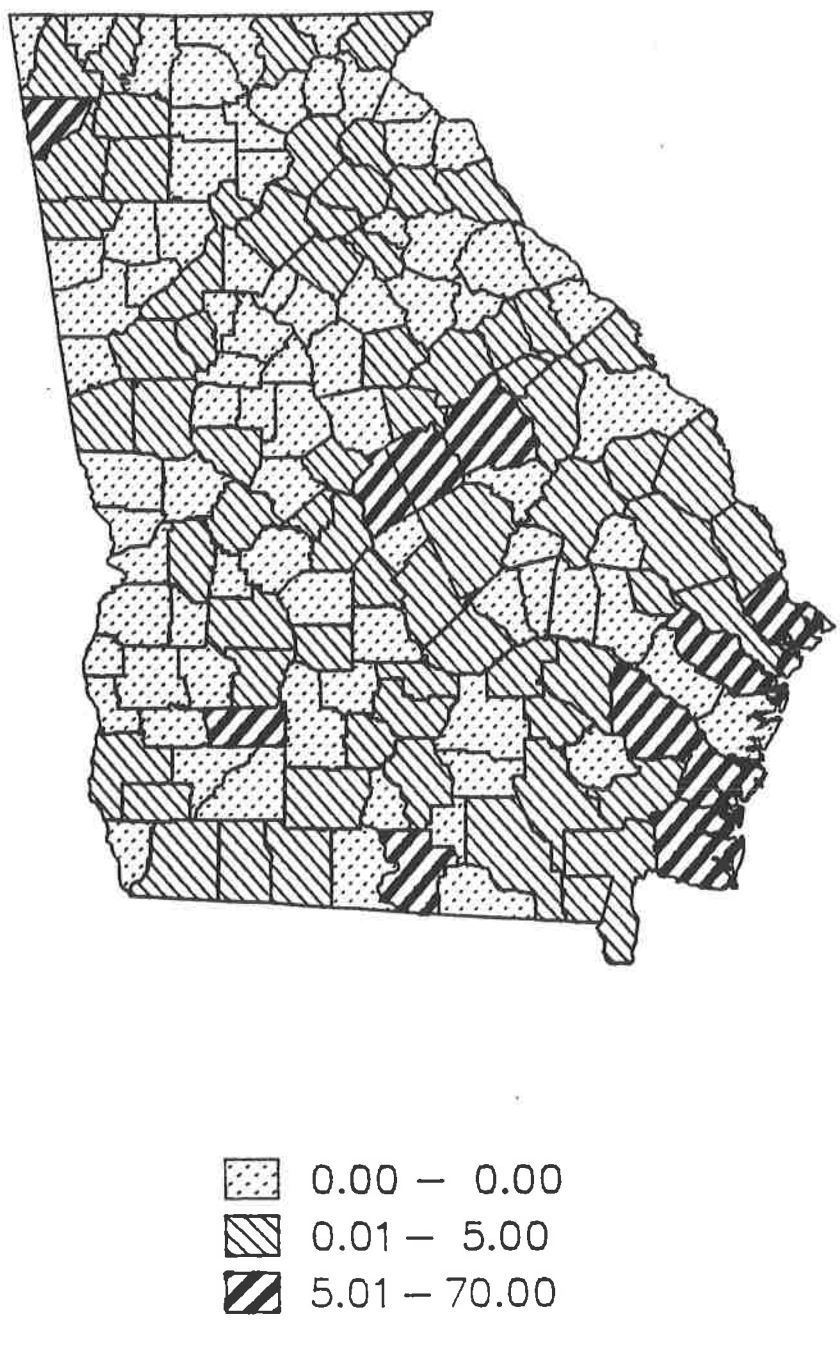


Figure 2-4. - Ground-water withdrawals for industry, Mgal/day, 1987

coastline are supported by the paper and chemical industries, while the counties in central Georgia, along the Fall Line, are dependent on kaolin mining. The industries that withdrew the most ground water in 1987 are paper production (168 Mgal/day), chemicals production (117 Mgal/day), and mining/mineral production (47.5 Mgal/day) (Figure 2-5).

GROUND-WATER USE FOR IRRIGATION

Irrigation constitutes the largest ground-water use in the State, using 494 Mgal/day or 40.2% of all ground water withdrawn in 1987. The irrigation estimates for 1987 are based on the Cooperative Extension Service's (CES) biannual Irrigation Survey (unpublished data), last conducted in 1986. A brief summary of estimated irrigation withdrawals is presented in Table A-5. The CES estimated that a total of 1,120,386 acres of crops were being irrigated in the State in 1986, with 73.1% of all irrigation occurring in the southwestern district of the State (Figure 2-6). The total number of irrigation systems in use in 1986 was 11,886, with ground water supplying 39% of the systems. In 1986, 114 new irrigation wells were added in for a total of 4,628 state-wide.

Continuing periods of drought through 1987 resulted in the Georgia General Assembly recognizing the need to regulate agricultural water users, who are the largest water users in the State. Beginning July 1, 1988, a permit is required for all ground-water and surface-water withdrawals for agricultural uses of 100,000 gallons or more per day on a monthly average. EPD will issue and regulate the permits.

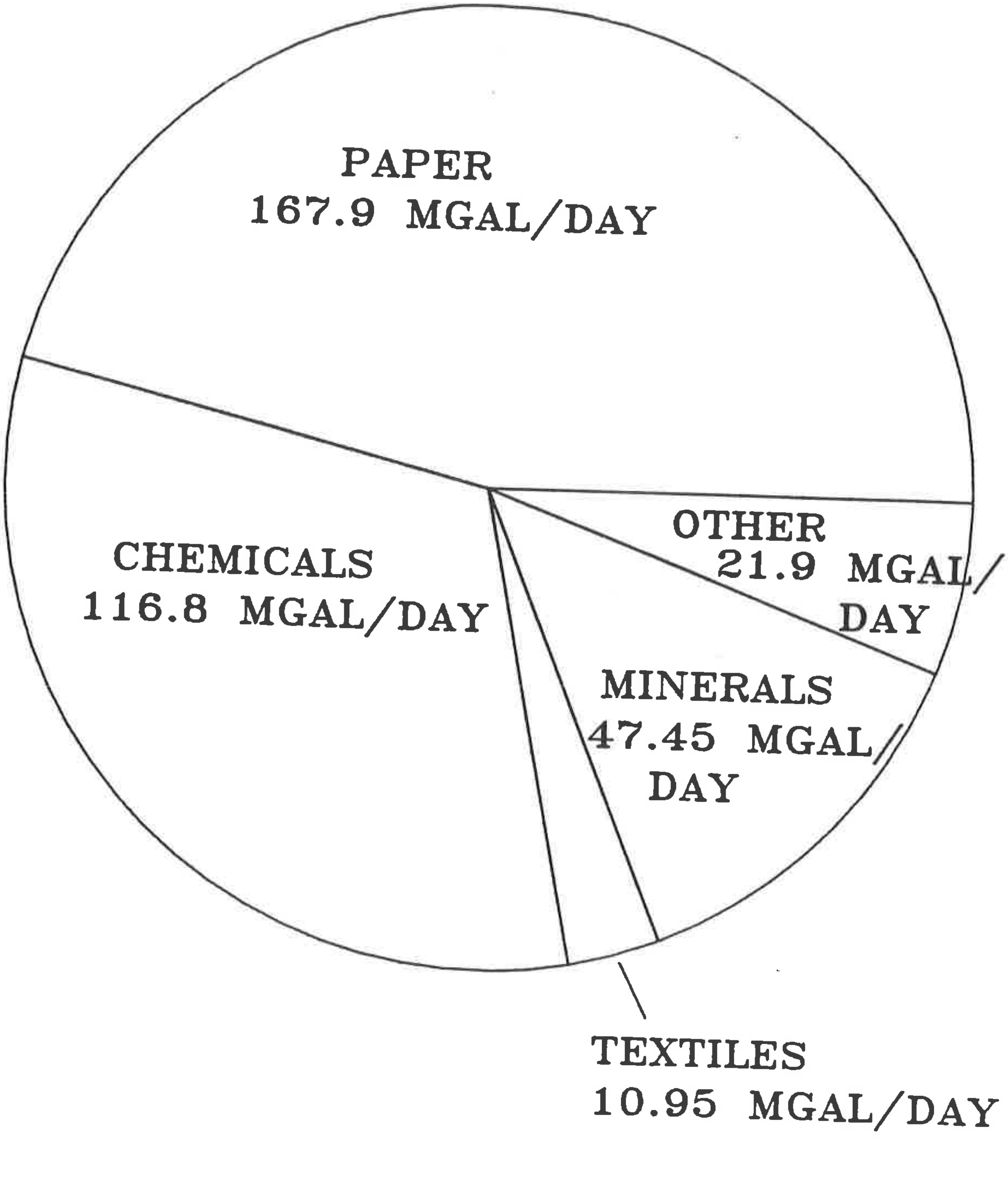


Figure 2-5. - Ground-water withdrawals by industry, 1987

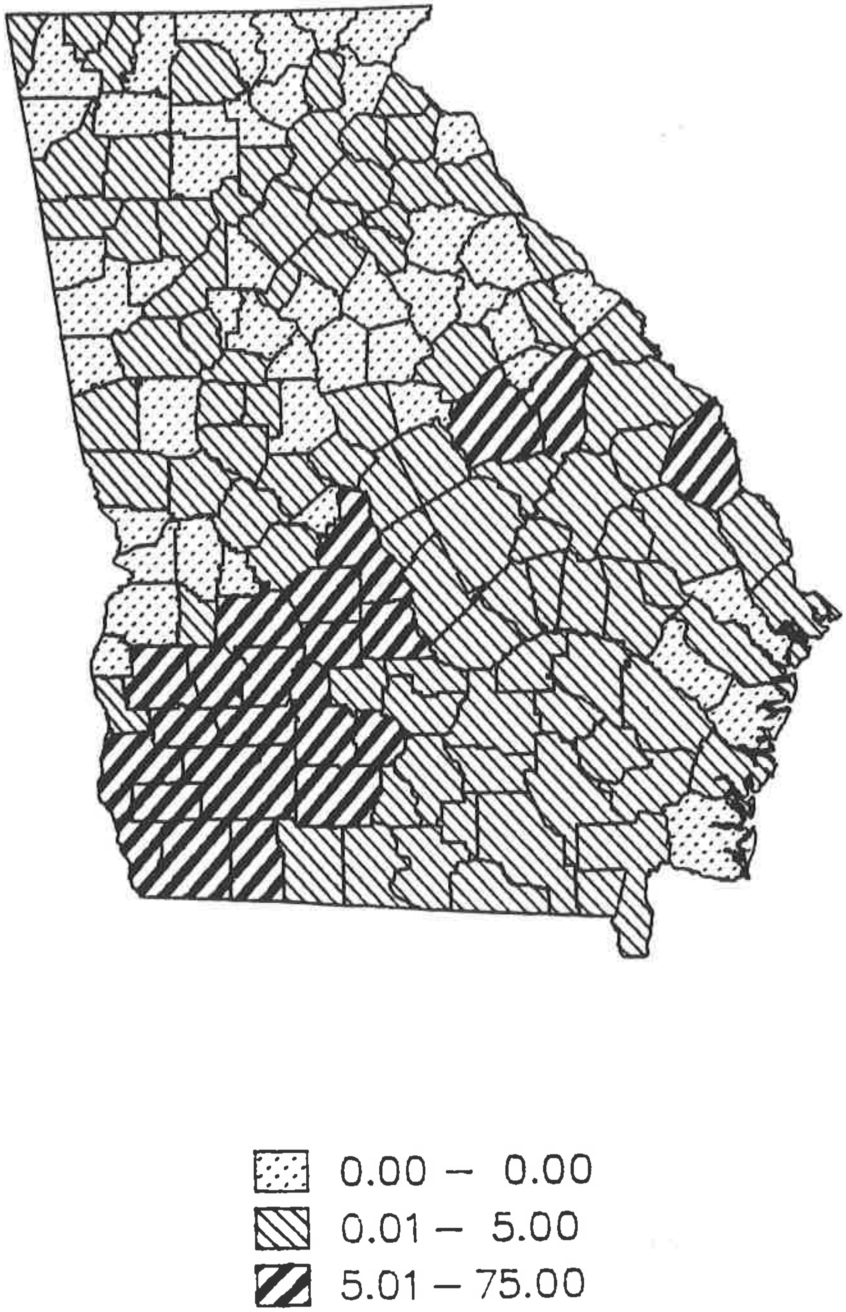


Figure 2-6. - Ground-water withdrawals for irrigation, Mgal/day, 1987

OTHER WATER-USE CATEGORIES

Other water-use categories include self-supplied domestic, commercial, livestock, and thermoelectric uses. These withdrawals totaled 12.4% of all ground-water withdrawals in 1987, approximately 152 Mgal/day.

Self-supplied domestic use is water used for normal household purposes, virtually all of which is supplied by wells and springs. Self-supplied domestic use was estimated to be 99 Mgal/day in 1985. This estimate is equal to the self-supplied population multiplied by 75 gallons/day (average per capita domestic use). Estimates for 1987 are not available but are expected to be similar to 1985.

Commercial users include restaurants, hotels, retail stores and other businesses, government and military facilities, prisons, schools, hospitals, recreational facilities, and others. For 1987, ground-water withdrawals by commercial users were estimated at 20.8 Mgal/day, with permitted users withdrawing 6.5 Mgal/day (Table A-6) and nonpermitted users withdrawing an estimated 14.3 Mgal/day. Most commercial users obtain their water from public water systems.

Thermoelectric power generation uses only a very small amount of ground water, primarily for boiler make-up water and sanitary supply in the power plants. Ground-water withdrawals for thermoelectric power generation totaled 6.3 Mgal/day in 1987 (Table A-7).

GROUND-WATER USE BY HYDROLOGIC UNIT

The state of Georgia is divided into 9 major hydrologic units, or drainage basins, and 52 sub-basins (Figure 2-7). Drainage basins are catchment areas for precipitation. Because precipitation is the principal source of recharge to the ground-water system, it is

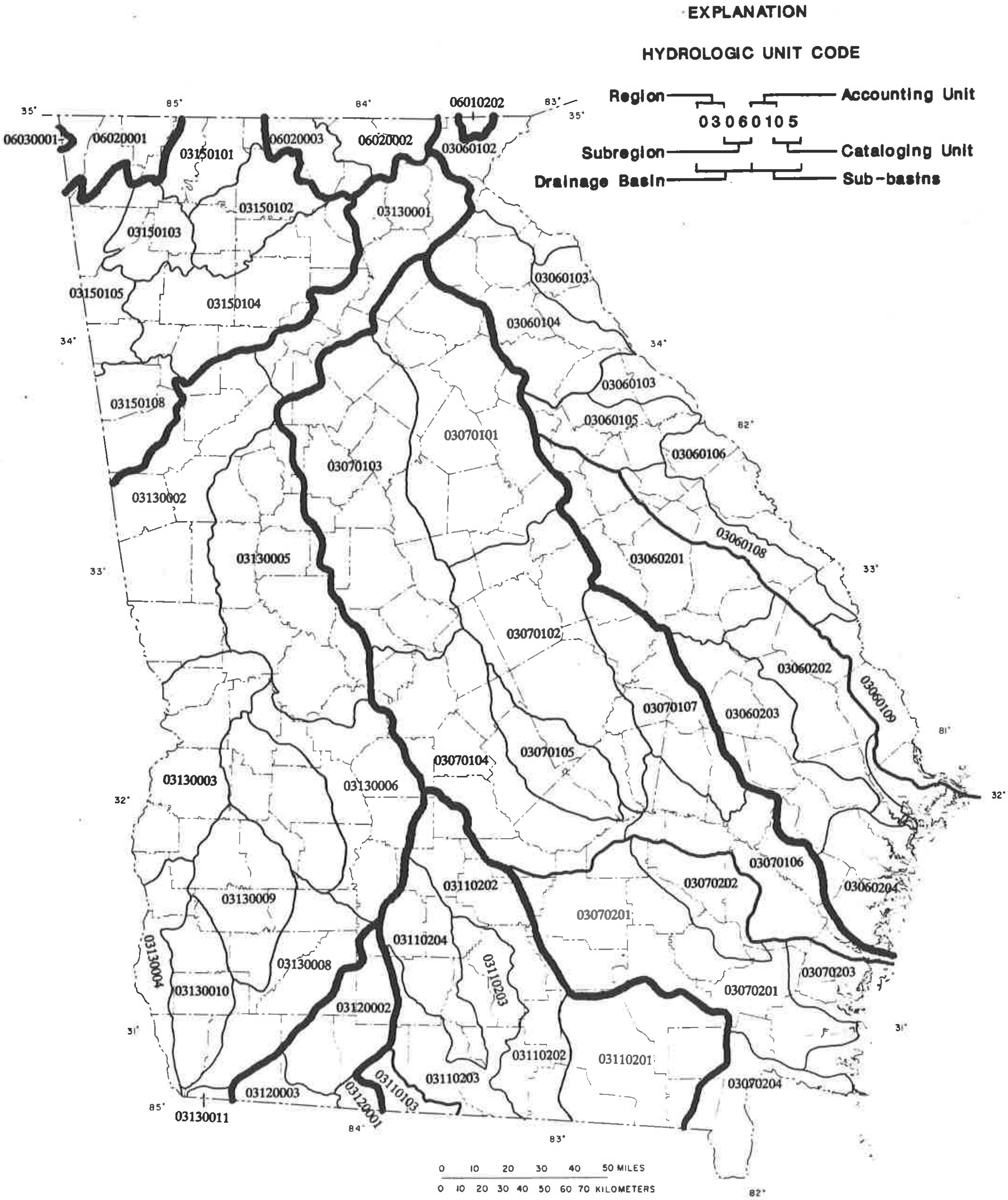


Figure 2-7. - Major hydrologic units of Georgia

important to examine ground-water use by hydrologic units. EPD has determined maximum withdrawal rates for each river basin and, when these limits are exceeded, water quality and availability for all users in a particular basin may be affected. Permitted ground-water use by hydrologic unit is presented in Table A-8 and Figure 2-8.

GROUND-WATER USE BY AQUIFER

Most ground water is withdrawn from the six principal aquifers in the State. These are the Paleozoic aquifers and the crystalline rock aquifers of north Georgia, and the Cretaceous aquifer system, the Clayton aquifer system, the Claiborne aquifer system, and the Floridan aquifer system of south Georgia (Figure 2-9).

Accurate estimates of total ground-water use by aquifer are difficult because locations and depths for all wells in the State are not available. However, well locations and depths for permitted ground-water users are available. A summary of estimates of permitted ground-water use by aquifer, exclusive of self-supplied domestic and other unpermitted uses, follows and is also presented in Table A-9.

The Floridan aquifer system is the most heavily utilized in the State, supplying 73.7% of all permitted ground-water use. In 1987, 344.1 Mgal/day was pumped from this aquifer by permitted ground-water users.

The Cretaceous aquifer system is the second most productive aquifer in the State, supplying ground water for most of the northern one-third of the Coastal Plain. The Cretaceous aquifer system supplied 17.9% of permitted ground-water use in 1987, with 83.6 Mgal/day pumped.

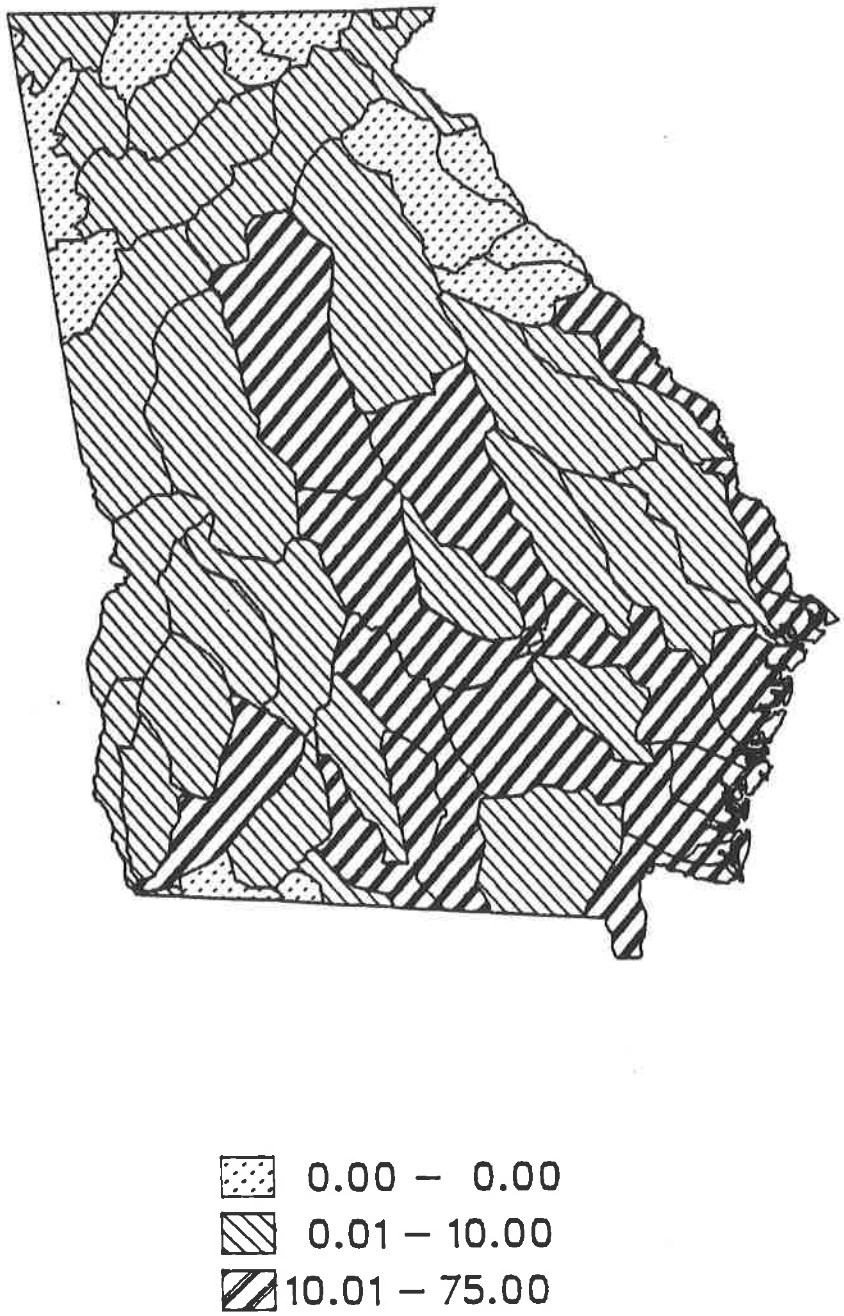


Figure 2-8. - Permitted ground-water withdrawals by river basin, Mgal/day, 1987

EXPLANATION

AREA IN WHICH AQUIFER IS UTILIZED

COASTAL PLAIN AQUIFERS

1 Floridan aquifer system

2 Floridan, Claiborne, Clayton and Cretaceous aquifer systems

3 Floridan and Cretaceous aquifer systems

4 Claiborne, Clayton and Cretaceous aquifer systems

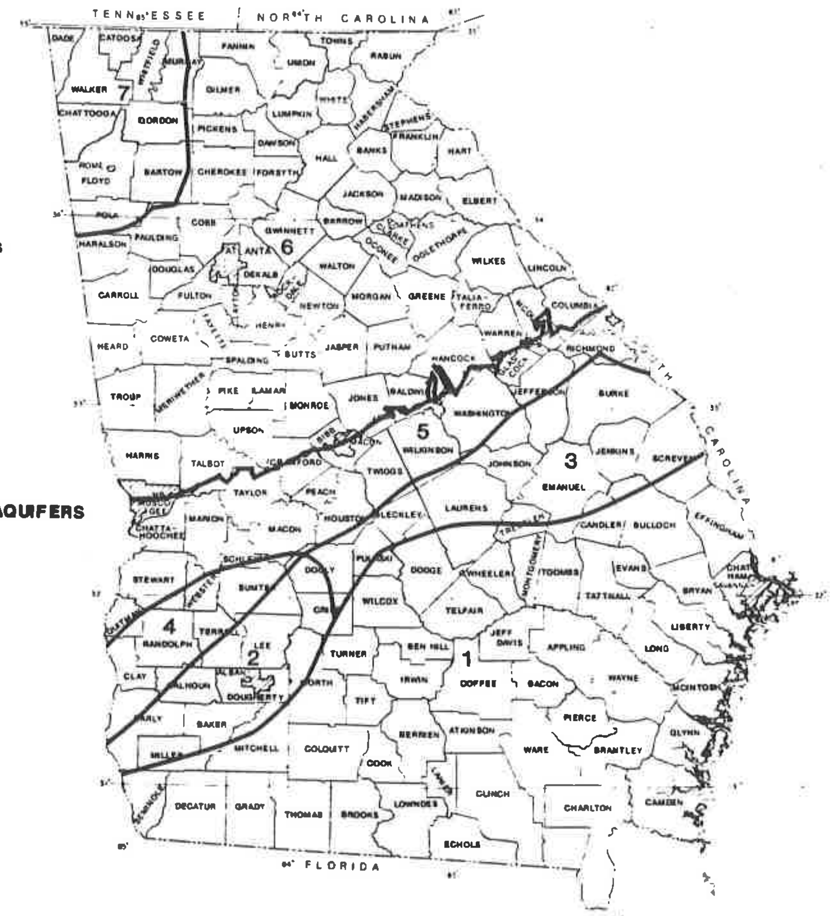
5 Cretaceous aquifer system

PIEDMONT AND BLUE RIDGE AQUIFERS

6 Crystalline rock aquifers

VALLEY AND RIDGE AND APPALACHIAN PLATEAU AQUIFERS

7 Paleozoic rock aquifers



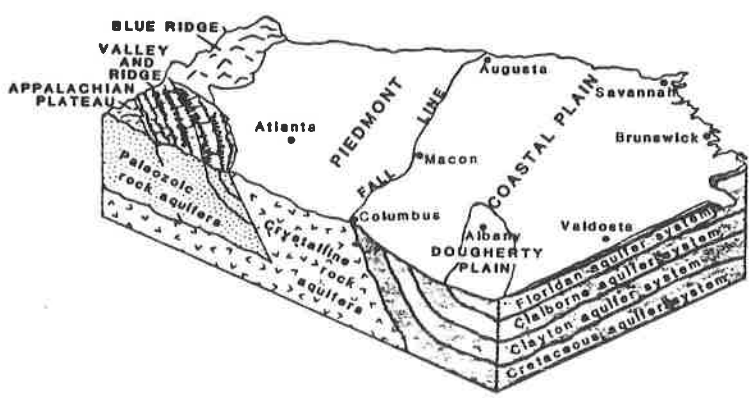


Figure 2-9. - Principal ground-water aquifers of Georgia (Joiner et. al., 1988)

The Clayton and Claiborne aquifer systems are a primary source of ground water for both irrigation and public water supply in southwestern Georgia. However, irrigation water use information for 1987 is incomplete, which makes it difficult to estimate total ground-water use in these aquifer systems. In addition to irrigation use, the Claiborne aquifer system supplied 3.1% of all permitted ground-water use, with 14.8 Mgal/day pumped. The Clayton aquifer system supplied 12.8 Mgal/day, or 2.7% of permitted ground-water use.

Ground water in the Paleozoic aquifers supplied 8.6 Mgal/day, or 1.9% of permitted ground-water use, and the crystalline rock aquifers supplied 3.1 Mgal/day, or 0.7% of permitted use. Most water used in the northern portion of the State is supplied from surface-water sources.

GROUND-WATER QUALITY IN GEORGIA, 1987

GEORGIA GROUND-WATER MONITORING NETWORK

The Ground-Water Monitoring Network is maintained by the Georgia Geologic Survey as an element of the State's Ground-Water Management Program. Ambient ground-water quality monitoring serves to detect new point sources of ground-water pollution in a timely manner and to assess the cumulative effect of non-point sources such as agricultural chemicals. Analyses are available for water samples collected during 1987 from 123 wells and three springs (Appendix B). These sample stations represent all seven major aquifer systems of the Coastal Plain Province and the unconfined ground-water systems of the Piedmont/Blue Ridge Province and the Valley and Ridge/Cumberland Plateau Province (Table 3-1).

Monitoring stations are located in three critical areas:

(a) recharge areas of the State's primary aquifers,
(b) other areas of potential pollution related to regional activities (agricultural and industrial areas), and
(c) areas of significant ground-water use.

The majority of Monitoring Network sampling stations are municipal and industrial wells that have reliable well-construction data. Monitoring wells maintained jointly by the Georgia Geologic Survey and the U.S. Geological Survey also are used in specific areas where the State's aquifers are recognized to be susceptible to contamination or pollution (for example, the Dougherty Plain of southwestern Georgia and the State's coastal area). Because these wells are completed in specific permeable zones of an aquifer, analyses from several of the wells can be used to assess ambient quality of water throughout an aquifer system.

Table 3-1. - Georgia Ground-Water Monitoring Network, 1987

AQUIFER SYSTEM	NUMBER OF MONITORING STATIONS	PRIMARY STRATIGRAPHIC EQUIVALENTS	AGE OF AQUIFER FORMATIONS
Miocene	4	Altamaha Formation and Hawthorne Group	Miocene
Floridan	50	Suwannee Limestone, Ocala Group, Bridgeboro Limestone, and Clabornian Carbonates	Oligocene to Middle Eocene
Jacksonian	7	Barnwell Group	Upper Eocene
Claiborne	7	Tallahatta Formation	Middle Eocene
Clayton	6	Clayton Formation	Paleocene
Providence	4	Providence Sand	Upper Cretaceous
Cretaceous	19	Ripley Formation, Cusseta Sand, Blufftown Formation, Eutaw Formation, and Tuscaloosa Formation	Upper Cretaceous
Piedmont	16	Unconfined aquifers	Predominately Paleozoic
Blue Ridge	4	Unconfined aquifers	Predominately Paleozoic
Valley and Ridge/ Cumberland Plateau	9	Unconfined aquifers	Paleozoic

It should be noted that the analyses of water from the limited number of monitoring stations define the ground-water quality only in those areas sampled and only of the aquifers from which the wells receive ground water. Caution should be exercised in drawing broad conclusions and applying any results reported in this study to those ground waters not being monitored.

Ground water from all monitoring stations is tested for parameters included in the Monitoring Network's standard analysis: pH, specific conductivity, chloride, sulfate, nitrite/nitrate, twelve common pesticide and industrial organic compounds, and thirty metals (Table 3-2). Where regional land-use activities have the potential to affect ground-water quality in the vicinity of a monitoring station, additional parameters are tested. These additional chemical screens are listed in Appendix B. The significance of the common major constituents of a water quality analysis is summarized in Table 3-3.

Sampling procedures are adapted from techniques used by the U.S. Geological Survey and the U.S. Environmental Protection Agency. All analyses, except for some contracted organic chemicals screens, are performed by EPD laboratories. Data for the Ground-Water Monitoring Network are constantly updated in the U.S. Environmental Protection Agency's STORET computer data management system.

Table 3-2. - Standard water quality analysis of the Ground-Water Monitoring Network - drinking-water limits from the Georgia Rules for Safe Drinking Water

Parameter*		Drinking-Water Limit (Where Applicable)	Parameter*		Drinking-Water Limit (Where Applicable)
			ICP SCREEN, Cont.		
pH	S.U.	--	Aluminum	ug/L	--
Spec. Cond.	umho/cm	--	Antimony	ug/L	--
Chloride	mg/L	250	Arsenic	ug/L	50
Sulfate	$mg.SO_4/L$	250	Barium	ug/l	1,000
Nitrite/nitrate	mg.N/L	10	Beryllium	ug/L	--
			Bismuth	ug/L	--
ORGANIC SCREEN #2			Cadmium	ug/L	10
Dicofol	ug/L	--	Chromium	ug/L	50
Endrin	ug/L	0.2	Cobalt	ug/L	--
Lindane	ug/L	4	Copper	ug/L	1,000
Methoxychlor	ug/L	100	Gold	ug/L	--
PCB's	ug/L	--	Iron	ug/L	300
Permethrin	ug/L	--	Lead	ug/L	50
Toxaphene	ug/L	5	Manganese	ug/L	50
			Molybdenum	ug/L	--
ORGANIC SCREEN #4			Nickel	ug/L	--
2,4-D	ug/L	100	Selenium	ug/L	10
Acifluorfen	ug/L	--	Silver	ug/L	50
Chloramben	ug/L	--	Strontium	ug/L	--
Silvex	ug/L	10	Thallium	ug/L	--
Trichlorfon	ug/L	--	Tin	ug/L	--
			Titanium	ug/L	--
ICP SCREEN			Vanadium	ug/L	--
Calcium	mg/L	--	Yttrium	ug/L	--
Magnesium	mg/L	--	Zinc	ug/L	5,000
Potassium	mg/L	--	Zirconium	ug/L	--
Sodium	mg/L	--			

*S.U. = standard units, umho/cm = micromhos/centimeter, mg/l= milligrams/liter (parts per million), ug/L = micrograms/liter (parts per billion)

Table 3-3. - The significance of parameters of a basic water-quality analysis (Wait, 1960)

PARAMETER(S)	SIGNIFICANCE
pH (Hydrogen ion concentration)	pH is a measure of the concentration of the hydrogen ion. Values of pH less than 7.0 denote acidity and values greater than 7.0 indicate alkalinity. Corrosiveness of water generally increases with decreasing pH. However, excessively alkaline waters may also attack metals. A pH range between 6.0 and 8.5 is considered acceptable.
Calcium and magnesium*	Calcium and magnesium cause most of the hardness of water. Hard water consumes soap before a lather will form and deposits scale in boilers, water heaters, and pipes. Hardness is reported in terms of equivalent calcium carbonate. The hardness of a water can be estimated by multiplying the parts per million of calcium by 2.5 and that of magnesium by 4.1.
Sodium and potassium*	Sodium and potassium have little effect on the use of water for most domestic purposes. Large amounts give a salty taste when combined with chloride. A high sodium ratio may limit the use of water for irrigation.
Iron and manganese	More than 300 parts per billion of iron stains objects red or reddish brown and more than 50 parts per billion of manganese stains objects black. Larger quantities cause unpleasant taste and favor growth of iron bacteria but do not endanger health.
Sulfate	Sulfate in hard water increases the formation of scale in boilers. In large amounts, sulfate in combination with other ions imparts a bitter taste to water. Concentrations above 250 parts per million may have a laxative effect, but 500 parts per million is considered safe.
Chloride	Chloride salts in excess of 100 parts per million give a salty taste to water. Large quantities make the water corrosive. Water that contains excessive amounts of chloride is not suitable for irrigation. It is recommended that chloride content should not exceed 250 parts per million.
Nitrite/nitrate	Concentrations much greater than the local average may suggest pollution. Excessive amounts of nitrogen in drinking or formula water of infants may cause a type of methemoglobinemia ("blue babies"). Nitrite/nitrate nitrogen in concentrations greater than 10 parts per million is considered to be a health hazard.

Water Class	Hardness (parts per million)
Soft	Less than 60
Moderately Hard	60 to 120
Hard	121 to 180
Very Hard	More than 180

*Major alkali metals present in most ground waters.

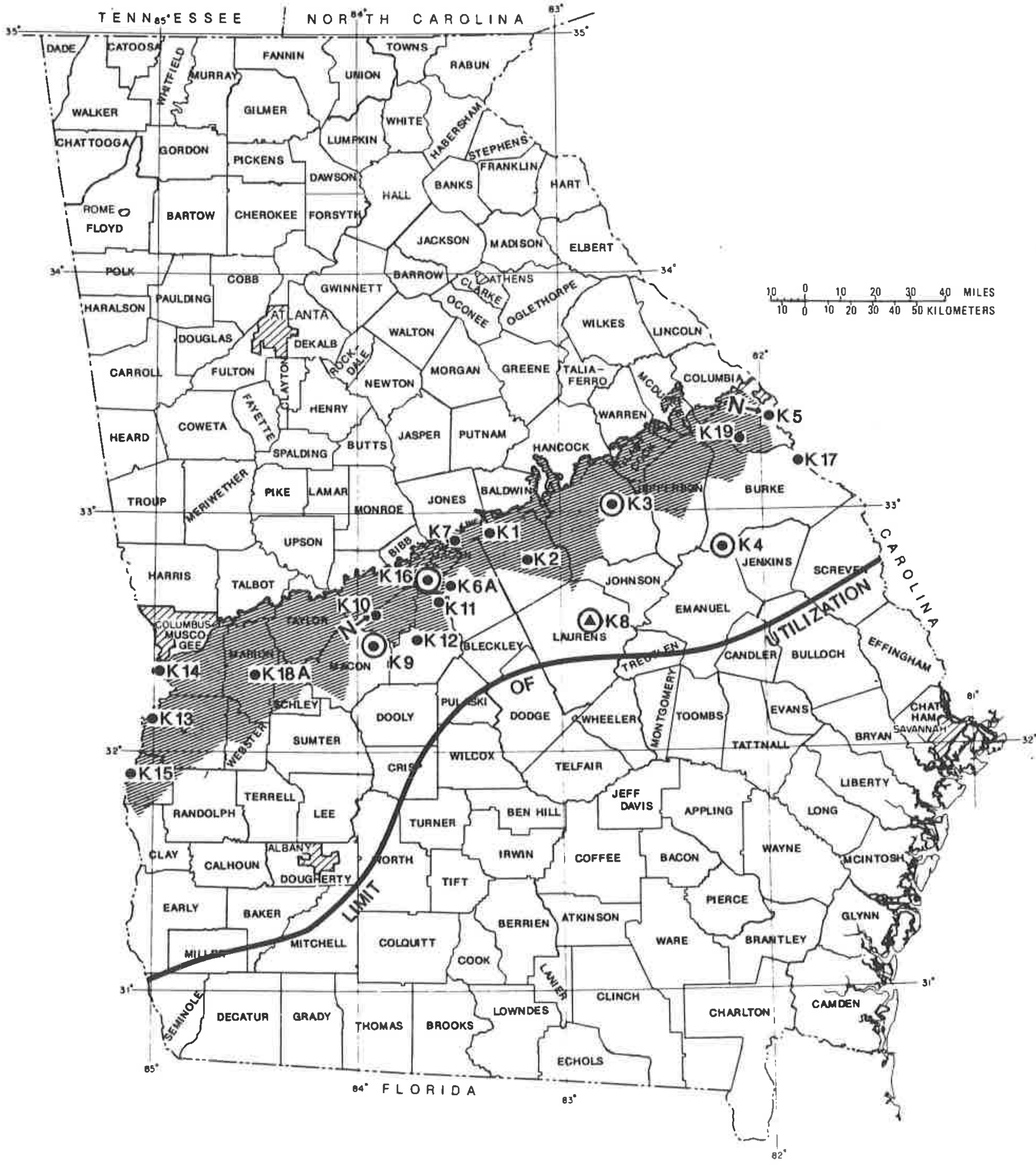
CRETACEOUS AQUIFER SYSTEM

The Cretaceous aquifer system is a complex group of interconnected aquifer subsystems consisting of the upper Cretaceous sands of the Coastal Plain Province. These sands form an extensive outcrop/recharge area immediately south of the Fall Line in west-central Georgia. Outcrops are restricted to valley bottoms in the northeastern Coastal Plain. Five distinct subsystems of the Cretaceous aquifer system, including the Providence aquifer system, are recognized west of the Ocmulgee River (Pollard and Vorhis, 1980) and merge into three subsystems to the east (Clarke and others, 1985). Aquifer sands thicken southward from the Fall Line, where they pinch out against crystalline Piedmont rocks, to a sequence of sand and clay approximately 2,000 feet thick at the southern limits of the main aquifer-use area. Recharge to the Cretaceous aquifer system is primarily derived from rainfall infiltration in the outcrop areas. Leakage from adjacent members of the aquifer system provides significant recharge in downdip areas.

Water quality of the Cretaceous aquifer system, excluding the Providence aquifer system which is treated separately in this report, was monitored in 19 wells (Figure 3-1 and Table 3-4). Sixteen wells were located in or adjacent to outcrop and recharge areas extending across the State. Three wells were in downdip areas in Burke and Laurens Counties. A total of 25 samples were collected in 1987.

Water of the outcrop area wells was typically acidic to the point of being corrosive and soft. Iron levels were in excess of drinking-water limits in water from only three of the wells. The three outcrop area wells, adjacent to the Chattahoochee River, yielded basic and soft waters with a sodium content of 22.6 to 79.6 parts per million. Water from two of these wells was unsuitable for irrigation because of the sodium concentrations. Water from the downdip wells ranged from acidic to basic with high iron and manganese levels in water from two of the three wells. Aluminum, barium, copper, strontium, and zinc, in addition to the major alkali metals: calcium, magnesium, potassium, and sodium, were the other common metallic cations in the Cretaceous aquifer water samples.

Chloride and sulfate levels were low, less than 15 parts per million, in all samples. Chloride concentrations were highest in water from wells in the Chattahoochee River area. Sulfate levels of the samples were generally higher in downdip areas. Nitrite/nitrate concentrations were detectable in water from eleven of the outcrop-area wells and significantly above average, 0.50 to 1.10 parts per million, in samples from three of these wells. Nitrite/nitrate values in the 1987 samples were within the range of values measured in samples collected during the previous three years. Chloroform and related compounds were detected in water from wells located in Irwinton, Wilkinson County, and Buena Vista, Marion County. A follow-up investigation at Buena Vista revealed the source of the chloroform to be treated water that was used in the pump lubrication system.



○ Iron and/or manganese concentrations exceed Drinking-Water Limits

N Nitrite/nitrate concentrations exceed 0.45 parts per million

● Soft water

▲ Moderately hard water

General recharge area (from Davis et. al., 1988)

Figure 3-1. - Water quality of the Cretaceous aquifer system

Table 3-4. - Summary of ground-water quality analyses, Cretaceous aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 25 ANALYSES			ANALYTICAL RESULTS 1984 - 1986 53 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	3.9	5.8	9.1	4.1	5.8	9.2
CALCIUM Ca (ppm)	0.3	3.5	23.7	0.3	3.5	36.9
MAGNESIUM Mg (ppm)	<0.1	0.4	1.7	0.0	0.4	2.1
SODIUM Na (ppm)	0.9	9.2	79.6	0.9	11.4	85.4
POTASSIUM K (ppm)	<0.5	0.7	4.5	<0.5	0.5	5.7
IRON Fe (ppb)	<10	499	4580	<10	316	3890
MANGANESE Mn (ppb)	<10	11	165	<10	<10	220
CHLORIDE Cl (ppm)	1.0	3.3	13.7	1.0	3.8	14.5
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	0.19	1.10	<0.02	0.21	1.10
SULFATE SO_4 (ppm)	<2	4	15	<2	3	15

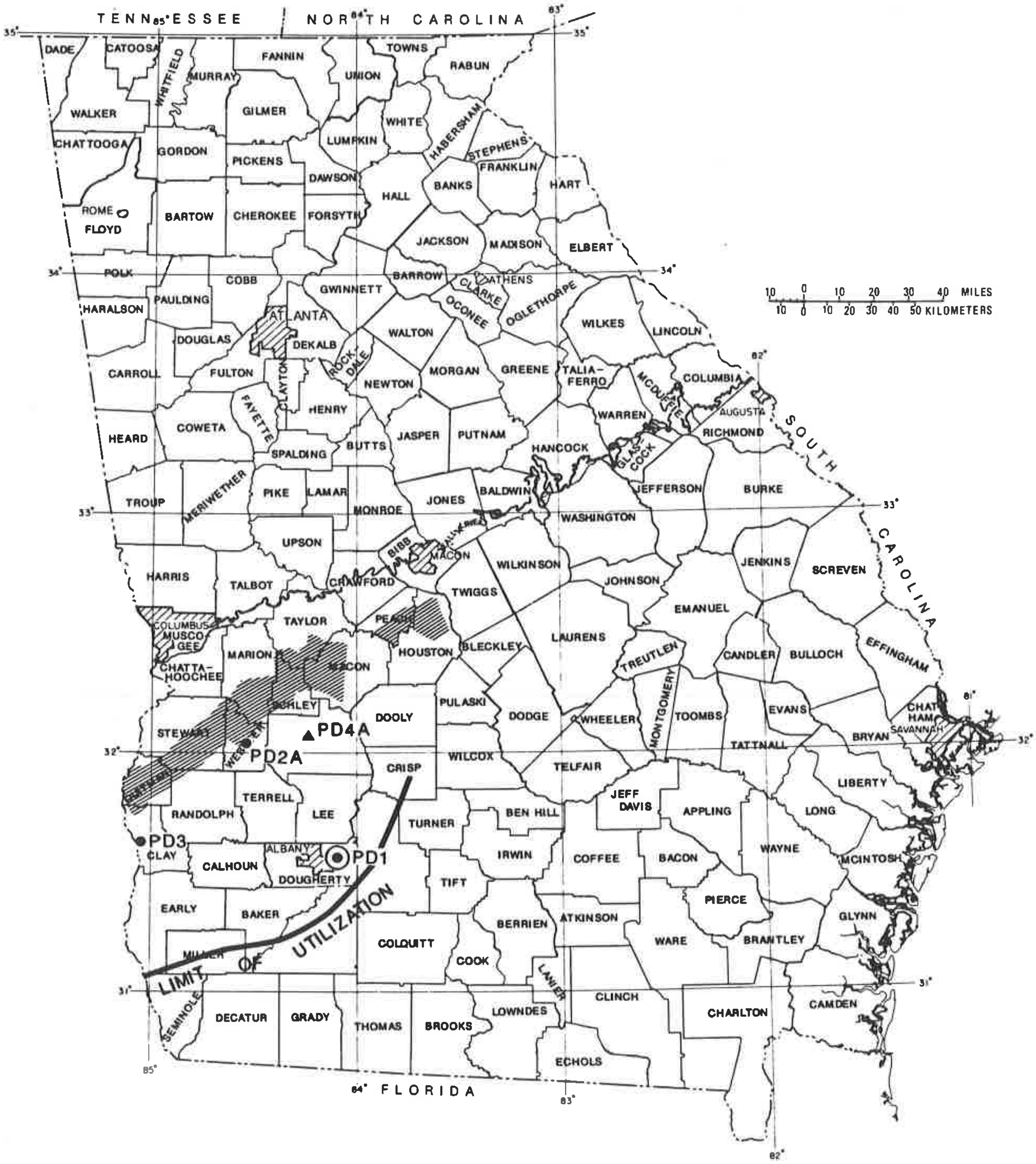
*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

PROVIDENCE AQUIFER SYSTEM

The Providence aquifer system of southwestern Georgia consists of sand and coquina limestone of the upper Cretaceous Providence Formation. Outcrops of the aquifer system extend from northern Clay and Quitman Counties through eastern Houston County. In its updip extent, the aquifer system thickens both to the east and to the west of a broad area of less-than-100-feet-thickness adjacent to the Flint River. Centers of greater-than-300-feet-thickness are known in Pulaski County and projected in the Baker-Calhoun-Early Counties area (Clarke and others, 1983).

Recharge from rainfall infiltration takes place in outcrop areas and, east of the Flint River, in adjacent covered areas where the aquifer is overlain by permeable sand units. The permeable Providence Formation-Clayton Formation interval forms a single aquifer east of the Flint River (Clarke and others, 1983) that is recognized as the Dublin aquifer system to the east of the Ocmulgee River (Clarke and others, 1985). The Chattahoochee River forms the western discharge boundary for this flow system in Georgia.

Water quality in the Providence aquifer system was monitored in one outcrop-area well and, where the system is confined, in two updip-area wells and one downdip-area well (Figure 3-2 and Table 3-5). Each well was sampled once. Water from the updip wells was slightly acidic and soft in the outcrop- area well and basic and soft to moderately hard in the confined-area wells. Sodium concentrations in water from two of the wells were too high for general irrigation use. Iron and manganese levels in water from all three updip wells were below drinking-water maximums. Water was basic and soft with an iron concentration that exceeded the drinking-water limit in the one downdip-area well. Calcium, magnesium, potassium, and strontium were the only other metallic cations that were commonly detected. Chloride and sulfate concentrations were low in all samples, less that 12 parts per million. Nitrite/nitrate, in trace amounts, was present in water from two of the updip wells.



○ Iron concentration exceeds Drinking-Water Limit

● Soft Water

▲ Moderately hard water

▨ General recharge area (from Davis et. al., 1988)

Figure 3-2. - Water quality of the Providence aquifer system

Table 3-5. - Summary of ground-water quality analyses, Providence aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 4 ANALYSES			1985 - 1986 9 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	6.5	7.7	8.8	5.7	7.7	9.1
CALCIUM Ca (ppm)	6.0	13.4	32.1	5.5	13.7	38.5
MAGNESIUM Mg (ppm)	0.5	1.1	1.9	0.5	1.1	2.2
SODIUM Na (ppm)	1.6	38.8	76.2	1.3	46.2	85.3
POTASSIUM K (ppm)	0.8	1.6	2.4	0.9	1.6	2.9
IRON Fe (ppb)	12	507	1870	15	179	835
MANGANESE Mn (ppb)	<10	<10	18	<10	<10	26
CHLORIDE Cl (ppm)	2.1	5.0	10.8	1.5	5.8	12.0
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	0.11	0.39	<0.02	0.16	0.76
SULFATE SO_4 (ppm)	<2	6	12	<2	7	15

*ppm= parts per million,
ppmN = parts per million as nitrogen,
ppb= parts per billion

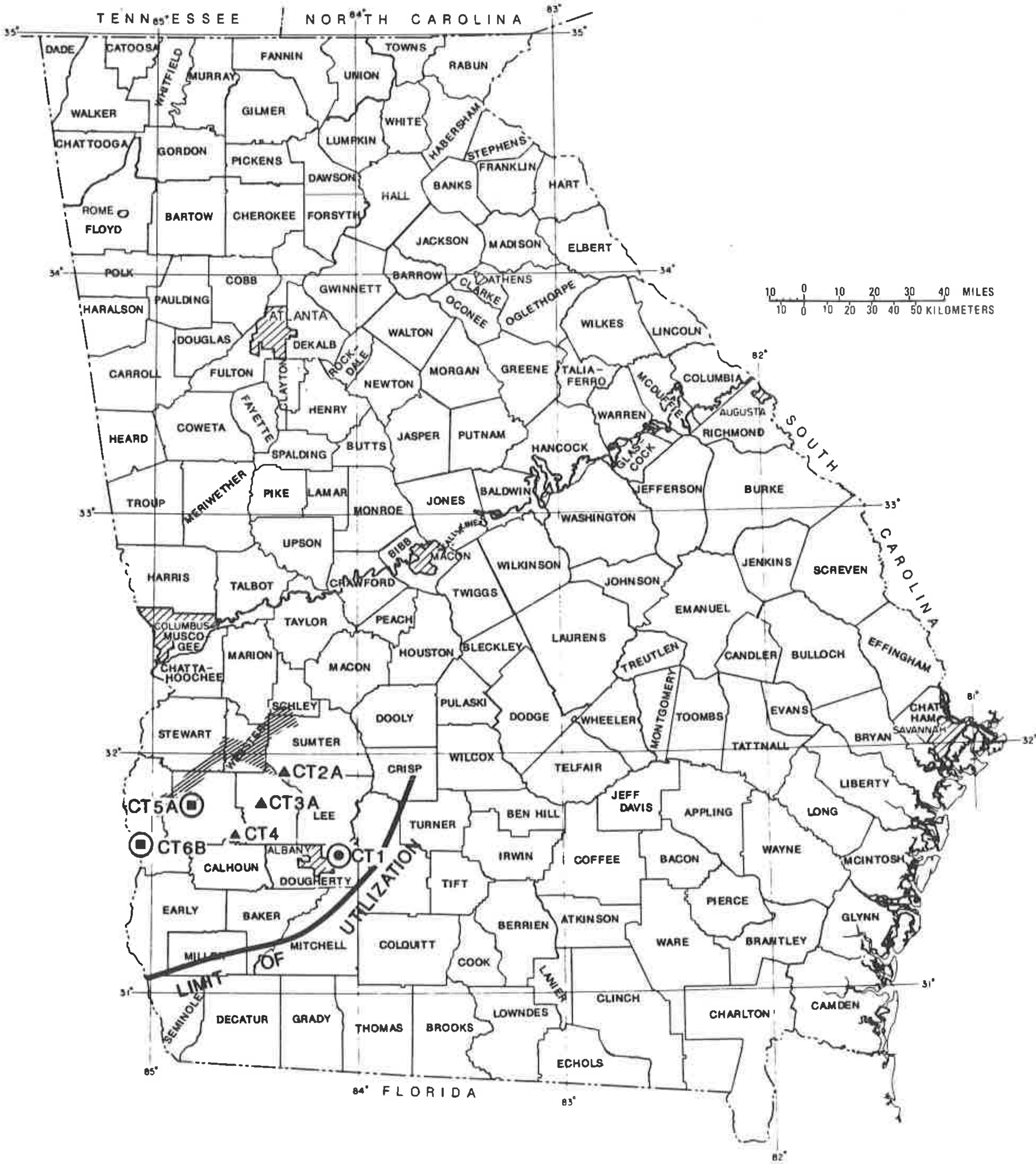
CLAYTON AQUIFER SYSTEM

The Clayton aquifer system of southwestern Georgia is developed in the middle limestone unit of the Paleocene Clayton Formation. Limestones and calcareous sands of the Clayton aquifer system crop out in a narrow belt extending from northeastern Clay County to southwestern Schley County. The aquifer thickness varies irrregularly, ranging from 50 feet near outcrop areas to 265 feet in southeastern Mitchell County (Clarke and others, 1984).

The Clayton aquifer system is recharged by rainfall infiltration in outcrop areas. Leakage from the underlying Providence aquifer system and the overlying Wilcox confining zone is significant in downdip areas (Clarke and others, 1984). Both the Flint River, to the east, and the Chattahoochee River, to the west, are areas of discharge for the aquifer system in its updip extent. East of the Ocmulgee River, the Clayton Formation and Providence Formation merge to form the Dublin aquifer system (Clarke and others, 1985).

Six wells, each sampled once in 1987, were used to monitor water quality of the Clayton aquifer system (Figure 3-3 and Table 3-6). These wells were located in the updip confined areas and in a downdip area. All water samples were basic and non-corrosive. The water was moderately hard to hard in the updip areas. Iron and manganese concentrations exceeded drinking-water limits in two of the samples. Barium, strontium, and zinc were the only other common metallic cations besides the major alkali metals. The water was soft with iron and manganese levels that were too high for domestic water uses in the one downdip-area well.

Chloride content was uniformly low in all samples. The levels of sulfate varied between 10 and 70 parts per million. Nitrite/nitrate concentrations were below detection limits in all samples. Excluding the Clay County well which was sampled for the Monitoring Network for the first time in 1987, the average concentrations of ions in water of the Clayton aquifer system have remained relatively constant for the period 1985 through 1987.



○ Iron and/or manganese concentrations exceed Drinking-Water Limits

● Soft water

▲ Moderately hard water

■ Hard water

General recharge area (from Davis et. al., 1988)

Figure 3-3. - Water quality of the Clayton aquifer system

Table 3-6. - Summary of ground-water quality analyses, Clayton aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 6 ANALYSES			1985 - 1986 12 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	7.3	7.6	7.8	7.4	7.8	8.2
CALCIUM Ca (ppm)	10.0	48.4	126.1	10.2	36.9	52.9
MAGNESIUM Mg (ppm)	3.1	3.6	4.8	1.1	3.5	5.1
SODIUM Na (ppm)	1.7	12.3	34.3	1.5	10.4	39.2
POTASSIUM K (ppm)	1.1	2.1	3.1	0.7	1.7	3.1
IRON Fe (ppb)	21	2660	14,400	29	327	1010
MANGANESE Mn (ppb)	<10	84	460	<10	<10	30
CHLORIDE Cl (ppm)	2.6	4.3	8.8	1.5	2.3	3.1
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SULFATE SO_4 (ppm)	10	22	70	8	12	19

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

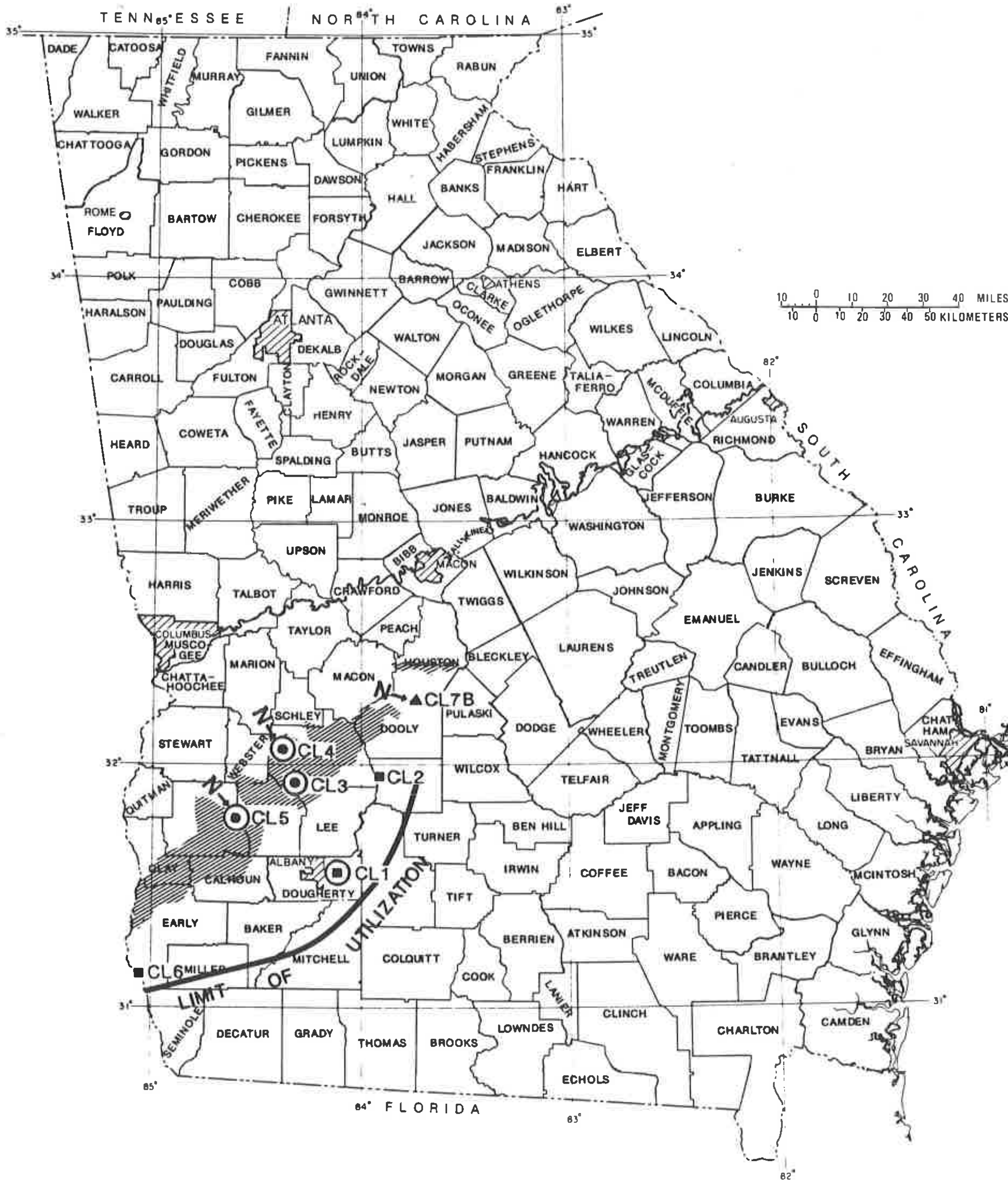
CLAIBORNE AQUIFER SYSTEM

The Claiborne aquifer system of southwestern Georgia consists primarily of sands of the middle Eocene Claiborne Group. The Claiborne aquifer system is generally restricted to the Tallahatta Formation in downdip areas where the Claiborne Group can be divided into an overlying Lisbon Formation and an underlying Tallahatta Formation, (McFadden and Perriello, 1983). Claiborne Group sands crop out in a belt extending from northern Early County through western Dooly County. The aquifer generally thickens from the outcrop area towards the southeast, attaining a thickness of almost 300 feet in eastern Dougherty County.

Recharge to the Claiborne aquifer system originates as rainfall infiltration in the outcrop area. Limited recharge may be derived in the vicinity of Albany in Dougherty County by leakage from the overlying Floridan aquifer system (Hicks and others, 1981). Surface drainages mark significant discharge boundaries of the aquifer system; to the east, the Ocmulgee River, and to the west, the Chattahoochee River. East of the Ocmulgee River, the permeable Tallahatta unit is included in the Gordon aquifer system (Brooks and others, 1985).

Ground-water samples were collected from seven Claiborne aquifer system wells during 1987 (Figure 3-4 and Table 3-7). Three of the wells were located in outcrop areas and the remaining four were located in downdip areas where the aquifer is confined. Water from wells in the outcrop areas was acidic to the point of being corrosive and soft. Iron or manganese concentra- tions exceeded drinking-water limits. Wells yielded water that was basic and moderately hard to hard in the downdip areas. The concentra- tion of iron was higher than the drinking-water limit only in water from one of the four downdip wells. No other metal cations exceeded drinking-water limits, although aluminium, barium, copper, yttrium, and zinc were commonly detected in addition to the major alkali metals.

Chloride and sulfate concentrations in the Claiborne aquifer water samples were uniformly low. Further downdip, in Thomas County, water in the Claiborne aquifer system is highly mineralized (Sever, 1966). Nitrite/nitrate levels ranged between 1.42 to 6.75 parts per million in water from two outcrop-area wells and one downdip-area well. These concentrations were reduced slightly from the levels monitored in 1986.



○ Manganese concentrations exceed Drinking-Water Limit

N Nitrite/nitrate concentrations exceed 0.45 parts per million

● Soft water

▲ Moderately hard water

■ Hard water

▨ General recharge area (from Davis et. al., 1988)

Figure 3-4. - Water quality of the Claiborne aquifer system

Table 3-7. - Summary of ground-water quality analyses, Claiborne aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 7 ANALYSES			ANALYTICAL RESULTS 1985 - 1986 16 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	4.3	6.4	8.0	4.2	6.6	7.8
CALCIUM Ca (ppm)	1.3	26.5	54.8	1.4	28.9	51.7
MAGNESIUM Mg (ppm)	0.3	3.4	8.6	0.3	3.9	8.6
SODIUM Na (ppm)	1.3	5.7	18.4	1.2	6.1	19.0
POTASSIUM K (ppm)	<0.5	1.8	3.6	<0.5	1.7	3.3
IRON Fe (ppb)	28	259	730	<10	316	875
MANGANESE Mn (ppb)	<10	79	460	<10	60	375
CHLORIDE Cl (ppm)	3.1	6.5	15.5	1.8	5.2	11.7
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	1.63	6.75	<0.02	1.10	6.80
SULFATE SO_4 (ppm)	<2	3	8	<2	4	21

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

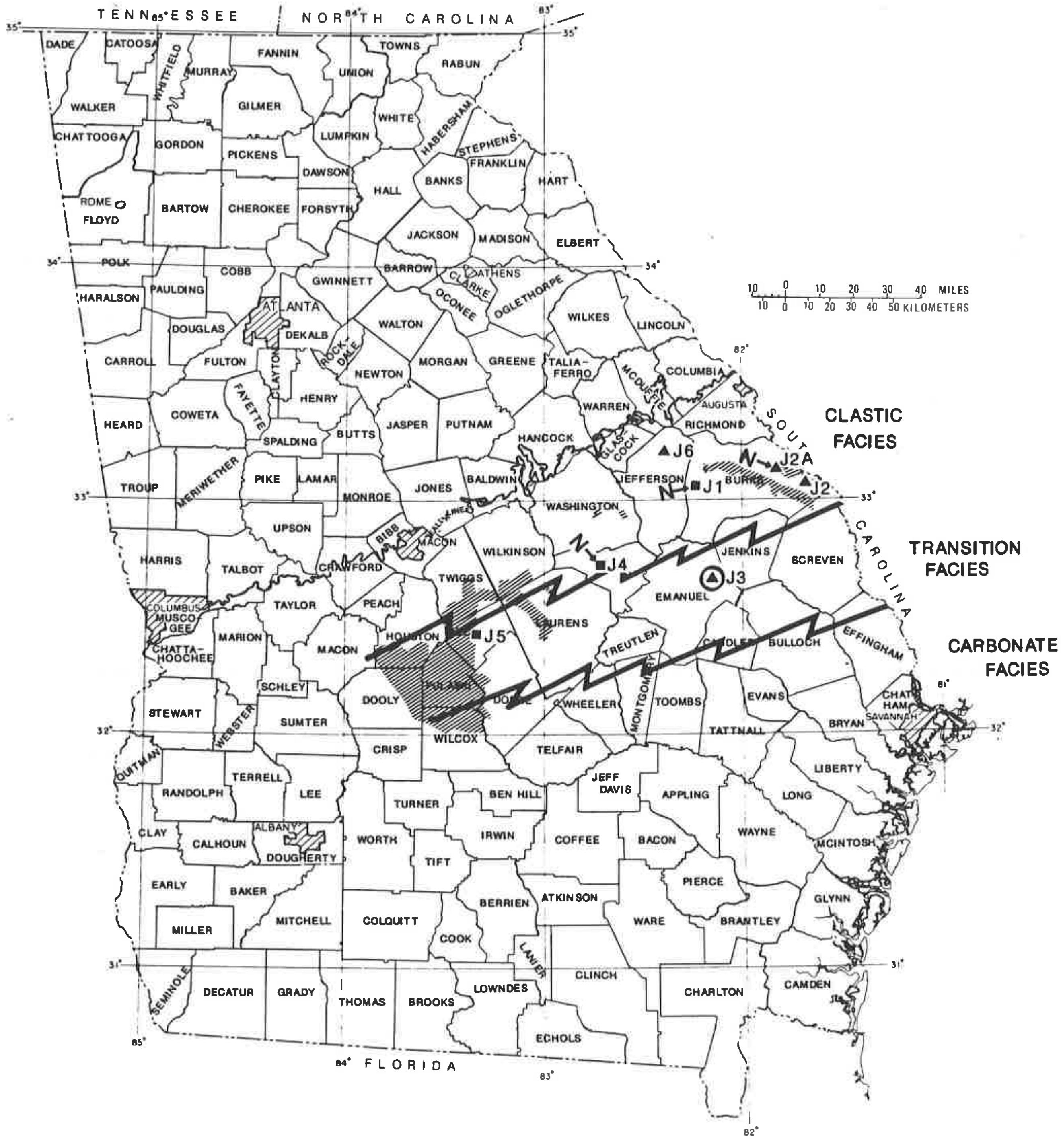
JACKSONIAN AQUIFER SYSTEM

The Jacksonian aquifer system of central and east-central Georgia is developed in sands of the Eocene Barnwell Group. Outcrops of sand and clay of the Barnwell Group extend from Macon and Peach Counties eastward to Burke and Richmond Counties. Aquifer sands of a northern clastic facies grade southward into less permeable silts and clays of a transition facies (Vincent, 1982). The water-bearing sands are relatively thin, generally ranging from ten to fifty feet in thickness. Limestones of a southern carbonate facies are included in the Floridan aquifer system.

Recharge to the Jacksonian aquifer system originates as rainfall infiltration where the sands crop out. Water availability is restricted to outcrop and adjacent areas. The Savannah River, to the east, and the Ocmulgee River, to the west, are discharge boundaries for the updip flow system.

Water quality in the Jacksonian aquifer system was monitored in five wells of the clastic facies and two wells of the transition facies. Three clastic-facies wells were sampled twice in 1987. Water from the aquifer system was generally basic and moderately hard to hard. Iron levels in all samples were below the maximum limits for drinking water. Manganese exceeded the limit only in water from one transition-facies well. The major alkali metals and barium, strontium, and zinc were the only other metallic cations commonly detected.

Chloride and sulfate levels were less than 15 parts per million in all samples. Nitrite/nitrate concentrations were higher, 0.50 to 3.70 parts per million, in water from two of the Burke County wells and the Johnson County well than in water from the other wells. Nitrite/nitrate levels have apparently increased through recent years in the two wells with a previous record of water quality.



- O Manganese concentration exceeds Drinking-Water Limit
- N Nitrite/nitrate concentrations exceed 0.45 parts per million
- ▲ Moderately hard water
- ■ Hard water
- (hatched) Significant recharge areas (from Davis et. al., 1988)
- (heavy zigzag line) Facies boundary (from Vincent, 1982)

Figure 3-5. - Water quality of the Jacksonian aquifer system

Table 3-8. - Summary of ground-water quality analyses, Jacksonian aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 10 ANALYSES			ANALYTICAL RESULTS 1984 - 1986 18 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	6.5	7.4	7.9	6.5	7.4	7.8
CALCIUM Ca (ppm)	24.6	45.5	65.3	24.1	44.8	67.4
MAGNESIUM Mg (ppm)	0.9	1.8	6.1	0.9	1.9	6.1
SODIUM Na (ppm)	1.5	3.3	9.7	1.5	3.5	9.7
POTASSIUM K (ppm)	<0.5	0.8	2.1	<0.5	1.0	2.1
IRON Fe (ppb)	<10	88	225	<10	107	285
MANGANESE Mn (ppb)	<10	16	110	<10	19	125
CHLORIDE Cl (ppm)	2.1	4.7	10.4	1.5	5.4	10.0
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	0.79	3.70	<0.02	0.58	2.50
SULFATE SO_4 (ppm)	<2	4	14	<2	4	17

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

FLORIDAN AQUIFER SYSTEM

The Floridan aquifer system, formerly known as the Principal Artesian aquifer system, consists of middle Eocene and Oligocene limestones and dolostones that underlie most of the Coastal Plain Province. Other units are included locally in the aquifer. The aquifer is a major source of ground water for much of its outcrop area and throughout its downdip extent to the south and east. The upper water-bearing units of the Floridan are the Ocala Group and the Suwannee Limestone (Crews and Huddlestun, 1984). These limestones crop out in a karstic area in southwestern Georgia including the Dougherty Plain and adjacent areas along strike to the northeast. Floridan aquifer system carbonates form a single permeable zone in updip areas, but they are separable into two zones in downdip areas (Miller, 1986). From its updip limit, defined in the east by clays of the Barnwell Group, the aquifer thickens to well over 700 feet in coastal Georgia. Ground-water quality and availability are limited by a dense limestone-and-clay facies along the trend of the Gulf Trough (Kellam and Gorday, in press). The Gulf Trough is a linear depositional feature that extends from southwestern Decatur County through central Bulloch County.

Maps of the potentiometric surface of the Floridan aquifer system indicate that the Dougherty Plain overlies a southwestward ground-water flow system, separate in Georgia from the dominant southeastward flow direction. Recharge in the Dougherty Plain is derived as rainfall infiltration in outcrop areas and leakage from extensive surficial aquifers (Hayes and others, 1983). The main body of the aquifer system, to the east, is recharged by leakage from the Jacksonian aquifer system and, adjacent to the Dougherty Plain, by rainfall infiltration in outcrop and shallowly-covered areas. Significant recharge occurs in the Brooks-Echols-Lowndes Counties area where upper confining beds are breached by the Withlacoochee River and numerous sinkholes (Krause, 1979).

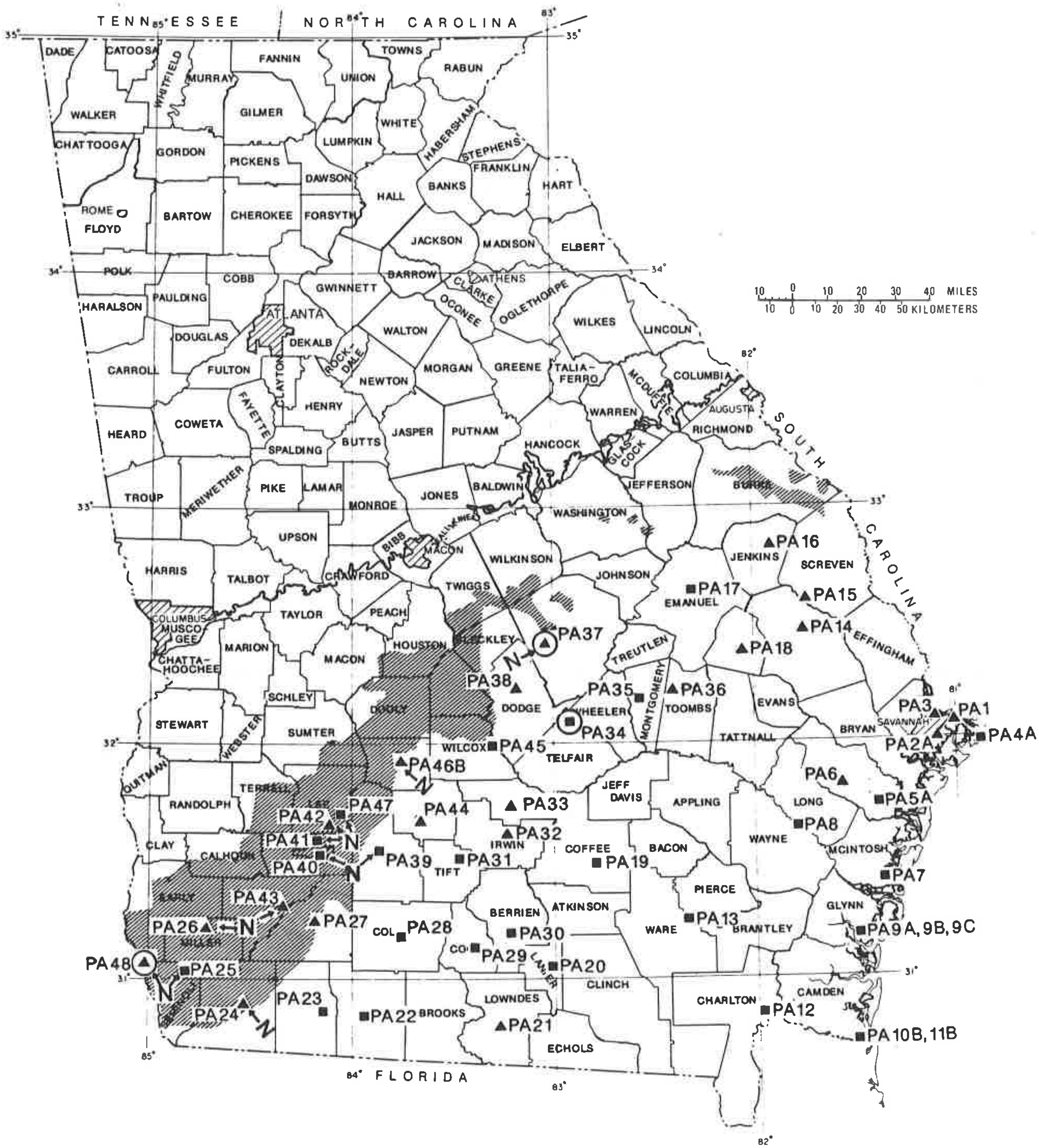
Fifty wells were used to monitor water quality of the Floridan aquifer system (Figure 3-6 and Table 3-9). Water from seventeen wells was sampled twice in 1987. Most of the multiple samples were collected from wells that were located in the Dougherty Plain and in the vicinity of a recharge center in Lowndes County.

All Floridan water samples were non-corrosive, ranging from neutral to basic, and moderately hard to hard. Iron and manganese exceeded drinking-water limits in water from only four wells. Barium, strontium, and zinc, in concentrations below drinking-water limits in all but one well, were the only other metallic cations commonly present other than the major alkali metals.

The average values of chloride and sulfate in the Floridan were slightly increased over those from previous years' monitoring. Typical chloride and sulfate concentrations in the water samples were below 10 parts per million, but chloride levels exceeded 100 parts per million in water from three coastal-area wells. Concentrations of sulfate were greater than 100 parts per million in water from ten wells that also were located primarily in coastal areas.

Average 1987 nitrite/nitrate values were higher in the Floridan than in previous years. Ten of the 12 wells that yielded water with nitrite/nitrate levels greater than 0.45 parts per million were located in the Dougherty Plain. Nitrite/nitrate concentrations were higher than any previously monitored levels in at least one of the 1987 samples from each of seven Dougherty Plain wells.

Traces of volatile organic compounds continued to be detected in water from a shallow well located in Albany, Dougherty County. EPD recently has completed investigations in Albany to attempt to define the extent of this pollution. Drinking-water supplies in Albany have not been impacted.



○ Iron and manganese concentrations exceed Drinking-Water Limits

N Nitrite/nitrate concentrations exceed 0.45 parts per million

▲ Moderately hard water

■ Hard water

▨ General recharge area (from Davis et. al., 1988)

Figure 3-6. - Water quality of the Floridan aquifer system

Table 3-9. - Summary of ground-water quality analyses, Floridan aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 67 ANALYSES			ANALYTICAL RESULTS 1984 - 1986 136 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	7.0	7.7	8.0	7.0	7.7	8.1
CALCIUM Ca (ppm)	22.4	43.9	132.0	22.3	45.7	136.0
MAGNESIUM Mg (ppm)	0.4	10.8	93.0	0.4	12.4	95.3
SODIUM Na (ppm)	1.6	17.8	550.0	1.6	18.9	575.0
POTASSIUM K (ppm)	<0.5	1.4	11.1	<0.5	1.6	9.3
IRON Fe (ppb)	<10	114	3600	<10	60	1470
MANGANESE Mn (ppb)	<10	10	130	<10	<10	100
CHLORIDE Cl (ppm)	1.5	30.4	1092.0	2.0	28.1	1000.0
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	0.78	7.32	<0.02	0.54	7.15
SULFATE SO_4 (ppm)	<2	47	425	<2	45	400

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

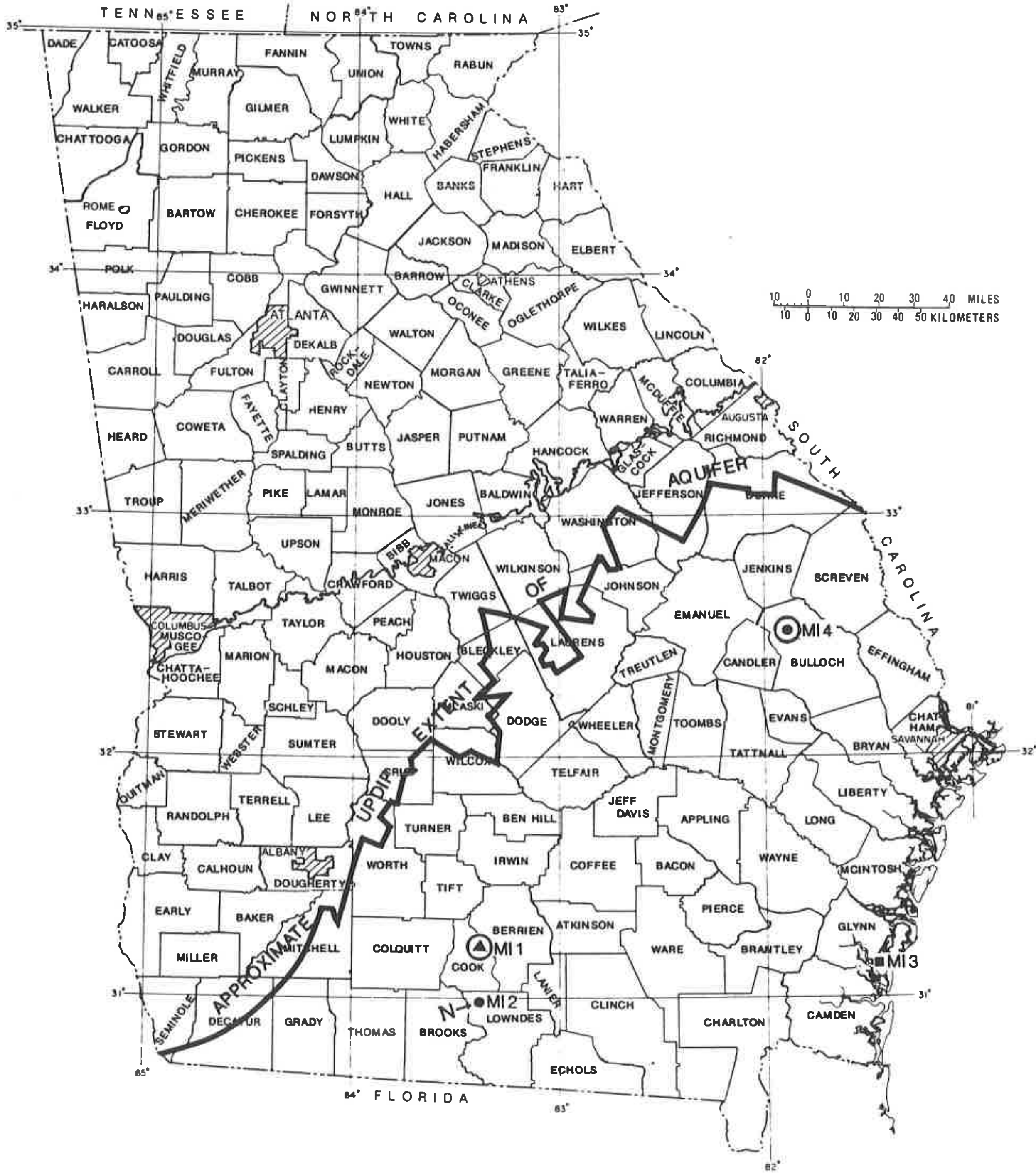
MIOCENE AQUIFER SYSTEM

Much of east-central, central, and southern Georgia lies within outcrop areas of the Miocene Altamaha Formation and Hawthorne Group. Miocene clays and sandy clays are thickest, more than 500 feet, in Wayne County. Discontinuous lens-shaped bodies of sand, 50 to 80 feet thick, are the main permeable units (Watson, 1982). Two principal aquifer units are present in the coastal area (Joiner and others, 1988).

Recharge to the Miocene aquifer system is primarily derived as rainfall infiltration in the outcrop area. Areas of confinement exist along the coast and locally in Grady, Thomas, Brooks, and Lowndes Counties. Leakage from overlying surface aquifers into the Miocene aquifer system and, in some areas, from the underlying Floridan aquifer system is significant in the coastal counties (Watson, 1982).

Four wells, each sampled twice in 1987 were used to monitor water quality of the Miocene aquifer system (Figure 3-7 and Table 3-10). Water from the Lowndes County well was acidic to the point of being corrosive and soft. Iron was a minor constituent. The two other updip wells yielded water that was basic and moderately hard and had iron and manganese levels that exceeded drinking-water limits. Water from the coastal-area well was basic and hard with high concentrations of all major element constituents. Iron and manganese levels were less than maximum drinking-water limits. The major alkali metals and aluminum, barium, strontium, and zinc were the only other metallic cations common to the Miocene aquifer water samples.

Chloride and sulfate concentrations were low, below 50 parts per million, in all samples. Nitrite/nitrate levels were 2.95 and 3.10 parts per million in the two samples of water from the Lowndes County well. Measured values of nitrite/nitrate in water from this well have increased since 1985.



○ Iron and manganese concentrations exceed Drinking Water Limits
N Nitrite/nitrate concentrations exceed 0.45 parts per million
● Soft water
▲ Moderately hard water
■ Hard water

Figure 3-7. - Water quality of the Miocene aquifer system

Table 3-10. - Summary of ground-water quality analyses, Miocene aquifer system

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 8 ANALYSES			1985 - 1986 11 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	5.0	7.0	8.2	4.7	7.0	8.0
CALCIUM Ca (ppm)	1.1	25.9	67.8	1.1	27.1	66.5
MAGNESIUM Mg (ppm)	0.7	7.7	13.6	0.6	8.6	13.9
SODIUM Na (ppm)	5.6	9.7	21.3	2.9	9.6	21.1
POTASSIUM K (ppm)	<0.5	1.6	3.9	<0.5	1.9	4.4
IRON Fe (ppb)	25	491	2010	<10	133	630
MANGANESE Mn (ppb)	<10	40	110	<10	22	105
CHLORIDE Cl (ppm)	2.5	9.4	25.6	2.0	8.6	23.5
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	0.76	3.10	<0.02	0.24	2.20
SULFATE SO_4 (ppm)	<2	15	46	<2	13	44

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

PIEDMONT/BLUE RIDGE UNCONFINED AQUIFERS

Georgia's Piedmont and Blue Ridge Physiographic Provinces are developed on metamorphic and igneous rocks that are predominately Paleozoic. Soil and saprolite horizons and openings along fractures and joints in the rocks are the major water-bearing features. Fracture density and interconnection are the primary controls on the availability of water from wells in these provinces. The permeability and thickness of soils and shallow saprolite horizons determine the amount of discharge that can be sustained. Both high-angle and near-horizontal fractures and joints have been shown to be important controls on yields of wells developed in crystalline rock (Cressler and others, 1983).

Sixteen wells in the Piedmont Province and four wells in the Blue Ridge Province were used to monitor water quality (Figure 3-8 and Tables 3-11/3-12). Water samples were collected twice from four of the Piedmont wells in 1987. All of these wells produced water from fractures in crystalline rock.

Water from Monitoring Network wells in the crystalline rock aquifers was generally non-corrosive and soft to moderately hard. Iron and manganese levels exceeded drinking-water limits in water from ten of the wells. Aluminum, barium, strontium, and zinc were common metallic cations in addition to the major alkali metals.

Chloride and sulfate concentrations were below 30 parts per million in all samples. Nitrite/nitrate was detected in water from 18 of the wells. Seven of these wells yielded water with nitrite/nitrate levels between 0.75 and 3.20 parts per million. The nitrite/nitrate concentrations monitored in 1987 were in ranges established by earlier analyses for most of the wells with a previous record of water quality.

Traces of volatile organic compounds were detected in samples from wells in Fulton and Rockdale Counties. Traces of a phthalate compound were present in the Fulton County water samples. These analyses indicate a continuing occurrence documented by the Monitoring Network in previous years. Current drinking-water supplies are not compromised in either area.

○ Iron and manganese concentrations exceed Drinking-Water Limits
N Nitrite/nitrate concentrations exceed 0.45 parts per million
● Soft water
▲ Moderately hard water

Figure 3-8. - Water quality of the Piedmont/Blue Ridge unconfined aquifers

Table 3-11. - Summary of ground-water quality analyses, Piedmont unconfined aquifers

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 20 ANALYSES			1984 - 1986 41 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	5.5	6.8	7.8	4.8	6.6	8.2
CALCIUM Ca (ppm)	0.2	12.9	26.8	0.2	15.4	64.3
MAGNESIUM Mg (ppm)	0.2	3.0	8.1	0.2	3.4	11.5
SODIUM Na (ppm)	1.4	9.3	24.3	0.9	11.2	59.3
POTASSIUM K (ppm)	1.6	2.6	4.9	1.1	2.3	4.7
IRON Fe (ppb)	<10	993	10,900	<10	1081	6670
MANGANESE Mn (ppb)	<10	141	1030	<10	56	1310
CHLORIDE Cl (ppm)	2.1	7.7	29.4	<0.1	6.9	50.0
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	0.52	3.20	<0.02	0.44	3.65
SULFATE SO_4 (ppm)	<2	9	29	<2	20	280

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

Table 3-12. - Summary of ground-water quality analyses, Blue Ridge unconfined aquifers

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 4 ANALYSES			ANALYTICAL RESULTS 1984 - 1986 7 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	6.1	6.7	7.8	5.9	6.7	7.8
CALCIUM Ca (ppm)	2.9	10.4	23.1	3.3	11.9	23.8
MAGNESIUM Mg (ppm)	1.3	1.8	2.4	1.3	2.1	2.5
SODIUM Na (ppm)	2.4	6.3	12.6	2.1	6.9	12.8
POTASSIUM K (ppm)	1.7	2.2	2.8	1.5	2.1	2.5
IRON Fe (ppb)	<10	88	295	<10	876	4950
MANGANESE Mn (ppb)	<10	35	120	<10	37	105
CHLORIDE Cl (ppm)	3.1	5.2	9.3	1.0	2.7	3.9
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	0.04	0.94	1.92	<0.02	0.56	1.86
SULFATE SO_4 (ppm)	<2	6	19	<1	7	14

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

VALLEY AND RIDGE UNCONFINED AQUIFERS

Low-yield unconfined aquifers are present in soils and regolith across most of the Valley and Ridge Province of northwestern Georgia. Higher yielding wells and springs, suitable for municipal supplies, generally are restricted to valley bottoms where dolostones and limestones crop out. Most large ground-water withdrawals are derived from dolostones and limestones of the Cambro-Ordovician Knox Group.

Water quality in the Valley and Ridge unconfined aquifers was monitored in six wells and three springs located throughout the Province (Figure 3-9 and Table 3-13). Four of these wells and all three springs produced water from Knox Group carbonates. The other wells represent water quality in the Ordovician Chickamauga Group of Walker County and the Cambrian Shady Dolomite of Bartow County. Water from the Cambro-Ordovician dolostones and limestones was typically basic and hard. The two wells in northernmost Walker County yielded water that was relatively mineralized. Iron and manganese concentrations did not exceed drinking-water limits in most water samples. The major alkali metals and aluminum, barium, and strontium were common metallic cations.

Chloride and sulfate concentrations were typically low. Levels were higher in the north Walker County area with up to 83 parts per million sulfate and 53 parts per million chloride present. Nitrite/nitrate was detected in water from eight of the monitoring stations at levels from 0.38 to 6.50 parts per million. The nitrite/nitrate levels measured in 1987 were generally the highest recorded in water samples from these stations since monitoring began in 1985.

N Nitrite/nitrate concentrations exceed 0.45 parts per million

▲ Moderately hard water

■ Hard water

Figure 3-9. - Water quality of the Valley and Ridge unconfined aquifers

Table 3-13. - Summary of ground-water quality analyses, Valley and Ridge unconfined aquifers

CONSTITUENT OR PHYSICAL PROPERTY*	ANALYTICAL RESULTS 1987 11 ANALYSES			1985 - 1986 22 ANALYSES		
	MINIMUM	MEAN	MAXIMUM	MINIMUM	MEAN	MAXIMUM
LABORATORY pH (standard units)	6.7	7.6	8.0	7.0	7.6	7.9
CALCIUM Ca (ppm)	23.9	41.7	70.9	22.1	44.3	78.5
MAGNESIUM Mg (ppm)	3.5	14.9	24.6	3.2	15.0	30.0
SODIUM Na (ppm)	0.8	8.9	33.6	0.7	10.7	50.1
POTASSIUM K (ppm)	<0.5	0.8	3.7	<0.5	0.8	3.7
IRON Fe (ppb)	<10	15	62	<10	38	415
MANGANESE Mn (ppb)	<10	9	66	<10	11	62
CHLORIDE Cl (ppm)	2.0	14.7	60.4	1.0	21.1	124.8
NITRITE & NITRATE NO_2 & NO_3 (ppmN)	<0.02	1.27	6.50	<0.02	0.82	3.35
SULFATE SO_4 (ppm)	<2	15	83	<2	10	62

*ppm = parts per million,
ppmN = parts per million as nitrogen,
ppb = parts per billion

SUMMARY AND CONCLUSIONS

Ground-water quality was monitored in 123 wells and three springs during 1987 and compared to previous annual analyses beginning in 1984 (Table 4-1). Water is sampled from the seven major aquifer systems of the Georgia Coastal Plain Province and the unconfined aquifer systems of the State's Piedmont, Blue Ridge, and Valley and Ridge Provinces.

Water quality in many of the monitoring wells of south Georgia is representative of the water quality over large areas because Coastal Plain aquifer systems are laterally extensive and generally have only gradational facies changes. Ground-water flow systems in north Georgia are relatively small, usually constrained by the topography of surface drainage basins. Analyses of water from north Georgia wells represent the ranges of water-quality parameters that typically occur in the region.

Limited rainfall in many areas of the State during 1987 provided a temporary break in an extended drought. Iron and aluminum concentrations in ground water were commonly higher than those that were previously monitored from wells of the outcrop areas of south Georgia aquifer systems and most of north Georgia in response to the periodic recharge (Table 4-3A/C). Increased concentrations of nitrite/nitrates were monitored throughout most of the Dougherty Plain flow system of the Floridan aquifer system and in the Valley and Ridge unconfined aquifers. Both of these areas are characterized by sinkholes at the land surface and are underlain by shallow carbonate aquifers (Table 4-2). Although the sources of these nitrite/nitrates have not been established, it should be noted that karst settings are typically the most susceptible to pollution from common land-use practices. Continued increases in nitrite/nitrate levels in these areas, if they occur, could warn of similar trends to follow in the other aquifers of the State.

Nitrite/nitrate concentrations in all samples collected during 1987 were below the maximum limits established as State drinking-water standards.

No new occurrences of pollution due to synthetic organic chemicals were detected in wells of the Ground-Water Monitoring Network. Continued traces of pollutants in water from one well each in Dougherty, Fulton, and Rockdale Counties apparently reflect only local conditions that do not characterize the general ground-water quality.

Table 4-1. - Average value of indicator parameters (parts per million) 1984-1987

Parameter / Aquifer	1984 # Analyses	1984 Value	1985 # Analyses	1985 Value	1986 # Analyses	1986 Value	1987 # Analyses	1987 Value
Nitrite/nitrate								
Cretaceous	12	0.27	14	0.21	27	0.18	25	0.19
Providence	*	---	4	0.19	5	0.13	4	0.11
Clayton	*	---	1	<0.02	11	<0.02	6	<0.02
Claiborne	*	---	2	0.58	14	1.17	7	1.63
Jacksonian	3	0.70	6	0.51	9	0.58	10	0.79
Floridan	11	0.02	61	0.45	64	0.73	69	0.78
Miocene	*	---	5	0.09	6	0.37	8	0.76
Piedmont	11	0.41	10	0.44	20	0.45	20	0.52
Blue Ridge	3	0.52	*	---	4	0.58	4	0.94
Val. & Ridge	*	---	11	0.84	11	0.79	11	1.27
Chloride								
Cretaceous	12	1.7	14	3.4	27	4.9	25	3.4
Providence	*	---	4	4.6	5	6.7	4	5.0
Clayton	*	---	1	1.5	11	2.4	6	4.4
Claiborne	*	---	2	6.8	14	5.0	7	6.6
Jacksonian	3	4.6	6	5.2	9	5.8	10	4.6
Floridan	11	10.1	61	19.4	64	39.4	69	30.4
Miocene	*	---	5	8.1	6	9.0	8	9.4
Piedmont	11	4.4	10	12.3	20	5.5	20	7.6
Blue Ridge	3	2.4	*	---	4	2.9	4	5.0
Val. & Ridge	*	---	11	25.8	11	16.4	11	14.7
Sulfate								
Cretaceous	12	1	14	2	27	3	25	4
Providence	*	---	4	7	5	7	4	6
Clayton	*	---	1	13	11	12	6	22
Claiborne	*	---	2	2	14	4	7	3
Jacksonian	3	2	6	3	9	5	10	4
Floridan	11	29	61	48	64	44	69	47
Miocene	*	---	5	10	6	16	8	15
Piedmont	11	55	10	8	20	8	20	9
Blue Ridge	3	6	*	---	4	8	4	6
Val. & Ridge	*	---	11	9	11	11	11	15

*No samples collected

Table 4-2. - Nitrite/nitrate concentrations in all samples from monitoring stations that have yielded water with concentrations greater than 0.45 parts per million

	1984	1985	1986	1987
BR2A	----	----	----	1.41
BR4	1.32	----	1.86	1.92
CL4	----	1.15	3.42	3.10
CL5	----	----	5.86/6.80	6.75
CL7B	----	----	----	1.42
J1	2.02	2.46	2.50/1.92	3.70/2.50
J2A	----	----	----	0.50
J4	----	0.51	0.20/0.59	0.51/0.62
K1	0.63	----	0.22	0.25
K5	0.25	0.29/0.29	0.22/0.12	0.53/U
K6	----	0.45	0.54	0.06
K10	0.94	0.92	1.10	1.07/1.10
MI2	----	U/0.42	2.20	2.95/3.10
PA21	----	1.38/U	U/U	U/U
PA24	----	U/1.19	1.08	1.43/1.30
PA25	----	0.99/1.31/1.24	1.38	1.41/1.37
PA26	----	1.08/1.41/1.26	1.46	1.53/1.66
PA27	----	1.09/0.40	0.30/0.30	0.33/0.32
PA35	----	U	2.45	0.02
PA36	----	U	4.20	0.02
PA37	----	----	1.53	5.25
PA39	----	0.83/0.05	0.03	0.02/0.80
PA40	----	U/1.06	1.32/1.05	1.31/1.24
PA41	----	2.08	1.62/3.40/3.83	2.20/6.86
PA42	----	2.60	3.15/3.08	2.90/3.50
PA43	----	1.12/1.29	1.20/1.47	1.51/1.66
PA46B	----	----	1.20	1.07
PA47A	----	----	3.75	1.95/7.32
PA47B	----	----	7.15	----
PA48	----	1.68	1.12	2.20/1.84
P2	1.04	1.20/1.25	1.23/1.08	1.77/1.19
P4A	0.95/0.90	----	----	----
P4B	----	----	0.39	0.75/0.39
P11	0.66	----	0.61	0.80
P12	----	1.05	3.65	3.20
P14	----	0.42	0.52	0.44
P15A	0.46	----	----	----
P16A	----	----	----	1.13
PD2A	----	0.76	0.64	----
VR1	----	0.50	0.52 2	0.73
VR2	----	0.49/0.77	0.39/0.81	0.56/1.07
VR3	----	0.67/0.75	0.61/0.65	0.94/0.73
VR5	----	3.30	3.35	6.50
VR6	----	0.65	0.68	0.94
VR8	----	0.63	0.61	0.89
VR9	----	1.04	0.82	1.19

U = Below detection limit of 0.02 parts per million

Table 4-3A. - Contaminants and pollutants detected by the Ground-Water Monitoring Network for south-central and south-eastern Georgia

Well ID (Date)	Contaminants Above Drinking Water Limits			Organic Pollutants
GWN-J3	Manganese =	110	ug/L	
GWN-K2				Chloroform = 1.6 ug/L
GWN-K3	Iron =	595	ug/L	
GWN-K4	Iron =	3800	ug/L	
	Manganese =	165	ug/L	
GWN-K8	Iron =	4580	ug/L	
	Manganese =	54	ug/L	
GWN-K9	Iron =	1880	ug/L	
GWN-K16 (6/24/87)	Iron =	360	ug/L	
GWN-MI1 (2/19/87)	Iron =	2010	ug/L	
	Manganese =	58	ug/L	
GWN-MI1 (7/28/87)	Iron =	375	ug/L	
GWN-MI4 (1/27/87)	Iron =	545	ug/L	
	Manganese =	100	ug/L	
GWN-MI4 (5/26/87)	Iron =	750	ug/L	
	Manganese =	110	ug/L	
GWN-PA9B	Chloride =	267.5	mg/L	
	Sulfate =	358.2	mg/L	
GWN-PA9C	Iron =	380	ug/L	
	Chloride =	1092.0	mg/L	
	Sulfate =	425.4	mg/L	
GWN-PA10B	Sulfate =	290.9	mg/L	
GWN-PA11B	Sulfate =	290.9	mg/L	
GWN-PA33	Barium =	2090	ug/L	
GWN-PA34	Manganese =	97	ug/L	
GWN-PA37	Iron =	915	ug/L	

Table 4-3B. - Contaminants and pollutants detected by the Ground-Water Monitoring Network for southwestern Georgia

Well ID (Date)	Contaminants Above Drinking Water Limits	Organic Pollutants
GWN-CL1	Iron = 570 ug/L	
GWN-CL3	Iron = 730 ug/L	
GWN-CL4	Manganese = 61 ug/L	
GWN-CL5	Manganese = 460 ug/L	
GWN-CT1	Iron = 980 ug/L	
GWN-CT5A	Iron = 365 ug/L	
GWN-CT6B	Iron = 14400 ug/L	
	Manganese = 460 ug/L	
GWN-K18		Chlorodibromomethane = 1.9 ug/L
		Chloroform = 9.8 ug/L
		Dichlorobromomethane = 4.2 ug/L
GWN-PA41 (3/18/87)		Tetrachloroethylene = 3.7 ug/L
		1,2-Trans-dichloroethylene = 1.3 ug/L
GWN-PA41 (10/28/87)		Tetrachloroethylene = 2.3 ug/L
		Toluene = 2.0 ug/L
		Xylene = 2.0 ug/L
GWN-PA48 (3/18/87)	Iron = 3600 ug/L	
	Manganese = 130 ug/L	
GWN-PA48 (11/18/87)	Iron = 605 ug/L	
GWN-PD1	Iron = 1870 ug/L	

Table 4-3C. - Contaminants and pollutants detected by the Ground-Water Monitoring Network for northern Georgia

Well ID (Date)	Contaminants Above Drinking Water Limits			Organic Pollutants
GWN-BR3	Manganese =	120	ug/L	
GWN-P1	Iron =	1590	ug/L	
	Manganese =	120	ug/L	
GWN-P3 (4/28/87)	Iron =	780	ug/L	
GWN-P3 (10/5/87)	Iron =	520	ug/L	Bis (2-Ethyl Hexyl) Phthalate = 11 ug/L 1,2-Dichloropropane = 1.5 ug/L
GWN-P4B (4/21/87)	Manganese =	1030	ug/L	
GWN-P4B (9/22/87)	Iron =	1620	ug/L	
	Manganese =	875	ug/L	
GWN-P6A	Manganese =	88	ug/L	
GWN-P9	Iron =	1020	ug/L	
	Manganese =	155	ug/L	
GWN-P10	Iron =	10900	ug/L	
	Manganese =	65	ug/L	
GWN-P13	Iron =	1440	ug/L	Tetrachloroethylene = 10 ug/L
	Manganese =	82	ug/L	
GWN-P15A (4/27/87)	Iron =	430	ug/L	
	Manganese =	88	ug/L	
GWN-P15A (9/23/87)	Iron =	520	ug/L	
	Manganese =	95	ug/L	
GWN-P16A	Iron =	555	ug/L	
	Manganese =	83	ug/L	
GWN-VR2 (8/5/87)	Manganese =	66	ug/L	

REFERENCES CITED

Brooks, R., Clarke, J.S., and Faye, R.E., 1985, Hydrogeology of the Gordon Aquifer System of East-Central Georgia: Georgia Geologic Survey Information Circular 75, 41 p.

Carter, R.F., and Stiles, H.R., 1983, Average Rainfall and Runoff in Georgia, 1941-1970: Georgia Geologic Survey Hydrologic Atlas 9, 1 pl.

Clarke, J.S., Brooks, R., and Faye, R.E., 1985, Hydrogeology of the Dublin and Midville Aquifer Systems of East-Central Georgia: Georgia Geologic Survey Information Circular 74, 62 p.

Clarke, J.S., Faye, R.E., and Brooks, R., 1983, Hydrogeology of the Providence Aquifer of Southwest Georgia: Georgia Geologic Survey Hydrologic Atlas 11, 5 pl.

Clarke, J.S., Faye, R.E., and Brooks, R., 1984, Hydrogeology of the Clayton Aquifer of Southwest Georgia: Georgia Geologic Survey Hydrologic Atlas 13, 6 pl.

Clarke, J.S., and Pierce, R.R., 1985, National Water Summary 1984: United States Geological Survey Water-Supply Paper 2275, pp. 179-184.

Cressler, C.W., Thurmond, C.J., and Hester, W.G., 1983, Ground Water in the Greater Atlanta Region, Georgia: Georgia Geologic Survey Information Circular 63, 144 p.

Crews, P.A., and Huddlestun, P.F., 1984, Geologic Sections of the Principal Artesian Aquifer System, in Arora, R., editor, Hydrogeologic Evaluation for Underground Injection Control in the Coastal Plain of Georgia: Georgia Geologic Survey Hydrologic Atlas 10, 41 pl.

Davis, K.R., Donahue, J.C., Hutcheson, R.H., and Waldrop, D.L., 1988, Most Significant Ground-Water Recharge Areas of Georgia: Georgia Geologic Survey Hydrologic Atlas 18, 1 pl., in press.

Environmental Protection Division, 1983, Rules for Safe Drinking Water, Chapter 391-3-5, Revised August 1983, Georgia Department of Natural Resources, 67 p.

Hayes, L.R., Maslia, M.L., and Meeks, W.C., 1983, Hydrology and Model Evaluation of the Principal Artesian Aquifer, Dougherty Plain, Southwest Georgia: Georgia Geologic Survey Bulletin 97, 93 p.

Hicks, D.W., Krause, R.E., and Clarke, J.S., 1981, Geohydrology of the Albany Area, Georgia: Georgia Geologic Survey Information Circular 57, 31 p.

Joiner, C.N., Reynolds, M.S., Stayton, W.L., and Boucher, F.G., 1988, Ground-Water Data for Georgia, 1987: United States Geological Survey Open-File Report 88-323, 172 p.

Kellam, M.F., and Gorday, L.L., Hydrogeology of the Gulf Trough Apalachicola Embayment Area, Georgia: Georgia Geologic Survey Bulletin, in press.

Krause, R.E., 1979, Geohydrology of Brooks, Lowndes, and Western Echols Counties, Georgia: United States Geological Survey Water-Resources Investigations 78-117, 48 p.

McFadden, S.S., and Perriello, P.D., 1983, Hydrogeology of the Clayton and Claiborne Aquifers in Southwestern Georgia: Georgia Geologic Survey Information Circular 55, 59 p.

Miller, J.A., 1986, Hydrogeologic Framework of the Floridan Aquifer System in Florida and Parts of Georgia, Alabama, and South Carolina: United States Geological Survey Professional Paper 1403-B, 91 p.

National Oceanic and Atmospheric Administration, 1981, Climatological Data Annual Summary: Georgia 1980, Volume 86, Number 13.

National Oceanic and Atmospheric Administration, 1982, Climatological Data Annual Summary: Georgia 1981, Volume 87, Number 13.

National Oceanic and Atmospheric Administration, 1983, Climatological Data Annual Summary: Georgia 1982, Volume 87, Number 13.

National Oceanic and Atmospheric Administration, 1984, Climatological Data Annual Summary: Georgia 1983, Volume 88, Number 13.

National Oceanic and Atmospheric Administration, 1985, Climatological Data Annual Summary: Georgia 1984, Volume 89, Number 13.

National Oceanic and Atmospheric Administration, 1986, Climatological Data Annual Summary: Georgia 1985, Volume 90, Number 13.

National Oceanic and Atmospheric Administration, 1987, Climatological Data Annual Summary: Georgia 1986, Volume 91, Number 13.

National Oceanic and Atmospheric Administration, 1988, Climatological Data Annual Summary: Georgia 1987, Volume 92, Number 13.

Pollard, L.D., and Vorhis, R.C., 1980, The Geohydrology of the Cretaceous Aquifer System in Georgia: Georgia Geologic Survey Hydrologic Atlas 3, 5 pl.

Sever, C.W., 1966, Reconnaissance of the Ground Water and Geology of Thomas County, Georgia: Georgia Geologic Survey Information Circular 34, 14 p.

Vincent, R.H., 1982, Geohydrology of the Jacksonian Aquifer in Central and East Central Georgia: Georgia Geologic Survey Hydrologic Atlas 8, 3 pl.

Wait, R.L., 1960, Source and Quality of Ground Water in Southwestern Georgia, Georgia Geologic Survey Information Circular 18, 74 p.

Watson, W., 1982, Aquifer Potential of the Shallow Sediments of the Coastal Area of Georgia, in Arden, D.D., Beck, B.F., and Morrow, E., Editors, Second Symposium on the Geology of the Southeastern Coastal Plain (March, 1979): Georgia Geologic Survey Information Circular 53, pp. 183-194.

APPENDICES

A. GROUND-WATER USE DATA FOR GEORGIA, 1987

B. ANALYSES OF SAMPLES COLLECTED DURING 1987 FOR THE GEORGIA GROUND-WATER MONITORING NETWORK

APPENDIX A: GROUND-WATER USE DATA FOR GEORGIA, 1987

Annual ground-water and surface-water use data are collected or estimated each succeeding year for the Georgia Water Use Program. Complete use data are collected and reported every five years as one of the Information Circular series of the Georgia Geologic Survey. Estimated ground-water use for 1987 follows, based on data reported to the Georgia Environmental Protection Division through its environmental facilities permit programs and data taken from previous surveys. In general, all activities requiring ground-water withdrawals of 100,000 gallons or more per day are permitted. Examples of typical permitted uses are public supply, industry and mining, large commercial facilities, and thermoelectric power generation. Beginning in July, 1989, a permit is also required for all irrigation withdrawals greater than 100,000 gallons per day. Self-supplied domestic use does not require a permit. For this appendix, the abbreviation Mgal/day (million gallons per day) is used.

TABLE A-1.- TOTAL PERMITTED GROUND-WATER WITHDRAWALS BY COUNTY IN Mgal/day (ANNUAL AVERAGE)

COUNTY	1980	1981	1982	1983	1984	1985	1986	1987
APPLING	1.07	1.05	1.07	1.08	1.05	1.05	1.04	1.01
ATKINSON	0.18	0.11	0.15	0.31	0.16	0.20	0.32	0.28
BACON	1.01	0.33	0.00	0.54	0.97	0.49	0.47	0.51
BAKER	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
BALDWIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BANKS	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00
BARROW	0.06	0.06	0.06	0.06	0.10	0.10	0.10	0.00
BARTOW	0.27	1.42	1.54	2.63	2.96	3.18	4.05	3.48
BEN HILL	2.59	2.54	2.36	2.50	2.50	2.76	3.26	2.58
BERRIEN	1.11	1.41	1.24	1.31	1.30	0.71	0.71	0.71
BIBB	3.35	3.28	2.99	2.91	2.95	3.06	3.12	1.22
BLECKLEY	0.66	0.42	0.58	0.68	0.74	0.75	1.08	0.11
BRANTLEY	0.06	0.06	0.06	0.19	0.14	0.14	0.14	0.00
BROOKS	1.20	1.34	1.45	1.43	1.40	1.42	1.33	1.28
BRYAN	0.62	0.62	0.57	0.36	0.69	0.85	0.63	0.75
BULLOCH	2.98	2.97	2.97	2.96	2.17	2.06	2.18	2.52
BURKE	0.82	1.08	1.11	1.41	1.32	1.92	2.90	4.16
BUTTS	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.00
CALHOUN	0.45	0.55	0.57	0.56	0.56	0.49	0.54	0.31
CAMDEN	35.50	34.46	32.01	32.18	61.59	32.36	36.99	35.40
CANDLER	0.62	0.65	0.61	0.62	0.59	0.59	0.64	0.56
CARROLL	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.00
CATOOSA	0.00	0.00	2.52	2.58	0.16	0.00	0.00	0.00
CHARLTON	0.09	1.03	0.67	0.69	0.65	0.67	0.00	0.00
CHATHAM	73.69	71.04	70.56	69.13	71.58	72.42	78.49	71.23
CHATTAHOOCHEE	0.21	0.20	0.19	0.20	0.17	0.00	0.00	0.10
CHATTOOGA	0.39	0.38	0.52	0.53	1.00	0.90	0.82	0.31
CHEROKEE	0.10	0.10	0.10	0.11	0.11	0.11	0.10	0.09
CLARKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLAY	0.20	0.01	0.07	0.14	0.12	0.00	0.00	0.00
CLAYTON	0.61	0.11	0.10	0.15	0.11	0.00	0.00	0.00
CLINCH	0.03	0.35	0.34	0.33	0.30	0.31	0.32	0.44
COBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COFFEE	3.17	4.07	3.83	4.08	3.30	3.41	3.90	5.35
COLQUITT	4.64	4.24	4.23	4.39	3.92	4.03	2.87	2.54
COLUMBIA	0.62	0.53	0.55	0.55	0.27	0.48	0.29	0.46
COOK	3.34	3.43	3.23	3.17	3.61	3.70	3.44	2.51
COWETA	0.23	0.23	0.15	0.24	0.11	0.10	0.11	0.00
CRAWFORD	0.18	0.14	0.15	0.14	0.15	0.14	0.00	0.00
CRISP	1.77	1.25	1.46	1.48	1.27	1.82	2.08	1.30
DADE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DAWSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DECATUR	1.14	2.30	2.79	2.80	3.02	3.02	3.42	0.95
DEKALB	0.08	0.07	0.07	0.06	0.00	0.00	0.00	0.00
DODGE	0.94	0.92	0.97	0.99	0.00	0.80	1.31	0.72
DOOLY	0.49	0.50	0.47	0.90	0.55	0.76	0.64	0.20
DOUGHERTY	30.05	31.09	31.92	30.74	26.99	31.67	34.37	32.49
DOUGLAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EARLY	0.97	0.77	0.77	0.77	0.94	1.34	1.43	1.01
ECHOLS	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00
EFFINGHAM	1.24	0.61	0.60	0.83	0.88	0.86	0.85	1.76
ELBERT	0.07	0.06	0.06	0.06	0.00	0.00	0.00	0.00
EMANUEL	1.87	1.17	1.16	1.55	1.28	1.18	1.25	1.54
EVANS	0.45	0.42	0.42	1.28	1.27	1.01	1.01	0.00

FANNIN	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
FAYETTE	0.03	0.03	0.03	0.03	0.00	0.00	0.10	0.25
FLOYD	0.01	0.57	0.00	0.34	2.41	2.38	2.36	0.34
FORSYTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FRANKLIN	0.24	0.24	0.24	0.24	0.00	0.00	0.00	0.00
FULTON	0.06	0.14	0.16	0.15	0.15	0.13	0.14	0.02
GILMER	0.00	0.00	0.00	0.00	0.30	0.30	0.30	0.00
GLASCOCK	0.11	0.12	0.11	0.11	0.01	0.00	0.01	0.01
GLYNN	97.68	92.11	81.29	72.63	79.20	73.35	75.98	72.43
GORDON	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRADY	1.77	1.75	1.83	1.70	2.06	0.00	0.00	0.00
GREENE	0.09	0.10	0.10	0.10	0.00	0.00	0.00	0.00
GWINNETT	0.15	0.09	0.09	0.09	0.00	0.00	0.00	0.00
HABERSHAM	0.31	0.52	0.87	1.28	1.24	0.25	0.31	0.28
HALL	0.81	0.34	0.33	0.43	0.42	0.43	0.40	0.32
HANCOCK	0.10	0.04	0.10	0.10	0.00	0.00	0.00	0.00
HARALSON	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARRIS	0.21	0.22	0.27	0.27	0.25	0.09	0.00	0.04
HART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEARD	0.12	0.11	0.14	0.17	0.15	0.00	0.00	0.00
HENRY	0.10	0.00	0.00	0.08	0.03	0.11	0.00	0.00
HOUSTON	17.84	15.42	15.42	17.66	16.23	16.27	17.65	15.13
IRWIN	0.70	0.62	0.60	0.65	0.62	0.00	0.00	0.00
JACKSON	0.36	0.14	0.15	0.15	0.29	0.31	0.32	0.35
JASPER	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
JEFF DAVIS	2.39	2.08	1.71	2.36	2.37	2.37	2.89	0.88
JEFFERSON	1.84	2.70	2.68	3.19	3.88	3.89	2.64	2.55
JENKINS	0.44	0.44	0.06	0.47	0.55	0.52	0.70	0.66
JOHNSON	0.38	0.39	0.26	0.27	0.30	0.30	0.00	0.00
JONES	0.45	0.33	0.21	0.22	0.25	0.55	0.66	0.65
LAMAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LANIER	0.30	0.32	0.30	0.30	0.25	0.25	0.26	0.25
LAURENS	1.57	1.55	1.60	1.88	1.58	1.81	1.59	1.56
LEE	0.09	0.08	0.08	0.39	0.31	0.00	0.00	1.23
LIBERTY	13.44	13.48	13.63	12.11	12.50	11.86	13.20	10.23
LINCOLN	0.00	0.07	0.03	0.04	0.05	0.05	0.00	0.00
LONG	0.14	0.00	0.00	0.14	0.00	0.00	0.00	0.00
LOWNDES	14.83	12.77	12.81	16.72	19.83	17.35	17.25	17.39
LUMPKIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MACON	1.69	3.25	4.61	3.02	3.05	3.18	2.28	1.22
MADISON	0.11	0.13	0.00	0.14	0.14	0.06	0.00	0.00
MARION	0.57	0.63	0.68	0.65	0.72	0.99	0.00	0.00
MCDUFFIE	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
MCINTOSH	0.21	0.00	0.00	0.02	0.09	0.05	0.19	0.14
MERIWETHER	0.23	0.09	0.09	0.25	0.23	0.18	0.19	0.24
MILLER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITCHELL	2.98	3.00	2.75	2.63	2.66	2.94	2.87	0.00
MONROE	0.07	0.09	7.83	7.24	0.08	0.05	0.05	0.03
MONTGOMERY	0.18	0.13	0.18	0.19	0.19	0.00	0.00	0.00
MORGAN	0.22	0.00	0.00	0.21	0.31	0.24	0.20	0.16
MURRAY	0.00	0.00	0.00	0.00	1.30	1.23	0.00	0.77
MUSCOGEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NEWTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OCONEE	0.02	0.00	0.00	0.09	0.14	0.12	0.00	0.00
OGLETHORPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAULDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PEACH	2.23	1.93	1.51	1.81	2.08	2.07	2.33	2.03
PICKENS	0.03	0.05	0.05	0.04	0.04	0.00	0.00	0.00
PIERCE	0.44	0.45	0.46	0.45	0.47	0.44	0.43	1.09
PIKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

POLK	0.00	0.00	0.00	0.07	0.05	0.28	2.35	2.31
PULASKI	1.04	1.02	1.01	1.02	1.37	0.77	0.00	0.62
PUTNAM	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
QUITMAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RABUN	0.01	0.01	0.00	0.01	0.13	0.00	0.12	0.15
RANDOLPH	0.00	0.11	0.00	0.35	0.37	0.44	0.00	0.00
RICHMOND	19.66	14.94	13.27	13.51	13.43	15.21	16.65	14.63
ROCKDALE	1.40	0.56	0.45	0.31	0.41	0.31	0.06	0.02
SCHLEY	0.21	0.00	0.00	0.00	0.00	1.08	0.90	0.00
SCREVEN	1.88	2.55	2.36	2.78	2.48	2.61	1.19	3.23
SEMINOLE	0.69	0.66	0.56	0.52	0.55	0.54	0.00	0.00
SPALDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEPHENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEWART	0.37	0.18	0.12	0.12	0.31	0.19	0.21	0.00
SUMTER	3.25	3.45	3.01	2.90	3.00	3.13	2.62	3.73
TALBOT	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
TALIAFERRO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TATTNALL	0.95	1.60	1.75	1.81	1.86	1.70	1.33	1.78
TAYLOR	0.68	0.68	0.44	0.66	0.67	0.64	0.51	0.53
TELFAIR	1.73	1.58	1.31	1.35	1.31	1.40	1.62	1.75
TERRELL	1.02	0.86	0.92	1.02	1.01	1.13	1.71	2.24
THOMAS	5.91	4.97	5.54	5.37	5.17	5.60	6.23	4.12
TIFT	4.51	4.80	4.93	4.28	4.88	4.95	5.25	5.25
TOOMBS	2.34	2.02	2.08	1.86	2.31	2.11	2.99	2.50
TOWNS	0.00	0.00	0.00	0.27	0.27	0.22	0.00	0.00
TREUTLEN	0.23	0.22	0.22	0.24	0.24	0.25	0.25	0.26
TROUP	0.10	0.07	0.06	0.04	0.05	0.04	0.05	0.05
TURNER	0.91	0.92	0.98	2.16	0.96	0.99	0.69	0.77
TWIGGS	35.70	34.68	19.90	14.36	15.16	11.57	11.80	18.16
UNION	0.39	0.43	0.44	0.41	0.39	0.36	0.16	0.22
UPSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WALKER	1.56	2.08	0.64	1.65	1.42	1.08	0.95	1.33
WALTON	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WARE	4.14	4.27	4.06	3.79	4.56	0.79	0.88	3.85
WARREN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASHINGTON	12.98	13.93	13.08	13.74	16.17	16.21	14.72	9.29
WAYNE	72.37	69.43	59.14	68.05	63.49	68.00	69.98	70.34
WEBSTER	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
WHEELER	0.00	0.17	0.00	0.17	0.00	0.00	0.00	0.00
WHITE	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.18
WHITFIELD	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILCOX	0.07	0.00	0.00	0.40	0.00	0.00	0.00	0.00
WILKES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILKINSON	14.80	16.64	17.36	23.30	27.72	25.79	23.76	10.07
WORTH	0.96	0.92	0.61	0.90	0.96	0.94	1.04	0.67
TOTAL	535.27	518.24	485.34	498.82	530.58	493.40	509.61	466.27

TABLE A-2. - ESTIMATED GROUND-WATER WITHDRAWALS (Mgal/day), 1987
(INCLUDES PERMITTED AND NON-PERMITTED USES)

COUNTY	PUBLIC SUPPLY	DOMESTIC & COMMERCIAL	INDUSTRY & MINING	IRRI-GATION	THERMO-ELECTRIC	LIVE-STOCK	TOTAL
APPLING	0.87	0.75	0.15	0.70	0.22	0.15	2.84
ATKINSON	0.32	0.22	0.00	0.72	0.00	0.27	1.53
BACON	0.01	0.41	0.51	0.95	0.00	0.06	1.94
BAKER	0.10	0.21	0.00	32.90	0.00	0.11	33.39
BALDWIN	0.04	1.61	0.01	0.00	0.00	0.01	1.67
BANKS	0.11	0.58	0.06	0.01	0.00	0.27	1.03
BARROW	0.08	0.85	0.10	0.01	0.00	0.68	1.72
BARTOW	1.25	1.16	4.17	0.02	0.00	0.12	6.72
BEN HILL	3.13	0.28	0.13	4.94	0.00	0.10	8.58
BERRIEN	0.36	0.51	0.71	3.82	0.00	0.07	5.47
BIBB	0.23	1.94	3.57	0.09	0.00	0.08	5.91
BLECKLEY	0.97	0.52	0.00	4.80	0.00	0.04	6.33
BRANTLEY	0.24	0.58	0.97	0.03	0.00	0.07	1.89
BROOKS	1.48	0.64	0.00	3.01	0.00	0.19	5.32
BRYAN	0.68	0.49	0.42	0.00	0.00	0.36	1.95
BULLOCH	1.74	1.70	0.89	2.17	0.00	0.15	6.65
BURKE	1.14	0.94	0.00	3.87	3.39	0.06	9.40
BUTTS	0.15	0.77	0.00	0.00	0.00	0.00	0.92
CALHOUN	0.59	0.09	0.00	6.39	0.00	0.03	7.10
CAMDEN	2.71	1.40	35.99	0.00	0.00	0.01	40.11
CANDLER	0.67	0.29	0.00	1.95	0.00	0.11	3.02
CARROLL	0.18	2.47	0.00	0.00	0.00	0.26	2.91
CATOOSA	2.61	0.64	0.00	0.10	0.00	0.02	3.37
CHARLTON	0.67	0.38	0.27	0.02	0.00	0.03	1.37
CHATHAM	32.89	3.48	43.29	1.30	2.42	0.01	83.39
CHATTAHOOCHEE	0.31	0.21	0.00	0.00	0.00	0.00	0.52
CHATTOOGA	1.15	0.79	6.87	0.00	0.00	0.02	8.83
CHEROKEE	0.24	3.65	0.00	0.00	0.00	0.37	4.26
CLARKE	0.21	0.94	0.00	0.05	0.00	0.04	1.24
CLAY	0.13	0.12	0.00	1.99	0.00	0.02	2.26
CLAYTON	0.22	0.22	0.00	0.00	0.00	0.00	0.44
CLINCH	0.47	0.25	0.03	0.31	0.00	0.01	1.07
COBB	0.15	0.57	0.00	0.02	0.00	0.01	0.75
COFFEE	5.46	0.93	0.00	3.53	0.00	0.31	10.23
COLQUITT	2.75	0.65	1.36	9.94	0.00	0.25	14.95
COLUMBIA	0.49	1.21	0.00	0.00	0.00	0.00	1.70
COOK	3.58	0.45	0.00	2.46	0.00	0.05	6.54
COWETA	0.30	2.01	0.03	0.03	0.00	0.00	2.37
CRAWFORD	0.13	0.50	0.00	0.48	0.00	0.93	2.04
CRISP	2.19	1.07	0.04	8.12	0.00	0.05	11.47
DADE	0.00	0.05	0.00	0.01	0.00	0.05	0.11
DAWSON	0.02	0.43	0.00	0.00	0.00	0.15	0.60
DECATUR	3.05	1.33	0.75	32.70	0.00	0.21	38.11
DEKALB	0.09	0.88	0.00	0.00	0.00	0.01	0.98
DODGE	1.44	0.75	0.03	4.29	0.00	0.08	6.59
DOOLY	0.76	0.37	0.00	17.20	0.00	0.05	18.41
DOUGHERTY	20.89	0.12	13.95	8.70	0.00	0.15	43.81
DOUGLAS	0.06	0.37	0.00	0.00	0.00	0.10	0.53
EARLY	1.38	0.52	0.13	15.70	0.00	0.07	17.87
ECHOLS	0.06	0.13	0.00	0.17	0.00	0.10	0.46
EFFINGHAM	0.77	1.08	0.99	0.30	0.20	0.26	3.60
ELBERT	0.07	0.84	0.02	0.22	0.00	0.03	1.18
EMANUEL	1.91	0.72	0.20	3.13	0.00	0.08	6.04

EVANS	0.48	0.22	0.69	0.83	0.00	0.05	2.27
FANNIN	0.10	0.52	0.00	0.00	0.00	0.00	0.62
FAYETTE	0.52	0.76	0.01	0.06	0.00	0.00	1.35
FLOYD	2.36	0.67	0.01	0.32	0.00	0.06	3.42
FORSYTH	0.25	1.61	0.00	0.01	0.00	0.60	2.47
FRANKLIN	0.32	0.56	0.00	0.04	0.00	0.42	1.34
FULTON	0.00	0.86	0.14	0.04	0.00	0.01	1.05
GILMER	0.01	0.63	0.00	0.01	0.00	0.13	0.78
GLASCOCK	0.10	0.11	0.04	0.00	0.00	0.01	0.26
GLYNN	11.64	5.43	63.74	2.09	0.02	2.20	85.12
GORDON	0.24	0.91	0.02	0.00	0.00	0.36	1.53
GRADY	2.17	0.90	0.08	7.38	0.00	0.16	10.69
GREENE	0.10	0.42	0.00	0.00	0.00	0.04	0.56
GWINNETT	0.20	0.19	0.01	0.59	0.00	0.08	1.07
HABERSHAM	1.39	0.88	0.00	0.00	0.00	0.51	2.78
HALL	0.44	1.74	1.17	0.84	0.00	0.83	5.02
HANCOCK	0.11	0.46	0.01	0.18	0.00	0.00	0.76
HARALSON	0.01	0.01	0.00	0.00	0.00	0.16	0.18
HARRIS	0.15	1.09	0.00	0.11	0.00	0.01	1.36
HART	0.11	1.06	0.00	0.00	0.00	0.13	1.30
HEARD	0.15	0.40	0.00	0.00	0.00	0.02	0.57
HENRY	0.21	1.46	0.00	0.00	0.00	0.01	1.68
HOUSTON	15.02	0.38	2.88	6.37	0.00	0.05	24.70
IRWIN	0.01	0.35	0.01	3.53	0.00	0.09	3.99
JACKSON	0.22	1.35	0.45	0.07	0.00	0.45	2.54
JASPER	0.07	0.34	0.00	0.00	0.00	0.06	0.47
JEFF DAVIS	0.87	0.53	2.05	4.04	0.00	0.05	7.54
JEFFERSON	1.88	0.64	4.69	6.09	0.00	0.06	13.36
JENKINS	0.61	0.33	0.25	3.13	0.00	0.09	4.41
JOHNSON	0.34	0.43	0.00	1.28	0.00	0.04	2.09
JONES	0.72	0.71	0.00	0.07	0.00	0.02	1.52
LAMAR	0.01	0.55	0.00	0.13	0.00	0.55	1.24
LANIER	0.26	0.24	0.00	3.04	0.00	0.03	3.57
LAURENS	1.04	1.22	0.83	3.52	0.00	0.12	6.73
LEE	0.58	0.80	0.97	14.90	0.00	0.11	17.43
LIBERTY	3.24	2.75	10.24	0.13	0.00	0.01	16.37
LINCOLN	0.03	0.40	0.00	0.01	0.00	0.03	0.47
LONG	0.15	0.30	0.00	0.00	0.00	0.02	0.47
LOWNDES	7.18	2.48	11.74	2.01	0.00	0.04	23.45
LUMPKIN	0.01	0.70	0.00	0.00	0.00	0.65	1.36
MACON	1.08	0.47	1.46	3.75	0.00	0.09	6.85
MADISON	0.25	1.21	0.00	0.12	0.00	0.42	2.00
MARION	0.98	0.30	0.00	0.00	0.00	0.08	1.36
MCDUFFIE	0.02	0.87	0.02	0.68	0.00	0.01	1.60
MCINTOSH	0.38	0.53	0.46	0.00	0.00	0.00	1.37
MERIWETHER	0.36	0.91	0.35	0.00	0.00	0.81	2.43
MILLER	0.20	0.36	0.01	31.80	0.00	0.18	32.64
MITCHELL	2.88	0.77	0.00	70.00	0.00	0.29	74.01
MONROE	0.00	0.78	0.00	0.00	0.03	2.12	2.93
MONTGOMERY	0.07	0.32	0.00	0.53	0.00	0.04	0.96
MORGAN	0.20	0.62	0.00	0.00	0.00	0.11	0.93
MURRAY	0.79	1.45	0.00	0.00	0.00	0.06	2.30
MUSCOGEE	0.03	0.19	0.00	0.00	0.00	0.01	0.23
NEWTON	0.18	1.56	0.00	0.00	0.00	0.02	1.76
OCONEE	0.32	0.78	0.02	0.14	0.00	0.21	1.47
OGLETHORPE	0.00	0.62	0.00	0.00	0.00	0.15	0.77
PAULDING	0.01	1.24	0.00	0.01	0.00	0.08	1.34
PEACH	2.38	0.52	0.01	0.00	0.00	0.01	2.92
PICKENS	0.06	0.44	0.00	0.00	0.00	0.11	0.61
PIERCE	0.50	1.28	0.00	1.91	0.00	0.06	3.75

PIKE	0.06	0.53	0.00	0.17	0.00	0.11	0.87
POLK	0.46	0.57	1.94	0.01	0.00	0.02	3.00
PULASKI	0.63	0.28	0.34	10.60	0.00	0.04	11.91
PUTNAM	0.04	0.54	0.01	0.00	0.00	0.00	0.59
QUITMAN	0.00	0.10	0.00	0.00	0.00	0.01	0.11
RABUN	0.03	0.98	0.01	0.00	0.00	0.05	1.07
RANDOLPH	0.49	0.25	0.00	5.67	0.00	0.05	6.46
RICHMOND	13.50	0.93	2.97	0.80	0.00	0.01	18.21
ROCKDALE	0.05	0.54	0.00	0.07	0.00	0.01	0.67
SCHLEY	0.90	0.13	0.00	0.00	0.00	0.03	1.06
SCREVEN	1.27	0.79	2.16	9.46	0.00	0.12	13.80
SEMINOLE	0.10	0.38	0.00	36.00	0.00	0.14	36.63
SPALDING	0.08	1.47	0.00	0.15	0.00	0.01	1.71
STEPHENS	0.08	0.29	0.00	0.04	0.00	0.10	0.51
STEWART	0.21	0.17	0.00	0.00	0.00	0.02	0.40
SUMTER	3.78	0.95	0.01	16.20	0.00	0.10	21.08
TALBOT	0.08	0.34	0.00	0.02	0.00	1.14	1.58
TALIAFERRO	0.00	0.12	0.00	0.00	0.00	0.00	0.12
TATTNALL	0.91	1.68	0.00	1.12	0.00	0.19	3.90
TAYLOR	0.72	0.28	0.11	0.47	0.00	0.09	1.67
TELFAIR	1.61	0.27	0.30	3.39	0.00	0.09	5.66
TERRELL	2.25	0.36	0.00	7.27	0.00	0.02	9.90
THOMAS	5.74	0.99	1.38	1.72	0.00	0.10	9.93
TIFT	5.27	0.29	0.25	15.70	0.00	0.10	21.64
TOOMBS	3.04	0.58	0.00	1.95	0.00	0.08	5.65
TOWNS	0.22	0.22	0.00	0.00	0.00	0.01	0.45
TREUTLEN	0.26	0.24	0.00	0.11	0.00	0.02	0.63
TROUP	0.02	1.82	0.09	0.02	0.00	0.00	1.95
TURNER	0.78	0.37	0.00	4.27	0.00	0.05	5.47
TWIGGS	0.19	0.60	26.73	0.71	0.00	0.01	28.24
UNION	0.22	0.39	0.01	0.00	0.00	0.05	0.67
UPSON	0.14	0.80	0.01	0.14	0.00	2.06	3.15
WALKER	0.80	0.43	0.94	0.00	0.00	0.07	2.24
WALTON	0.07	1.14	0.04	0.08	0.00	0.09	1.42
WARE	3.49	0.65	1.04	0.60	0.00	0.05	5.83
WARREN	0.00	0.28	0.52	0.00	0.00	0.01	0.81
WASHINGTON	1.35	0.69	13.43	5.38	0.00	0.06	20.91
WAYNE	1.64	0.84	68.94	1.32	0.00	0.03	72.77
WEBSTER	0.07	0.11	0.00	1.88	0.00	0.02	2.08
WHEELER	0.17	0.18	0.00	1.25	0.00	0.04	1.64
WHITE	0.21	0.75	0.00	0.03	0.00	0.21	1.20
WHITFIELD	0.00	0.23	0.03	0.11	0.00	0.08	0.45
WILCOX	0.47	0.29	0.00	14.30	0.00	0.04	15.12
WILKES	0.00	0.41	0.00	0.00	0.00	0.06	0.47
WILKINSON	0.84	0.32	25.59	0.09	0.00	0.01	26.85
WORTH	0.76	0.79	0.00	5.47	0.00	0.10	7.12
TOTAL	218.49	120.04	364.85	494.07	6.29	25.48	1229.21

TABLE A-3.- PERMITTED PUBLIC SUPPLY GROUND-WATER WITHDRAWALS BY COUNTY IN Mgal/day (ANNUAL AVERAGE)

COUNTY	1980	1981	1982	1983	1984	1985	1986	1987
APPLING	0.71	0.77	0.82	0.86	0.83	0.83	0.85	0.79
ATKINSON	0.18	0.11	0.15	0.31	0.16	0.20	0.32	0.28
BACON	0.64	0.00	0.00	0.54	0.55	0.00	0.00	0.00
BAKER	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
BALDWIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BANKS	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
BARROW	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00
BARTOW	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.09
BEN HILL	2.59	2.54	2.36	2.41	2.43	2.69	3.12	2.55
BERRIEN	0.40	0.63	0.69	0.76	0.67	0.00	0.00	0.00
BIBB	0.26	0.15	0.00	0.00	0.00	0.00	0.00	0.00
BLECKLEY	0.52	0.31	0.47	0.57	0.64	0.66	0.96	0.00
BRANTLEY	0.06	0.06	0.06	0.19	0.14	0.14	0.14	0.00
BROOKS	1.20	1.34	1.45	1.43	1.40	1.42	1.33	1.28
BRYAN	0.38	0.38	0.39	0.19	0.48	0.50	0.21	0.51
BULLOCH	2.44	2.42	2.47	1.76	1.02	0.90	1.30	1.04
BURKE	0.61	0.79	0.83	1.02	0.97	1.06	0.99	0.77
BUTTS	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.00
CALHOUN	0.45	0.55	0.57	0.56	0.56	0.49	0.54	0.31
CAMDEN	0.62	0.92	1.33	1.18	1.80	1.47	1.71	1.83
CANDLER	0.62	0.65	0.61	0.62	0.59	0.59	0.64	0.56
CARROLL	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.00
CATOOSA	0.00	0.00	2.52	2.58	0.16	0.00	0.00	0.00
CHARLTON	0.00	0.76	0.67	0.69	0.65	0.67	0.00	0.00
CHATHAM	27.49	27.64	27.78	27.67	27.40	29.44	30.88	28.72
CHATTAHOOCHEE	0.21	0.20	0.19	0.20	0.17	0.00	0.00	0.10
CHATTOOGA	0.39	0.38	0.52	0.53	1.00	0.90	0.82	0.31
CHEROKEE	0.10	0.10	0.10	0.11	0.11	0.11	0.10	0.09
CLARKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLAY	0.20	0.01	0.07	0.14	0.12	0.00	0.00	0.00
CLAYTON	0.61	0.11	0.10	0.15	0.11	0.00	0.00	0.00
CLINCH	0.03	0.35	0.34	0.33	0.30	0.31	0.32	0.44
COBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COFFEE	3.17	4.07	3.83	4.08	3.30	3.41	3.90	5.35
COLQUITT	3.26	3.05	3.14	3.37	3.12	3.24	2.03	2.30
COLUMBIA	0.61	0.53	0.55	0.55	0.27	0.48	0.29	0.46
COOK	3.34	3.43	3.23	3.17	3.61	3.70	3.44	2.51
COWETA	0.23	0.23	0.15	0.24	0.11	0.10	0.11	0.00
CRAWFORD	0.18	0.14	0.15	0.14	0.15	0.14	0.00	0.00
CRISP	1.77	1.25	1.46	1.48	1.27	1.82	2.08	1.30
DADE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DAWSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DECATUR	0.68	1.95	2.44	2.28	2.23	2.23	2.84	0.21
DEKALB	0.08	0.07	0.07	0.06	0.00	0.00	0.00	0.00
DODGE	0.91	0.92	0.97	0.99	0.00	0.80	1.31	0.72
DOOLY	0.48	0.50	0.47	0.90	0.55	0.76	0.64	0.20
DOUGHERTY	16.55	17.22	17.85	17.65	17.44	18.40	20.79	19.90
DOUGLAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EARLY	0.87	0.77	0.77	0.68	0.81	1.21	1.33	0.87
ECHOLS	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00
EFFINGHAM	0.53	0.49	0.45	0.52	0.55	0.59	0.61	0.57
ELBERT	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00
EMANUEL	1.67	1.17	1.16	1.35	1.08	1.18	1.25	1.54
EVANS	0.44	0.42	0.42	0.44	0.44	0.31	0.34	0.00

FANNIN	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
FAYETTE	0.03	0.03	0.03	0.03	0.00	0.00	0.10	0.25
FLOYD	0.00	0.57	0.00	0.34	2.41	2.38	2.36	0.34
FORSYTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FRANKLIN	0.24	0.24	0.24	0.24	0.00	0.00	0.00	0.00
FULTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GILMER	0.00	0.00	0.00	0.00	0.30	0.30	0.30	0.00
GLASCOCK	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
GLYNN	10.58	6.09	6.14	5.45	8.87	9.37	10.23	9.90
GORDON	0.00	0.00	0.00	0.00	0.24	0.24	0.00	0.00
GRADY	1.69	1.75	1.83	1.70	2.06	0.00	0.00	0.00
GREENE	0.09	0.10	0.10	0.10	0.00	0.00	0.00	0.00
GWINNETT	0.15	0.09	0.09	0.09	0.00	0.00	0.00	0.00
HABERSHAM	0.31	0.52	0.87	1.28	1.24	0.25	0.31	0.28
HALL	0.18	0.18	0.18	0.20	0.00	0.00	0.00	0.00
HANCOCK	0.10	0.04	0.10	0.10	0.00	0.00	0.00	0.00
HARALSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARRIS	0.10	0.10	0.10	0.10	0.09	0.09	0.00	0.04
HART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEARD	0.12	0.11	0.14	0.17	0.15	0.00	0.00	0.00
HENRY	0.10	0.00	0.00	0.08	0.03	0.11	0.00	0.00
HOUSTON	14.11	12.42	12.32	14.62	13.10	13.22	14.78	12.64
IRWIN	0.69	0.62	0.60	0.65	0.62	0.00	0.00	0.00
JACKSON	0.16	0.14	0.15	0.15	0.00	0.00	0.00	0.00
JASPER	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
JEFF DAVIS	0.70	0.68	0.02	0.68	0.69	0.69	0.84	0.00
JEFFERSON	0.44	1.44	1.45	1.60	1.91	1.78	0.00	0.00
JENKINS	0.37	0.39	0.01	0.41	0.46	0.52	0.60	0.53
JOHNSON	0.38	0.39	0.26	0.27	0.30	0.30	0.00	0.00
JONES	0.45	0.33	0.21	0.22	0.25	0.55	0.66	0.65
LAMAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LANIER	0.30	0.32	0.30	0.30	0.25	0.25	0.26	0.25
LAURENS	0.97	0.93	0.88	0.85	0.62	0.85	0.78	0.73
LEE	0.08	0.08	0.08	0.39	0.31	0.00	0.00	0.28
LIBERTY	4.93	4.94	5.15	2.77	3.15	3.12	2.96	0.13
LINCOLN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LONG	0.14	0.00	0.00	0.14	0.00	0.00	0.00	0.00
LOWNDES	5.30	5.58	5.40	5.92	6.25	5.86	6.42	5.98
LUMPKIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MACON	0.60	1.19	0.86	1.11	1.03	1.03	0.82	0.00
MADISON	0.11	0.13	0.00	0.14	0.14	0.06	0.00	0.00
MARION	0.57	0.63	0.68	0.65	0.72	0.99	0.00	0.00
MCDUFFIE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCINTOSH	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.14
MERIWETHER	0.16	0.00	0.00	0.21	0.15	0.11	0.12	0.18
MILLER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITCHELL	2.97	3.00	2.75	2.63	2.66	2.94	2.87	0.00
MONROE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MONTGOMERY	0.18	0.13	0.18	0.19	0.19	0.00	0.00	0.00
MORGAN	0.22	0.00	0.00	0.21	0.31	0.24	0.20	0.16
MURRAY	0.00	0.00	0.00	0.00	1.30	1.23	0.00	0.77
MUSCOGEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NEWTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OCONEE	0.00	0.00	0.00	0.09	0.14	0.12	0.00	0.00
OGLETHORPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAULDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PEACH	2.22	1.93	1.51	1.81	2.08	2.07	2.33	2.03
PICKENS	0.03	0.05	0.05	0.04	0.04	0.00	0.00	0.00
PIERCE	0.43	0.45	0.46	0.45	0.47	0.44	0.43	0.48
PIKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

POLK	0.00	0.00	0.00	0.00	0.00	0.25	0.45	0.41
PULASKI	1.04	1.02	0.83	0.71	1.03	0.77	0.00	0.62
PUTNAM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QUITMAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RABUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RANDOLPH	0.00	0.00	0.00	0.35	0.37	0.44	0.00	0.00
RICHMOND	10.50	11.20	9.87	10.23	10.02	11.80	13.35	12.12
ROCKDALE	1.38	0.48	0.42	0.28	0.31	0.29	0.00	0.00
SCHLEY	0.21	0.00	0.00	0.00	0.00	1.08	0.90	0.00
SCREVEN	0.06	1.20	1.34	1.28	1.27	1.25	1.19	1.07
SEMINOLE	0.69	0.66	0.56	0.52	0.55	0.54	0.00	0.00
SPALDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEPHENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEWART	0.37	0.18	0.12	0.12	0.31	0.19	0.21	0.00
SUMTER	3.25	3.45	3.01	2.90	3.00	3.13	2.62	3.73
TALBOT	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
TALIAFERRO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TATTNALL	0.00	0.68	0.88	0.91	0.92	0.91	0.40	0.90
TAYLOR	0.68	0.68	0.44	0.66	0.67	0.64	0.51	0.53
TELFAIR	1.50	1.36	1.17	1.20	1.18	1.23	1.47	1.45
TERRELL	1.01	0.86	0.92	1.02	1.01	1.13	1.71	2.24
THOMAS	4.44	4.12	4.56	4.32	4.41	4.85	5.38	4.02
TIFT	4.34	4.64	4.80	4.12	4.73	4.79	4.80	5.11
TOOMBS	2.34	2.02	2.08	1.86	2.31	2.11	2.99	2.50
TOWNS	0.00	0.00	0.00	0.27	0.27	0.22	0.00	0.00
TREUTLEN	0.23	0.22	0.22	0.24	0.24	0.25	0.25	0.26
TROUP	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TURNER	0.91	0.92	0.98	1.08	0.96	0.99	0.69	0.77
TWIGGS	0.16	0.00	0.16	0.17	0.18	0.00	0.00	0.00
UNION	0.38	0.43	0.44	0.41	0.39	0.36	0.16	0.22
UPSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WALKER	0.64	0.96	0.64	0.91	0.65	0.57	0.54	0.66
WALTON	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WARE	3.73	3.91	3.70	3.46	4.23	0.70	0.82	3.45
WARREN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASHINGTON	0.56	1.23	0.96	1.19	1.33	1.39	1.29	1.34
WAYNE	1.03	1.25	1.42	1.51	1.45	1.40	1.47	1.40
WEBSTER	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
WHEELER	0.00	0.17	0.00	0.17	0.00	0.00	0.00	0.00
WHITE	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.18
WHITFIELD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILCOX	0.07	0.00	0.00	0.40	0.00	0.00	0.00	0.00
WILKES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILKINSON	0.41	0.39	0.26	0.67	0.76	0.43	0.71	0.84
WORTH	0.96	0.92	0.61	0.90	0.96	0.94	1.04	0.67
TOTAL	167.50	166.79	166.00	171.77	173.31	172.59	175.78	155.93

TABLE A-4. - PERMITTED INDUSTRIAL GROUND-WATER WITHDRAWALS BY COUNTY IN Mgal/day (ANNUAL AVERAGE)

COUNTY	1980	1981	1982	1983	1984	1985	1986	1987
APPLING	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ATKINSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACON	0.37	0.33	0.00	0.00	0.42	0.49	0.47	0.51
BAKER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BALDWIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BANKS	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00
BARROW	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.00
BARTOW	0.22	1.37	1.49	2.58	2.96	3.18	4.05	3.39
BEN HILL	0.00	0.00	0.00	0.09	0.07	0.07	0.13	0.04
BERRIEN	0.72	0.77	0.55	0.55	0.63	0.71	0.71	0.71
BIBB	3.09	3.14	2.99	2.91	2.95	3.06	3.12	1.22
BLECKLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRANTLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BROOKS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRYAN	0.23	0.22	0.18	0.17	0.21	0.35	0.42	0.24
BULLOCH	0.19	0.19	0.15	0.84	0.82	0.79	0.88	0.86
BURKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BUTTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALHOUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAMDEN	34.88	33.53	30.68	31.00	59.79	30.88	35.28	33.57
CANDLER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARROLL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CATOOSA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHARLTON	0.09	0.27	0.00	0.00	0.00	0.00	0.00	0.00
CHATHAM	42.42	39.99	39.18	38.98	42.42	38.68	43.29	39.42
CHATTAHOOCHEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHATTOOGA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHEROKEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLARKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLAYTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLINCH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COFFEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLQUITT	1.37	1.20	1.09	1.02	0.79	0.79	0.85	0.24
COLUMBIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COOK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COWETA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRAWFORD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRISP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DADE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DAWSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DECATUR	0.46	0.35	0.34	0.52	0.79	0.79	0.58	0.74
DEKALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DODGE	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DOOLY	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DOUGHERTY	13.50	13.87	14.07	13.09	9.55	13.27	13.58	12.58
DOUGLAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EARLY	0.11	0.00	0.00	0.10	0.13	0.13	0.10	0.13
ECHOLS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EFFINGHAM	0.61	0.00	0.00	0.00	0.00	0.00	0.03	0.99
ELBERT	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EMANUEL	0.20	0.00	0.00	0.20	0.20	0.00	0.00	0.00
EVANS	0.02	0.00	0.00	0.84	0.84	0.70	0.67	0.00

FANNIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FAYETTE	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOYD	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FORSYTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FRANKLIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FULTON	0.06	0.14	0.16	0.15	0.15	0.13	0.14	0.02
GILMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GLASCOCK	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01
GLYNN	85.29	84.08	73.21	65.13	68.02	62.14	62.71	59.55
GORDON	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRADY	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GREENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GWINNETT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HABERSHAM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HALL	0.63	0.16	0.16	0.23	0.42	0.43	0.40	0.32
HANCOCK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARALSON	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARRIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEARD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HENRY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOUSTON	3.74	3.00	3.10	3.05	3.12	3.06	2.88	2.49
IRWIN	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JACKSON	0.21	0.00	0.00	0.00	0.29	0.31	0.32	0.35
JASPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JEFF DAVIS	1.69	1.40	1.69	1.68	1.68	1.68	2.05	0.88
JEFFERSON	1.40	1.26	1.22	1.59	1.97	2.11	2.64	2.55
JENKINS	0.07	0.05	0.05	0.06	0.10	0.00	0.11	0.13
JOHNSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JONES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAMAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LANIER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAURENS	0.59	0.62	0.72	1.03	0.96	0.96	0.81	0.83
LEE	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.95
LIBERTY	8.51	8.54	8.48	9.34	9.35	8.75	10.24	10.10
LINCOLN	0.00	0.07	0.03	0.04	0.05	0.05	0.00	0.00
LONG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWNDES	9.53	7.18	7.41	10.79	13.58	11.49	10.83	11.41
LUMPKIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MACON	1.09	2.06	3.75	1.91	2.01	2.14	1.46	1.22
MADISON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARION	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCDUFFIE	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
MCINTOSH	0.21	0.00	0.00	0.02	0.09	0.05	0.00	0.00
MERIWETHER	0.08	0.09	0.09	0.04	0.09	0.07	0.07	0.06
MILLER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITCHELL	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MONROE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MONTGOMERY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MORGAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MURRAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MUSCOGEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NEWTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OCONEE	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OGLETHORPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAULDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PEACH	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PICKENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIERCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

POLK	0.00	0.00	0.00	0.07	0.05	0.03	1.91	1.90
PULASKI	0.00	0.00	0.18	0.31	0.34	0.00	0.00	0.00
PUTNAM	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
QUITMAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RABUN	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00
RANDOLPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RICHMOND	8.78	3.41	3.09	2.99	3.11	3.12	2.97	2.20
ROCKDALE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCHLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCREVEN	1.82	1.36	1.02	1.50	1.21	1.36	0.00	2.16
SEMINOLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPALDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEPHENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEWART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUMTER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TALBOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TALIAFERRO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TATTNALL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAYLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TELFAIR	0.23	0.22	0.15	0.15	0.13	0.16	0.15	0.30
TERRELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
THOMAS	1.47	0.85	0.98	1.05	0.76	0.75	0.85	0.10
TIFT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOOMBS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOWNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TREUTLEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TROUP	0.08	0.07	0.06	0.04	0.05	0.04	0.05	0.05
TURNER	0.00	0.00	0.00	1.08	0.00	0.00	0.00	0.00
TWIGGS	35.53	34.68	19.74	14.20	14.97	11.57	11.80	18.16
UNION	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UPSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WALKER	0.92	1.12	0.00	0.74	0.77	0.50	0.40	0.67
WALTON	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WARE	0.41	0.36	0.36	0.32	0.33	0.08	0.07	0.40
WARREN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASHINGTON	12.42	12.70	12.11	12.56	14.84	14.81	13.43	7.95
WAYNE	71.34	68.18	57.72	66.54	62.03	66.60	68.50	68.94
WEBSTER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WHEELER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WHITE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WHITFIELD	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILCOX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILKES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILKINSON	14.39	16.25	17.10	22.63	26.96	25.36	23.05	9.23
WORTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	359.46	343.11	303.31	312.21	350.24	311.74	322.12	297.58

TABLE A-5.- ESTIMATED GROUND-WATER WITHDRAWALS FOR IRRIGATION IN Mgal/day

COUNTY	1980	1981	1984	1986
APPLING	1.04	0.72	0.65	0.70
ATKINSON	0.40	0.73	1.15	0.71
BACON	0.60	1.52	0.95	0.95
BAKER	32.90	20.72	18.81	32.97
BALDWIN	0.00	0.00	0.00	0.00
BANKS	0.02	0.04	0.02	0.01
BARROW	0.01	0.02	0.05	0.01
BARTOW	0.02	0.01	0.00	0.02
BEN HILL	1.56	1.74	1.12	4.94
BERRIEN	1.03	1.57	3.79	3.82
BIBB	0.02	0.02	0.50	0.09
BLECKLEY	4.70	4.58	3.91	4.80
BRANTLEY	0.04	0.05	0.05	0.03
BROOKS	1.54	4.09	1.93	3.01
BRYAN	0.00	0.00	0.00	0.00
BULLOCH	4.59	6.94	3.48	2.17
BURKE	6.84	6.48	4.70	3.87
BUTTS	0.00	0.00	0.00	0.00
CALHOUN	3.81	2.72	5.88	6.39
CAMDEN	0.00	0.00	0.00	0.00
CANDLER	1.59	2.06	2.01	1.95
CARROLL	0.00	0.00	0.00	0.00
CATOOSA	0.01	0.01	0.10	0.10
CHARLTON	0.01	0.02	0.02	0.02
CHATHAM	0.29	0.29	1.42	1.30
CHATTAHOOCHEE	0.00	0.00	0.00	0.00
CHATTOOGA	0.00	0.00	0.00	0.00
CHEROKEE	0.00	0.00	0.00	0.00
CLARKE	0.01	0.02	0.02	0.05
CLAY	1.41	1.26	1.07	1.99
CLAYTON	0.00	0.00	0.00	0.00
CLINCH	0.04	0.11	0.12	0.31
COBB	0.03	0.04	0.05	0.02
COFFEE	3.96	1.45	4.12	3.53
COLQUITT	2.04	3.84	7.31	9.94
COLUMBIA	0.00	0.00	0.00	0.00
COOK	0.83	1.32	1.13	2.46
COWETA	0.01	0.05	0.01	0.03
CRAWFORD	0.15	0.29	0.47	0.48
CRISP	2.26	1.93	1.55	8.12
DADE	0.00	0.00	0.01	0.01
DAWSON	0.00	0.00	0.00	0.00
DECATUR	32.36	27.12	32.77	32.77
DEKALB	0.00	0.00	0.00	0.00
DODGE	5.06	4.59	2.63	4.29
DOOLY	5.93	8.96	10.88	17.23
DOUGHERTY	2.98	3.44	5.64	8.69
DOUGLAS	0.00	0.00	0.00	0.00
EARLY	7.61	5.40	8.49	15.77
ECHOLS	0.08	0.05	0.13	0.17
EFFINGHAM	0.17	0.20	0.22	0.30
ELBERT	0.04	0.07	0.16	0.22
EMANUEL	2.73	3.63	3.69	3.13
EVANS	0.34	0.30	0.39	0.83
FANNIN	0.00	0.00	0.00	0.00

FAYETTE	0.05	0.06	0.04	0.06
FLOYD	0.03	0.03	0.30	0.32
FORSYTH	0.05	0.05	0.04	0.01
FRANKLIN	0.02	0.10	0.04	0.04
FULTON	0.07	0.10	0.03	0.04
GILMER	0.00	0.06	0.01	0.01
GLASCOCK	0.00	0.00	0.00	0.00
GLYNN	0.03	0.01	2.83	2.09
GORDON	0.00	0.00	0.00	0.00
GRADY	3.36	3.38	1.40	7.38
GREENE	0.00	0.00	0.00	0.00
GWINNETT	0.07	1.10	1.22	0.59
HABERSHAM	0.00	0.00	0.00	0.00
HALL	0.10	0.09	0.75	0.84
HANCOCK	0.00	0.78	0.18	0.18
HARALSON	0.00	0.00	0.00	0.00
HARRIS	2.45	2.05	0.12	0.11
HART	0.00	0.00	0.00	0.00
HEARD	0.00	0.00	0.00	0.00
HENRY	0.00	0.00	0.00	0.00
HOUSTON	2.85	1.93	5.27	6.37
IRWIN	1.91	1.85	1.07	3.53
JACKSON	0.00	0.01	0.06	0.08
JASPER	0.00	0.00	0.00	0.00
JEFF DAVIS	1.82	3.36	3.67	4.04
JEFFERSON	2.16	3.74	5.37	6.09
JENKINS	2.04	3.73	2.09	3.13
JOHNSON	0.40	0.40	1.34	1.28
JONES	0.01	0.01	0.09	0.07
LAMAR	0.04	0.10	0.13	0.13
LANIER	2.87	3.03	3.10	3.04
LAURENS	1.75	1.68	3.01	3.52
LEE	12.02	17.31	9.53	14.97
LIBERTY	0.00	0.01	0.16	0.14
LINCOLN	0.00	0.00	0.01	0.01
LONG	0.06	0.07	0.00	0.00
LOWNDES	3.44	1.18	2.51	2.01
LUMPKIN	0.00	0.00	0.00	0.00
MACON	2.01	2.30	1.65	3.75
MADISON	0.04	0.08	0.10	0.12
MARION	0.00	0.00	0.00	0.00
MCDUFFIE	0.97	0.18	0.35	0.68
MCINTOSH	0.00	0.02	0.00	0.00
MERIWETHER	0.00	0.00	0.00	0.00
MILLER	29.38	19.80	25.72	31.89
MITCHELL	43.67	41.36	10.91	70.07
MONROE	0.00	0.00	0.00	0.00
MONTGOMERY	0.25	0.34	0.54	0.53
MORGAN	0.00	0.00	0.00	0.00
MURRAY	0.00	0.00	0.00	0.00
MUSCOGEE	0.00	0.00	0.00	0.00
NEWTON	0.00	0.00	0.00	0.00
OCONEE	0.10	0.13	0.07	0.14
OGLETHORPE	0.00	0.00	0.00	0.00
PAULDING	0.05	0.01	0.01	0.01
PEACH	0.00	0.00	0.00	0.00
PICKENS	0.00	0.00	0.00	0.00
PIERCE	0.70	1.03	0.91	1.91
PIKE	0.06	0.14	0.20	0.17
POLK	0.00	0.00	0.01	0.01

PULASKI	3.76	5.63	8.61	10.63
PUTNAM	0.00	0.00	0.00	0.00
QUITMAN	0.00	0.00	0.00	0.00
RABUN	0.00	0.00	0.00	0.00
RANDOLPH	5.29	4.23	3.81	5.67
RICHMOND	0.03	0.04	0.91	0.80
ROCKDALE	0.00	0.00	0.23	0.07
SCHLEY	0.00	0.00	0.00	0.00
SCREVEN	4.91	5.73	4.84	9.46
SEMINOLE	19.04	18.95	24.07	36.01
SPALDING	0.05	0.15	0.14	0.15
STEPHENS	0.00	0.01	0.00	0.04
STEWART	0.00	0.00	0.00	0.00
SUMTER	8.22	12.73	7.89	16.24
TALBOT	0.03	0.04	0.02	0.02
TALIAFERRO	0.00	0.00	0.00	0.00
TATTNALL	0.79	0.79	1.00	1.12
TAYLOR	0.35	0.51	0.32	0.47
TELFAIR	1.46	1.67	3.39	3.39
TERRELL	3.72	5.23	2.53	7.27
THOMAS	1.03	1.33	1.46	1.72
TIFT	5.35	5.24	6.33	15.74
TOOMBS	0.74	0.35	1.55	1.95
TOWNS	0.00	0.00	0.00	0.00
TREUTLEN	0.06	0.19	0.11	0.11
TROUP	0.05	0.04	0.01	0.02
TURNER	1.85	1.47	0.97	4.27
TWIGGS	0.17	0.36	0.02	0.71
UNION	0.00	0.00	0.00	0.00
UPSON	0.05	0.10	0.14	0.14
WALKER	0.00	0.00	0.00	0.00
WALTON	0.00	0.04	5.90	0.07
WARE	0.10	0.09	0.51	0.60
WARREN	0.00	0.00	0.00	0.00
WASHINGTON	1.16	1.45	2.23	5.38
WAYNE	0.64	0.60	0.77	1.32
WEBSTER	0.87	0.20	0.65	1.88
WHEELER	1.39	1.75	0.51	1.25
WHITE	0.36	0.04	0.05	0.03
WHITFIELD	0.04	0.05	0.08	0.11
WILCOX	3.50	4.58	11.35	14.32
WILKES	0.00	0.00	0.00	0.00
WILKINSON	0.01	0.02	0.10	0.09
WORTH	3.03	2.91	0.82	5.47
TOTAL	311.60	306.57	307.54	494.10

TABLE A-6.- PERMITTED COMMERCIAL GROUND-WATER WITHDRAWALS BY COUNTY IN Mgal/day (ANNUAL AVERAGE)

COUNTY	1980	1981	1982	1983	1984	1985	1986	1987
APPLING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ATKINSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BAKER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BANKS	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
BARROW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BARTOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BEN HILL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BERRIEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BLECKLEY	0.14	0.11	0.11	0.10	0.10	0.09	0.11	0.11
BRANTLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BROOKS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRYAN	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
BULLOCH	0.35	0.36	0.35	0.36	0.33	0.37	0.00	0.62
BURKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BUTTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALHOUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAMDEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CANDLER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARROLL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CATOOSA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHARLTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHATHAM	0.46	0.35	0.35	0.43	0.38	0.74	0.97	0.67
CHATTAHOOCHEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHATTOOGA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHEROKEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLARKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLAYTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLINCH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COFFEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLQUITT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLUMBIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COOK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COWETA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRAWFORD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRISP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DADE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DAWSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DECATUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEKALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DODGE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DOOLY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DOUGHERTY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DOUGLAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EARLY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECHOLS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EFFINGHAM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELBERT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EMANUEL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EVANS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FANNIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FAYETTE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOYD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FORSYTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FRANKLIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FULTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GILMER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GLASCOCK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GLYNN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GORDON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.96
GRADY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GREENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GWINNETT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HABERSHAM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HALL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HANCOCK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARALSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARRIS	0.11	0.12	0.17	0.17	0.16	0.00	0.00	0.00
HART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEARD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HENRY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOUSTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IRWIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JACKSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JASPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JEFF DAVIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JEFFERSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JENKINS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JOHNSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JONES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAMAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LANIER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAURENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIBERTY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINCOLN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LONG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWNDES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUMPKIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MACON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MADISON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARION	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCDUFFIE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCINTOSH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MERIWETHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MILLER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITCHELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MONROE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MONTGOMERY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MORGAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MURRAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MUSCOGEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NEWTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OCONEE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OGLETHORPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAULDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PEACH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PICKENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIERCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIKE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61
POLK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PULASKI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PUTNAM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QUITMAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RABUN	0.00	0.00	0.00	0.00	0.12	0.00	0.11	0.15
RANDOLPH	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
RICHMOND	0.39	0.32	0.31	0.29	0.30	0.29	0.33	0.31
ROCKDALE	0.03	0.08	0.03	0.03	0.09	0.02	0.06	0.02
SCHLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCREVEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEMINOLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPALDING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEPHENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STEWART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUMTER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TALBOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TALIAFERRO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TATTNALL	0.95	0.91	0.87	0.90	0.94	0.79	0.93	0.88
TAYLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TELFAIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TERRELL	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
THOMAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TIFT	0.17	0.16	0.14	0.16	0.15	0.16	0.13	0.14
TOOMBS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOWNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TREUTLEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TROUP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TURNER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TWIGGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UNION	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UPSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WALKER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WALTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WARE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WARREN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASHINGTON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WAYNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEBSTER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WHEELER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WHITE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WHITFIELD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILCOX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILKES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WILKINSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WORTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	4.38	4.44	4.24	4.47	4.87	4.28	5.68	9.45

TABLE A-7. - GROUND-WATER WITHDRAWALS FOR THERMOELECTRIC POWER GENERATION IN Mgal/day (ANNUAL AVERAGE)

THERMOELECTRIC PLANTS IN GEORGIA:

NAME	1980	1981	1982	1983	1984	1985	1986	1987
PT. WENTWORTH	1.24	1.19	1.13	0.80	1.01	1.44	0.97	0.80
RIVERSIDE	1.86	1.66	1.91	1.04	1.45	1.90	2.16	1.41
PLANT VOGTLE	0.21	0.29	0.28	0.40	0.36	0.86	1.91	3.39
ARKWRIGHT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HARLEE BRANCH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EDWIN I. HATCH	0.21	0.28	0.25	0.22	0.21	0.22	0.19	0.23
PLANT MCMANUS	0.04	0.04	0.03	0.02	0.01	0.01	0.01	0.02
ATKINSON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCDONOUGH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PLANT YATES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WANSLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITCHELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PLANT BOWEN	0.00	0.00	0.00	0.00	1.74	0.00	0.00	0.00
HAMMOND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRISP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCINTOSH	0.11	0.12	0.15	0.31	0.33	0.27	0.20	0.20
PLANT SCHERER	0.07	0.09	0.07	0.07	0.08	0.06	0.06	0.03
SEPCO-OPERATIONS	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
SAVANNAH STATION	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	3.95	3.88	4.03	3.07	5.40	4.97	5.71	6.29

TABLE A-8. - PERMITTED GROUND WATER USE BY HYDROLOGIC UNIT CODE (HUC), 1987

OGEECHEE-SAVANNAH RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
03060102	0.151
03060103	0.000
03060104	0.000
03060105	0.000
03060106	17.948
03060108	2.156
03060109	69.988
03060201	2.098
03060202	5.509
03060203	3.385
03060204	13.806
TOTAL	115.041

ALTAMAHA-ST.MARY'S RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
03070101	0.511
03070102	21.455
03070103	13.692
03070104	23.959
03070105	2.475
03070106	71.941
03070107	3.788
03070201	11.880
03070202	0.786
03070203	72.434
03070204	34.603
TOTAL	257.524

SUWANEE RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
03110103	4.292
03110201	0.438
03110202	19.982
03110203	12.266
03110204	1.579
TOTAL	38.557

OCHLOCKNEE RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
03120001	0.000
03120002	0.372
03120003	0.000
TOTAL	0.372

APALACHICOLA RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
03130001	0.779
03130002	0.102
03130003	0.100
03130004	0.132
03130005	1.106
03130006	2.524
03130007	4.956
03130008	33.438
03130009	2.235
03130010	1.180
TOTAL	46.552

ALABAMA RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
03150101	0.769
03150102	0.000
03150103	0.343
03150104	3.670
03150105	2.524
03150108	0.000
TOTAL	7.306

UPPER TENNESSEE RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
06010202	0.000

MIDDLE TENNESSEE-HIWASSEE RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
06020001	1.332
06020002	0.223
06020003	0.000
TOTAL	1.555

MIDDLE TENNESSEE-ELK RIVER BASIN

HUC	GROUND-WATER USE (Mgal/day)
06030001	0.000

TOTAL 466.907

TABLE A-9. - PERMITTED GROUND-WATER USE BY AQUIFER, 1987

AQUIFER	GROUND-WATER USE (Mgal/day)
FLORIDAN	344.10
PALEOZOIC	8.64
CRETACEOUS	83.60
CLAYTON	12.79
CLAIBORNE	14.83
CRYSTALLINE ROCK	3.10
TOTAL	466.66

APPENDIX B: ANALYSES OF SAMPLES COLLECTED DURING 1987 FOR THE GEORGIA GROUND-WATER MONITORING NETWORK

All water quality samples that are collected for the Georgia Ground-Water Monitoring Network are subjected to a Standard Analysis which includes tests for five 'indicator' parameters, twelve common pesticides and industrial chemicals, and thirty metals. Analyses for additional parameters may be included for samples that are collected from an area where a possibility of ground-water pollution exists due to regional activities. These optional screens include tests for agricultural chemicals, coal-tar creosote, phenols and anilines, and volatile organic compounds (refer to Tables B-1 through B-4). Because parameters other than the five 'indicators' and eight of the metals of the Standard Analysis were detected very rarely, other parameters are listed in the appendix only when they were detected.

For this appendix, the following abbreviations are used:

SU = standard units,

mg/L = milligrams per liter (parts per million),

ug/L = micrograms per liter (parts per billion), and

umho/cm = micromhos per centimeter.

Table B-1.- Standard water quality analysis: indicator parameters, Organic Screens #2 and #4, and ICP metal screen

Parameter	Detection Limit	
pH	---	SU
Spec. Cond.	1.0	umho/cm
Chloride	0.1	mg/L
Sulfate	2.0	mg/L
Nitrite/nitrate	0.02	mg/L
ORGANIC SCREEN	#2	
Dicofol	0.10	ug/L
Endrin	0.03	ug/L
Lindane	0.008	ug/L
Methoxyclor	0.30	ug/L
PCB's	0.60	ug/L
Permethrin	0.30	ug/L
Toxaphene	1.20	ug/l
ORGANIC SCREEN	#4	
2,4-D	5.2	ug/L
Acifluorfen	1.0	ug/L
Chloramben	0.2	ug/L
Silvex	0.1	ug/L
Trichlorfon	2.0	ug/L
ICP METAL SCREEN		
Calcium	0.0	mg/L
Magnesium	0.0	mg/L
Sodium	0.0	mg/L
Potassium	0.5	mg/L

Parameter	Detection Limit	
ICP METAL SCREEN, Cont.		
Silver	10	ug/L
Aluminum	50	ug/L
Arsenic	50	ug/L
Gold	25	ug/L
Barium	10	ug/L
Beryllium	10	ug/L
Bismuth	50	ug/L
Cadmium	10	ug/L
Cobalt	10	ug/L
Chromium	10	ug/L
Copper	10	ug/L
Iron	10	ug/L
Manganese	10	ug/L
Molybdenum	10	ug/L
Nickel	25	ug/L
Lead	25	ug/L
Antimony	50	ug/L
Selenium	3	ug/L
Tin	50	ug/L
Strontium	10	ug/L
Titanium	10	ug/L
Thallium	50	ug/L
Vanadium	10	ug/L
Yttrium	10	ug/L
Zinc	10	ug/L
Zirconium	10	ug/L

Table B-2.- Additional water quality analyses: cyanide, mercury, and Organic Screens #1, #3, #5, and #7

Parameter	Detection Limit		Parameter	Detection Limit	
Cyanide	0.05	ug/L	Mercury	0.5	ug/L
			ORGANIC SCREEN #1		
Alachlor	3.00	ug/L	Malathion	1.40	ug/L
Atrazine	0.44	ug/L	Metolachlor	2.40	ug/L
Azodrin	1.00	ug/L	Metribuzin	1.25	ug/L
Chloropyrifos	0.80	ug/L	Mevinphos	1.40	ug/L
Cynazine	1.00	ug/L	Napropamide	0.81	ug/L
Dasanit	0.60	ug/L	Parathion (E)	0.08	ug/L
DCPA	0.01	ug/L	Parathion (M)	0.10	ug/L
Demeton	1.00	ug/L	Pebulate	1.81	ug/L
Diazinon	1.00	ug/L	Pendimethalin	1.80	ug/L
Dimethoate	0.50	ug/L	Phorate	1.00	ug/L
Disyton	1.00	ug/L	Profluralin	2.00	ug/L
Eptam	1.70	ug/L	Simazine	1.25	ug/L
Ethoprop	0.50	ug/L	Sutan	1.25	ug/L
Fluchloralin	15.0	ug/L	Terbufos	3.00	ug/L
Fonophos	0.50	ug/L	Trifluralin	2.00	ug/L
Guthion	2.00	ug/L	Vernam	0.56	ug/L
Isopropalin	2.00	ug/L			
			ORGANIC SCREEN #3		
Dinoseb	0.10	ug/L			
			ORGANIC SCREEN #5		
Carbaryl	10.0	ug/L	Linuron	0.06	ug/L
Carbofuran	2.0	ug/L	Methomyl	0.03	ug/L
Diuron	0.03	ug/L	Monuron	0.04	ug/L
Fluometuron	0.08	ug/l	Temik	0.20	ug/L
			ORGANIC SCREEN #7		
EDB	1	ug/L			

Table B-3.- Additional water quality analyses: Organic Screens #8 and #9

ORGANIC SCREEN #8

Parameter	Detection Limit
Napthalene	10 ug/L
2-Chloronaphthalene	10 ug/L
Acenaphthylene	10 ug/L
Acenaphthene	10 ug/L
Fluorene	10 ug/L
Phenanthrene	10 ug/L
Anthracene	10 ug/L
Fluoranthene	10 ug/L
Pyrene	10 ug/L
Benzo(a)anthracene	100 ug/L
Benzo(b)fluoranthene	100 ug/L
Benzo(k)fluoranthene	100 ug/L
Benzo(a)pyrene	100 ug/L
Indeno(1,2,3-cd)pyrene	100 ug/L
Benzo(ghi)perylene	100 ug/L

ORGANIC SCREEN #9

Parameter	Detection Limit
Anilene	10 ug/L
2-Chlorophenol	10 ug/L
2-Nitrophenol	10 ug/L
Phenol	10 ug/L
2,4-Dimethylphenol	10 ug/L
2,3-Dichlorophenol	10 ug/L
2,4,6-Trichlorophenol	10 ug/L
Parachlorometa cresol	10 ug/L
2,4-Dinitrophenol	100 ug/L
4,6-Dinitro-o-cresol	50 ug/L
Pentachlorophenol	25 ug/L
4-Nitrophenol	25 ug/L

Table B-4.- Additional water quality analyses: Organic Screen #10

ORGANIC SCREEN #10

Parameter	Detection Limit
Methyl chloride	1 ug/L
Trichlorofluoromethane	1 ug/L
1,1-Dichloroethylene	1 ug/L
1,1-Dichloroethane	1 ug/L
1,2-Trans-dichloroethylene	1 ug/L
Chloroform	1 ug/L
1,2-Dichloroethane	1 ug/L
1,1,1-Trichloroethane	1 ug/L
Carbon tetrachloride	1 ug/L
Dichlorobromomethane	1 ug/L
1,2-Dichloropropane	1 ug/L
Trans-1,3-dichloropropene	1 ug/L
Trichloroethylene	1 ug/L
Benzene	1 ug/L
Chlorodibromomethane	1 ug/L
1,1,2-Trichloroethane	1 ug/L
Cis-1,3-dichloropropene	1 ug/L
Bromoform	1 ug/L
1,1,2,2-Tetrachloroethane	1 ug/L
Tetrachloroethylene	1 ug/L
Toluene	1 ug/L
Chlorobenzene	1 ug/L
Ethylbenzene	1 ug/L
Acetone	50 ug/L
Methyl ethyl ketone	25 ug/L
Carbon disulfide	1 ug/L
Vinyl chloride	1 ug/L
Isopropyl acetate	1 ug/L
2-Hexanone	1 ug/L
Methyl isobutyl ketone	1 ug/L
Styrene	1 ug/L
Xylene	1 ug/L

WATER QUALITY ANALYSES OF THE CRETACEOUS AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-K001 Englehard Kaolin Company #2, Gordon Wilkinson County 1987/06/23	5.1	0.8	0.2	1.5	0.7	15	ND	2.1	ND	0.25	ND	ND	26	Al = 27 ug/L	
GWN-K002 Irwinton #2 Wilkinson County 1987/06/23	5.0	1.3	0.3	1.7	ND	130	ND	2.1	4.4	0.29	ND	ND	26	Al = 53 ug/L Cu = 55 ug/L Zn = 11 ug/L $CHCl_3$ = 1.6 ug/L	10
GWN-K003 Sandersville #7B Washington County 1987/04/22	6.5	15.9	1.4	2.0	0.6	595	32	3.2	7.0	ND	21	56	110		1,5,10
GWN-K004 Midville Experiment Station TW 1 Burke County 1987/01/28	7.1	8.0	1.7	11.2	4.5	3800	165	1.5	13.0	ND	475	150	133		1,3,5
GWN-K005 Richmond County #101, Augusta Richmond County 1987/04/21	5.6	0.3	0.2	1.0	ND	ND	ND	2.6	ND	0.53	ND	ND	14		Hg,8,9

WATER QUALITY ANALYSES OF THE CRETACEOUS AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-K005 Richmond County #101, Augusta Richmond County 1987/09/23	4.9	0.3	0.2	1.1	ND	ND	ND	2.1	ND	ND	ND	ND	14		Hg,8,9
GWN-K006A Huber Corp. #6 Twiggs County 1987/06/24	5.8	4.1	0.5	3.2	1.4	23	ND	3.1	4.6	0.06	15	56	50	Zn = 21 ug/L	Cn
GWN-K007 Jones County #4, Macon Jones County 1987/06/23	5.6	1.7	0.3	1.3	0.5	ND	ND	2.1	ND	0.16	12	11	23		
GWN-K008 Laurens Park Mill #3, Mohasco Corp., East Dublin Laurens County 1987/01/29	6.2	23.7	1.2	2.0	3.6	4580	54	1.5	15.0	ND	86	105	148	Al = 20 ug/L Cu = 12 ug/L	1,5,10
GWN-K009 Marshallville #1 Macon County 1987/06/25	5.2	3.1	0.3	1.1	ND	1880	ND	2.1	13.5	ND	ND	ND	40	Al = 175 ug/L	1,5,10

WATER QUALITY ANALYSES OF THE CRETACEOUS AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-K010 Fort Valley #1 Peach County 1987/01/29	4.9	1.1	0.4	2.7	ND	ND	ND	2.5	2.0	1.07	ND	ND	29		10
GWN-K010 Fort Valley #1 Peach County 1987/06/25	5.3	1.1	0.4	2.6	ND	14	ND	3.1	ND	1.10	ND	ND	30		10
GWN-K011 Warner Robins #1A Houston County 1987/01/29	4.7	0.5	0.2	1.1	ND	70	ND	1.0	2.0	0.15	ND	ND	15		10
GWN-K011 Warner Robins #1A Houston County 1987/06/24	5.4	0.5	0.2	0.9	ND	24	ND	1.0	ND	0.26	ND	ND	13	Cu = 22 ug/L	10
GWN-K012 Perry, Holiday Inn Well Houston County 1987/01/29	3.9	0.5	0.2	1.1	ND	180	12	1.5	9.5	ND	ND	ND	46	Al = 380 ug/L Zn = 99 ug/L	1,5,10

WATER QUALITY ANALYSES OF THE CRETACEOUS AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-K012 Perry, Holiday Inn Well Houston County 1987/06/24	4.1	1.3	0.2	1.0	0.6	165	10	2.1	9.2	0.03	ND	ND	44	Al = 325 ug/L Zn = 58 ug/L	1,5,10
GWN-K013 Omaha #1 Stewart County 1987/11/18	9.1	2.4	ND	44.9	0.4	ND	ND	13.7	8.1	ND	ND	45	208		1,3,5
GWN-K014 Fort Benning Test Well Chattahoochee County 1987/11/17	7.8	12.3	0.1	22.6	2.6	155	ND	8.8	7.6	ND	ND	230	166		
GWN-K015 Georgetown #2 Quitman County 1987/11/18	9.0	0.7	ND	79.6	ND	ND	ND	10.8	ND	ND	ND	16	334	Al = 28 ug/L	10
GWN-K016 Packaging Corporation of America, North Well Bibb County 1987/01/29	5.0	0.4	0.2	4.3	ND	50	ND	2.0	ND	0.34	ND	ND	27		10

WATER QUALITY ANALYSES OF THE CRETACEOUS AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-K016 Packaging Corporation of America, North Well Bibb County 1987/06/24	5.5	0.4	0.2	4.3	ND	360	ND	2.1	2.6	0.38	ND	ND	28		10
GWN-K017 Well #1 (East) Burke County 1987/04/22	7.8	3.7	0.6	33.9	1.9	195	10	3.2	4.0	ND	29	49	179		Hg,1,3,5,8, 9,10
GWN-K018A Buena Vista #6 Marion County 1987/03/19	5.7	3.0	0.4	1.4	ND	210	ND	3.1	5.2	0.08	ND	ND	32	Al = 85 ug/L $CHCl_3$ = 9.8 ug/L Chldibrmeth = 1.9 ug/L Dichlbrmeth = 4.2 ug/L	10
GWN-K019 Hephzibah, Murphy Street Well (#3) Richmond County 1987/04/21	5.7	0.5	0.4	1.6	0.5	10	ND	2.1	ND	0.08	ND	ND	19	Cu = 25 ug/L	10
GWN-K019 Hephzibah, Murphy Street Well (#3) Richmond County 1987/09/23	5.0	0.6	0.4	1.4	ND	15	ND	3.6	2.7	0.04	ND	ND	18	Cu = 16 ug/L	10

WATER QUALITY ANALYSES OF THE PROVIDENCE AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 &NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PD001 TW 10 - Albany Dougherty County 10/27/1987	8.8	7.9	0.8	74.6	2.0	1870	ND	4.0	4.7	ND	ND	90	354	Al = 1,930 ug/L Ti = 55 ug/L V = 11 ug/L Zn = 33 ug/L	
GWN-PD002A Preston #1 Webster County 03/19/1987	6.5	7.5	0.5	1.6	0.8	12	ND	3.1	ND	0.39	20	13	55		1,3,5,10
GWN-PD003 Fort Gaines #2 Clay County 11/18/1987	8.2	6.0	1.1	76.2	1.3	20	ND	10.8	12.4	ND	ND	105	352		
GWN-PD004A Americus #3 Sumter County 03/19/1987	7.2	32.1	1.9	2.8	2.4	125	18	2.1	9.0	0.06	ND	210	187		1,3,5,10

WATER QUALITY ANALYSES OF THE CLAYTON AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-CT001 Turner City Well Dougherty County 1987/10/26	7.6	10.0	4.8	34.3	2.7	980	17	3.0	11.3	ND	14	260	249		
GWN-CT002A Burton Thomas Well Sumter County 1987/10/08	7.7	37.8	3.2	5.9	1.5	44	ND	2.6	20.0	ND	ND	330	227	Zn = 26 ug/L	1,3,5
GWN-CT003A Dawson, Lemon St. Well Terrell County 1987/10/08	7.8	23.1	3.1	20.8	2.4	21	ND	3.1	9.6	ND	ND	485	218		1,3,5,10
GWN-CT004 C.T. Martin TW 2 Randolph County 1987/10/29	7.5	42.3	3.4	4.6	1.7	150	ND	3.0	10.1	ND	ND	295	245		1,3,5
GWN-CT005A Cuthbert #3 Randolph County 1987/10/08	7.5	51.3	3.6	1.7	1.1	365	30	5.2	13.9	ND	15	155	281		1,3,5,10

WATER QUALITY ANALYSES OF THE CLAYTON AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 &NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-CT006B Fort Gaines Test Well Clay County 1987/11/18	7.3	126.1	3.8	6.7	3.1	14400	460	8.8	70.1	ND	45	200	557	Ni = 25 ug/L V = 15 ug/L Zn = 240 ug/L	1,3,5

WATER QUALITY ANALYSES OF THE CLAIBORNE AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-CL001 TW 5-Albany Dougherty County 1987/10/27	7.3	50.0	8.6	8.4	2.9	570	ND	5.0	2.9	ND	ND	385	329		
GWN-CL002 Unadilla #3 Dooly County 1987/10/07	7.3	38.4	0.6	1.3	0.5	28	ND	3.1	7.5	0.17	12	115	197	Al = 40 ug/L	1,3,5
GWN-CL003 Pete Long TW 2 Lee County 1987/10/07	5.4	1.3	0.3	1.4	ND	730	18	5.2	ND	ND	ND	14	19		1,3,5
GWN-CL004 Plains #3 Sumter County 1987/03/19	5.0	1.8	1.2	4.1	0.8	115	61	7.6	ND	3.10	17	14	53	Al = 31 ug/L Cu = 22 ug/L Y = 12 ug/L Zn = 33 ug/L	1,3,5,10
GWN-CL005 Shellman #2 Randolph County 1987/10/08	4.3	4.7	2.7	3.7	3.6	37	460	15.5	ND	6.75	61	40	110	Al = 255 ug/L Co = 20 ug/L Cu = 29 ug/L Y = 65 ug/L Zn = 26 ug/L	

WATER QUALITY ANALYSES OF THE CLAIBORNE AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-CL006 Georgia Tubing Company Well Early County 1987/11/18	8.0	34.7	8.3	18.4	3.5	73	ND	6.0	3.9	ND	ND	460	297		1,3,5
GWN-CL007B Vet. Memorial State Park TW 2 Crisp County 1987/03/16	7.7	54.8	2.0	2.6	1.3	260	11	3.1	6.0	1.42	ND	185	288		

WATER QUALITY ANALYSES OF THE JACKSONIAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-J001 Vidette #1 Burke County 1987/04/22	7.7	57.3	0.9	3.8	ND	17	ND	9.4	2.0	3.70	51	31	329		1,3,5
GWN-J001 Vidette #1 Burke County 1987/09/24	7.2	58.1	0.9	4.0	ND	14	ND	10.4	2.4	2.50	51	33	326		1,3,5
GWN-J002 Girard Elementary School Well Burke County 1987/04/21	7.9	44.9	1.3	2.7	1.6	ND	ND	3.2	ND	0.06	ND	98	261	Zn = 10 ug/L	1,3,5,10
GWN-J002A Oakwood Village MHP #2 Burke County 1987/09/23	6.8	43.0	0.9	1.5	0.7	49	ND	3.1	ND	0.50	59	60	237	Zn = 93 ug/L	1,3,5,10
GWN-J003 J. W. Black Well, Canoochee Emanuel County 1987/01/28	7.6	33.8	6.1	9.7	1.6	115	110	9.1	ND	ND	705	295	246	Zn = 38 ug/L	1,5,10

WATER QUALITY ANALYSES OF THE JACKSONIAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-J004 Wrightsville #4, North Myrtle Street Well Johnson County 1987/01/29	7.6	48.1	1.7	2.7	0.9	10	ND	2.5	5.0	0.51	25	155	257	Zn	1,5
GWN-J004 Wrightsville #4, North Myrtle Street Well Johnson County 1987/06/23	7.5	55.2	1.4	2.6	1.1	25	ND	3.1	2.9	0.62	45	145	277	V = 15 ug/L Zn = 10 ug/L	1,5
GWN-J005 Cochran #3 Bleckley County 1987/06/24	7.7	65.3	2.5	3.0	2.1	225	26	2.1	13.5	0.02	10	235	360	Zn = 35 ug/L	1,3,5,10
GWN-J006 Wrens #4 Jefferson County 1987/04/22	7.2	24.6	1.0	1.5	0.5	215	13	2.1	9.0	ND	13	91	151	Zn = 19 ug/L	1,5,10
GWN-J006 Wrens #4 Jefferson County 1987/09/24	6.5	24.9	1.0	1.5	ND	215	12	2.1	7.3	ND	13	100	148		1,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA001 Thunderbolt #1 Chatham County 05/27/1987	7.8	26.6	9.9	17.3	2.4	ND	ND	16.7	6.7	ND	11	405	256		
GWN-PA002A Savannah #6 Chatham County 05/27/1987	7.9	24.1	8.5	11.4	1.8	ND	ND	5.2	6.0	ND	12	305	215		8,9
GWN-PA003 Layne-Atlantic Well, Savannah Chatham County 05/27/1987	7.9	29.6	8.0	9.8	1.8	33	ND	6.2	6.0	ND	21	315	226		8,9
GWN-PA004A Tybee Island #2 Chatham County 05/27/1987	8.0	31.1	22.4	38.5	4.2	ND	ND	29.2	100.0	ND	ND	1,400	483		
GWN-PA005A Interstate Paper Company #2, Riceboro Liberty County 12/09/1987	7.9	25.4	15.2	16.1	2.8	20	ND	6.9	44.2	0.04	30	480	307		

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA006 Hinesville #5 Liberty County 12/09/1987	7.0	22.4	12.3	14.1	2.4	23	ND	6.4	27.4	0.11	23	395	266		
GWN-PA007 Darien New Well McIntosh County 12/09/1987	7.7	42.5	27.4	25.0	1.9	78	ND	26.6	179.1	0.04	56	810	535		
GWN-PA008 ITT/Rayonier #4D, Doctortown Wayne County 12/09/1987	7.8	29.3	17.2	17.4	2.5	ND	ND	9.8	71.6	0.04	78	605	355		
GWN-PA009A Brunswick Pulp and Paper Company South 1 Glynn County 12/08/1987	7.2	40.4	25.3	13.9	1.6	24	ND	18.7	125.3	0.03	50	455	457	Zn = 25 ug/L	8,9
GWN-PA009B Brunswick Pulp and Paper Company South 2 Glynn County 12/08/1987	7.6	87.4	54.1	123.0	3.2	240	ND	267.5	358.2	0.03	105	1180	1490		8,9

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA009C Miller Ball Park TW 25 Glynn County 12/08/1987	7.7	132.0	93.0	550.0	11.1	380	ND	1092.0	425.4	0.03	69	2330	3990	Zn = 20 ug/L	8,9
GWN-PA010B Gilman Paper Company #11, St. Marys Camden County 12/07/1987	7.4	70.9	39.5	50.0	2.5	17	ND	108.2	290.9	0.02	40	820	876		
GWN-PA011B St. Mary's #3 Camden County 12/07/1987	7.6	68.9	35.1	23.6	2.0	23	ND	36.9	290.9	0.02	40	700	696		
GWN-PA012 Folkston #3 Charlton County 12/07/1987	7.7	64.9	29.3	22.0	2.1	67	ND	32.4	176.9	0.03	34	570	632		
GWN-PA013 Waycross #3 Ware County 12/07/1987	7.7	38.7	17.2	15.6	1.9	25	ND	15.7	71.6	0.03	72	375	392		8,9

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA014 Statesboro #7 Bulloch County 01/27/1987	7.2	31.2	5.0	6.6	0.8	60	27	5.5	8.0	ND	37	195	220		
GWN-PA015 King Finishing Company, Fire Pump Well, Dover Screven County 01/29/1987	7.7	24.2	8.5	8.2	3.9	68	ND	2.0	9.5	ND	ND	410	225		Cn
GWN-PA016 Millen #1 Jenkins County 01/28/1987	7.8	42.8	3.0	4.4	2.2	15	31	4.0	10.0	ND	ND	195	252		1,5
GWN-PA016 Millen #1 Jenkins County 06/23/1987	7.9	43.4	3.0	4.0	2.6	26	30	5.1	9.8	0.03	ND	205	267		1,5
GWN-PA017 Swainsboro #7 Emanuel County 01/28/1987	7.5	44.7	2.0	3.0	ND	ND	ND	1.5	ND	0.04	165	175	242		

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA017 Swainsboro #7 Emanuel County 06/23/1987	7.8	46.2	1.8	2.9	1.2	13	ND	2.1	ND	0.07	165	165	256		
GWN-PA018 Metter #2 Candler County 01/27/1987	7.8	28.1	3.3	9.9	1.5	ND	50	4.0	5.0	ND	27	245	204		
GWN-PA019 Douglas #4 Coffee County 02/18/1987	7.8	43.9	18.6	10.6	1.4	38	27	10.6	80.0	ND	55	460	394		
GWN-PA020 Lakeland #2 Lanier County 02/18/1987	7.6	42.5	16.0	4.5	1.0	10	ND	4.2	71.0	ND	27	190	352	Zn = 40 ug/L	10
GWN-PA020 Lakeland #2 Lanier County 07/29/1987	7.9	42.2	16.1	4.6	0.8	25	ND	4.1	79.8	ND	28	200	340		10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA021 Valdosta #1 Lowndes County 02/25/1987	7.5	32.8	4.3	3.0	ND	ND	ND	5.3	34.0	ND	42	53	219	Zn = 10 ug/L	1,5,8,9,10
GWN-PA021 Valdosta #1 Lowndes County 07/29/1987	7.7	35.3	4.2	3.1	ND	ND	ND	13.3	41.8	ND	47	60	223		1,5,8,9,10
GWN-PA022 Thomasville #6 Thomas County 02/25/1987	7.8	41.0	19.7	7.2	0.6	ND	ND	7.4	70.0	0.07	22	330	388		
GWN-PA023 Cairo #8 Grady County 02/25/1987	8.0	33.5	16.4	10.5	1.7	ND	ND	7.4	35.0	ND	125	345	336	Mo = 43 ug/L	10
GWN-PA024 Bainbridge #1 Decatur County 02/25/1987	8.0	42.5	1.2	1.7	ND	ND	ND	3.2	ND	1.43	10	37	207		1,3,5,7,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA024 Bainbridge #1 Decatur County 07/30/1987	7.7	35.0	3.3	1.8	ND	ND	ND	3.1	2.8	1.31	ND	37	203		1,3,5,7,10
GWN-PA025 Donalsonville, East 7th Street Well Seminole County 02/25/1987	7.7	51.5	0.6	3.6	0.5	ND	ND	5.3	ND	1.41	ND	24	267		Cn,1,3,5,10
GWN-PA025 Donalsonville, East 7th Street Well Seminole County 07/30/1987	7.9	50.2	0.6	3.4	ND	ND	ND	61.3	ND	1.37	ND	26	258		Cn,1,3,5,10
GWN-PA026 Colquitt #3 Miller County 02/26/1987	7.7	42.5	0.5	1.9	ND	ND	ND	3.2	ND	1.53	ND	19	215		1,3,5,10
GWN-PA026 Colquitt #3 Miller County 07/30/1987	7.9	40.5	0.5	1.9	ND	ND	ND	3.1	ND	1.66	ND	20	206		1,3,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 &NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA027 Camilla New Well (#4) Mitchell County 02/26/1987	7.3	28.6	4.1	2.1	0.5	ND	ND	2.1	ND	0.33	135	275	221		1,3,5,8,9,10
GWN-PA027 Camilla New Well (#4) Mitchell County 07/29/1987	8.0	40.9	1.1	1.7	ND	ND	ND	2.0	ND	0.32	10	38	209	Cu = 11 ug/L	1,3,5,8,9,10
GWN-PA028 Moultrie #1 Colquitt County 02/24/1987	7.9	35.5	20.8	26.9	4.0	ND	ND	10.6	122.0	ND	94	2100	455		
GWN-PA029 Adel #6 Cook County 02/19/1987	7.7	45.1	16.2	3.6	0.7	61	30	4.2	71.0	ND	13	320	361		Cn,1,5,10
GWN-PA029 Adel #6 Cook County 07/28/1987	8.0	47.4	17.6	3.7	0.8	55	27	50.0	116.2	0.03	14	365	373	Cu = 10 ug/L	Cn,1,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA030 Nashville Mills #2, Amoco Fabrics Company Berrien County 02/18/1987	8.0	39.4	16.0	4.9	1.2	11	ND	5.3	72.0	ND	52	230	340		
GWN-PA030 Nashville Mills #2, Amoco Fabrics Company Berrien County 07/28/1987	8.0	39.0	16.0	4.7	1.1	12	ND	6.1	78.2	0.03	53	240	325		
GWN-PA031 Tifton #6 Tift County 02/24/1987	8.0	41.0	8.5	2.5	0.6	ND	ND	2.1	ND	ND	64	265	263		
GWN-PA032 Ocilla #3 Irwin County 02/18/1987	7.8	33.3	5.0	2.0	ND	140	28	2.0	ND	ND	76	150	199		
GWN-PA033 Fitzgerald Well C Ben Hill County 02/17/1987	7.9	23.9	8.3	2.8	0.7	295	16	3.2	ND	ND	2090	255	181	Zn = 32 ug/L	10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA034 McRae #1 Telfair County 06/24/1987	7.8	47.7	10.0	4.8	2.3	180	97	6.2	3.8	0.02	260	755	344		
GWN-PA035 Mount Vernon New Well Montgomery County 06/24/1987	7.8	28.0	12.8	5.7	4.9	87	28	4.1	8.5	0.02	88	500	274	Zn = 40 ug/L	
GWN-PA036 Vidalia #1 (Sixth Street Well) Toombs County 06/24/1987	7.9	27.8	5.4	10.9	3.2	28	35	4.1	3.5	0.02	145	380	239		Cn
GWN-PA037 Hogan Monitoring Well Laurens County 02/17/1987	7.6	43.0	0.5	1.8	ND	915	15	4.2	ND	5.25	15	22	220	Al = 230 ug/L Zn = 200 ug/L	
GWN-PA038 Eastman #4 Dodge County 06/24/1987	7.6	43.3	1.4	2.0	1.2	22	ND	2.1	ND	0.24	110	98	240	Zn = 47 ug/L	1,3,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA039 Sylvester #1 Worth County 02/24/1987	7.7	46.8	7.4	3.4	1.0	ND	ND	3.2	ND	0.02	200	360	280	Mo = 10 ug/L	1,3,5,10
GWN-PA039 Sylvester #1 Worth County 07/29/1987	7.9	44.6	6.8	3.3	0.9	ND	ND	3.1	ND	0.80	200	375	270		1,3,5,10
GWN-PA040 Merck and Company #8 Dougherty County 03/17/1987	7.7	48.5	1.0	2.1	ND	ND	ND	4.2	ND	1.31	14	50	255		Cn
GWN-PA040 Merck and Company #8 Dougherty County 10/27/1987	7.4	51.3	1.1	2.3	0.5	ND	ND	5.0	ND	1.24	ND	55	270		Cn
GWN-PA041 TW 13 - Albany Dougherty County 03/18/1987	7.1	97.3	2.8	18.1	2.0	60	50	12.6	18.3	2.20	46	78	557	Al = 55 ug/L Zn = 23 ug/L T-12Diclrethln = 1.3 ug/L Tetclrethln = 3.7 ug/L	Cn,1,3,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 &NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA041 TW 13 - Albany Dougherty County 10/28/1987	7.0	90.1	2.4	17.2	2.4	115	13	18.9	31.0	6.86	39	76	575	V = 13 ug/L Zn = 15 ug/L Tetclrethln = 2.3 ug/L Toluene = 2.0 ug/L Xylene = 2.0 ug/L	Cn,1,3,5,10
GWN-PA042 Garrett OW 4 Lee County 03/17/1987	7.4	27.1	0.4	2.2	ND	ND	ND	5.2	ND	2.90	ND	13	157		Cn
GWN-PA042 Garrett OW 4 Lee County 10/28/1987	7.0	31.1	0.5	2.6	ND	21	ND	8.0	ND	3.50	ND	16	175		Cn
GWN-PA043 Newton #1 Baker County 02/26/1987	7.8	43.9	0.9	2.3	ND	ND	ND	3.2	ND	1.51	ND	39	220		1,3,5,10
GWN-PA043 Newton #1 Baker County 07/30/1987	8.0	40.8	1.0	2.5	ND	ND	ND	5.1	ND	1.66	ND	43	213		1,3,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA044 Sycamore #2 Turner County 02/26/1987	7.9	28.6	4.1	2.1	0.7	ND	ND	2.1	ND	0.10	135	275	184		1,3,5,10
GWN-PA045 Abbeville #2 Wilcox County 02/17/1987	7.7	49.1	3.6	2.0	1.5	33	ND	3.2	2.0	0.05	15	210	264		1,3,5,10
GWN-PA046B C. Tyson Well Crisp County 03/16/1987	7.9	45.0	0.8	2.3	ND	20	ND	4.2	ND	1.07	30	37	227	Cu = 100 ug/L Zn = 52 ug/L	1,3,5,10
GWN-PA047 Haley Farms TW 19 Lee County 03/17/1987	8.1	51.4	1.0	1.6	ND	170	ND	3.1	ND	1.95	17	68	246		1,3,5,10
GWN-PA047 Haley Farms TW 19 Lee County 10/29/1987	7.3	60.0	1.0	2.2	ND	14	ND	10.0	ND	7.32	ND	62	314		1,3,5,10

WATER QUALITY ANALYSES OF THE FLORIDAN AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 &NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-PA048 Doug Harvey TW 1 - Jakin Early County 03/18/1987	7.8	47.7	0.6	2.2	ND	3600	130	4.2	ND	2.20	ND	22	227	Al = 1,610 ug/L Mo = 11 ug/L/L Ti = 74 ug/L V = 14 ug/LL Y = 19 ug/L Zn = 40 ug/L	Cn,1,3,5,10
GWN-PA048 Doug Harvey TW 1 - Jakin Early County 11/18/1987	7.6	45.0	ND	1.8	ND	605	17	5.0	12.0	1.84	ND	24	229	Al = 685 ug/L Ti = 30 ug/L Zn = 27 ug/L	Cn,1,3,5,10

WATER QUALITY ANALYSES OF THE MIOCENE AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-MI001 W. J. McMillan Well Cook County 02/19/1987	8.0	22.5	13.6	6.6	1.4	2010	58	3.2	22.5	ND	21	115	233	Zn = 53 ug/L	Cn,1,5,10
GWN-MI001 W. J. McMillan Well Cook County 07/28/1987	8.2	21.7	13.4	6.4	1.3	375	26	4.1	3.6	0.03	20	125	223	Zn = 13 ug/L	Cn,1,5,10
GWN-MI002 Boutwell Well Lowndes County 02/18/1987	5.0	1.7	1.1	5.6	0.7	28	ND	7.4	ND	2.95	16	12	60	Al = 65 ug/L Cu = 10 ug/L Zn = 10 ug/L	1,5,8,9,10
GWN-MI002 Boutwell Well Lowndes County 07/29/1987	5.0	1.1	0.7	5.8	ND	25	ND	7.1	ND	3.10	ND	ND	48	Al = 59 ug/L	1,5,8,9,10
GWN-MI003 Coffin Park TW 3 Glynn County 05/27/1987	7.7	67.8	11.6	21.3	3.9	85	15	20.8	34.2	ND	11	455	481		10

WATER QUALITY ANALYSES OF THE MIOCENE AQUIFER SYSTEM

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-MI003 Coffin Park TW 3 Glynn County 12/08/1987	7.6	61.4	11.0	20.7	3.7	110	14	25.6	45.9	0.02	11	475	486		10
GWN-MI004 Hopeulikit TW 2 Bulloch County 01/27/1987	7.2	15.4	5.0	5.7	1.0	545	100	2.5	8.0	ND	73	90	139	Al = 67 ug/L Zn = 10 ug/L	
GWN-MI004 Hopeulikit TW 2 Bulloch County 05/26/1987	7.3	15.8	5.2	5.8	1.2	750	110	4.2	5.2	ND	73	90	144	Al = 83 ug/L Zn = 43 ug/L	

WATER QUALITY ANALYSES OF THE PIEDMONT UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-P001 Luthersville New Well Meriwether County 08/26/1987	6.8	7.2	2.7	15.0	2.7	1590	120	15.0	18.3	ND	ND	100	139	Zn = 39 ug/L	
GWN-P002 Riverdale, Delta Drive Well Clayton County 04/21/1987	6.8	9.2	1.3	9.4	1.6	ND	23	4.2	2.0	1.77	30	75	115		10
GWN-P002 Riverdale, Delta Drive Well Clayton County 09/22/1987	6.2	9.2	1.3	9.5	1.7	ND	23	3.6	3.3	1.19	32	82	108		10
GWN-P003 Fort McPherson Well Fulton County 04/28/1987	7.1	8.6	2.3	8.5	3.2	780	43	2.1	9.0	0.10	13	71	117	Al = 31 ug/L	8,9,10
GWN-P003 Fort McPherson Well Fulton County 10/05/1987	6.5	8.2	2.4	8.4	3.3	520	45	4.1	6.3	ND	13	77	101	Al = 37 ug/L Bs(2EthlHxl)pthal = 11 ug/L 12Diclprop = 1.5 ug/L	8,9,10

WATER QUALITY ANALYSES OF THE PIEDMONT UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-P004B Barton Brands Inc. #2 Fulton County 04/21/1987	6.5	17.5	3.6	24.3	2.9	135	1030	29.4	12.0	0.75	80	280	268		8,9,10
GWN-P004B Barton Brands Inc. #2 Fulton County 09/22/1987	6.1	13.1	2.7	20.6	2.5	1620	875	2.1	7.3	0.39	76	240	208	Zn = 17 ug/L	8,9,10
GWN-P005 Flowery Branch #1 Hall County 05/12/1987	7.2	22.9	4.0	1.6	1.9	ND	ND	3.1	2.5	0.02	30	88	150	Zn = 22 ug/L	10
GWN-P006A Shiloh #1 Harris County 12/10/1987	7.8	15.5	2.4	8.4	2.4	37	88	11.8	5.3	0.05	10	48	133	Al = 25 ug/L Zn = 10 ug/L	
GWN-P007 Hampton #6 Henry County 08/26/1987	7.3	13.4	1.3	4.5	2.1	98	10	11.0	9.7	0.11	38	67	112		10

WATER QUALITY OF THE PIEDMONT UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-P008 Wayne Poultry Company #4, Pendergrass Jackson County 05/12/1987	7.6	24.6	8.1	8.5	1.7	ND	ND	4.1	5.2	0.37	ND	71	214		
GWN-P009 Gray #4 Jones County 06/23/1987	7.1	14.9	7.6	13.6	4.2	1020	155	9.2	28.6	0.03	37	120	214		10
GWN-P010 Franklin Springs Well Franklin County 05/12/1987	5.9	4.3	2.3	4.2	2.7	10900	65	4.1	20.4	0.03	13	64	78	Al = 96 ug/L Zn = 295 ug/L	
GWN-P011 Danielsville #1 Madison County 05/12/1987	6.7	5.1	2.4	5.0	1.8	210	ND	3.1	ND	0.80	12	30	70	Zn = 41 ug/L	
GWN-P012 Nabisco Plant Well #1, Woodbury Meriwether County 08/26/1987	6.6	10.6	2.6	12.7	3.4	ND	ND	16.0	6.7	3.20	46	84	148	Cu = 12 ug/L Zn = 19 ug/L	

WATER QUALITY ANALYSES OF THE PIEDMONT UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 &NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-P013 Conyers, Rosser Street Well Rockdale County 08/26/1987	7.6	26.8	1.5	11.0	1.6	1440	82	8.0	16.9	ND	ND	84	204	Al = 145 ug/L Mo = 24 ug/L Ti = 26 ug/L Zn = 17 ug/L Tetclrethln = 10 ug/L	10
GWN-P014 Upson County, Sunset Village #1 Upson County 08/26/1987	5.5	0.2	0.2	1.4	1.6	ND	ND	4.0	ND	0.44	29	ND	17		
GWN-P015A P. Bolton (formerly Sanford) Well Dekalb County 04/27/1987	7.5	18.8	4.7	7.6	4.9	430	88	8.4	10.0	0.10	64	95	188	Zn = 97 ug/L	10
GWN-P015A P. Bolton Well Dekalb County 09/23/1987	6.9	17.4	4.6	7.6	4.8	520	95	5.2	6.6	ND	65	100	179	Zn = 15 ug/L	10
GWN-P016A Demorest Ball Park Well Habersham County 05/13/1987	6.5	11.2	1.3	4.8	1.9	555	83	5.2	3.9	1.13	17	93	96	Zn = 100 ug/L	10

WATER QUALITY ANALYSES OF THE BLUE RIDGE UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-BR001 Hiawassee #6 Towns County 1987/05/13	6.4	5.9	1.3	2.4	2.6	43	20	3.1	5.3	0.37	27	36	56	Al = 2 ug/L Zn = 95 ug/L	10
GWN-BR002A Notla Water Authority #3 Union County 1987/05/13	6.1	2.9	1.3	3.4	1.7	16	ND	5.2	ND	1.41	39	35	50		
GWN-BR003 Dawsonville, Shoal Hole Park Well Dawson County 1987/05/12	7.8	23.1	2.4	12.6	2.8	295	120	3.1	18.6	0.04	10	215	189		
GWN-BR004 Morganton Old Well Fannin County 1987/05/13	6.6	9.5	2.2	6.8	1.8	ND	ND	9.3	2.1	1.92	ND	97	102	Zn = 13 ug/L	Cn,10

WATER QUALITY ANALYSES OF THE VALLEY AND RIDGE UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Metals Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-VR001 Kingston Road Well, Rome Floyd County 08/06/1987	8.0	23.9	14.0	1.2	ND	ND	ND	2.0	ND	0.73	ND	15	213		10
GWN-VR002 Tri-County Hospital Well - Ft. Oglethorpe Catoosa County 01/26/1987	6.7	51.5	19.8	33.6	0.8	35	26	60.4	32.0	0.56	26	69	549	Al = 50 ug/L Cu = 14 ug/L	10
GWN-VR002 Tri-County Hospital Well - Ft. Oglethorpe Catoosa County 08/05/1987	7.4	70.9	24.6	26.3	1.0	45	66	53.0	25.3	1.07	31	90	610		10
GWN-VR003 Chickamauga, Crawfish Springs Walker County 01/26/1987	7.1	26.7	10.8	1.4	0.5	ND	ND	2.5	5.0	0.94	60	25	207	Al = 50 ug/L	10
GWN-VR003 Chickamauga, Crawfish Springs Walker County 08/05/1987	7.7	28.5	13.3	1.1	0.8	ND	ND	2.0	2.5	0.73	76	25	225		10

WATER QUALITY ANALYSES OF THE VALLEY AND RIDGE UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-VR004 American Thread Co. (formerly Standard Coosa-Thatcher Co.) Well #4 Walker County 08/05/1987	7.9	70.7	21.3	22.2	3.7	62	12	19.0	83.0	ND	120	995	558		
GWN-VR005 Chattooga County #4 Chattooga County 08/05/1987	7.4	67.7	3.5	5.1	1.2	ND	ND	9.0	3.2	6.50	96	175	350	Zn = 14 ug/L	10
GWN-VR006 Chemical Products Corporation, East Well Bartow County 08/06/1987	7.9	25.5	15.2	3.9	1.1	ND	ND	6.0	3.2	0.94	675	200	241		
GWN-VR007 Adairsville, Lewis Spring Bartow County 08/06/1987	7.8	27.8	14.1	0.8	ND	ND	ND	2.0	ND	0.38	33	26	223		10
GWN-VR008 Cedartown Spring Polk County 08/06/1987	7.7	31.8	14.8	1.4	ND	21	ND	3.0	5.4	0.89	13	23	251		10

WATER QUALITY ANALYSES OF THE VALLEY AND RIDGE UNCONFINED AQUIFERS

PARAMETERS	pH	Ca	Mg	Na	K	Fe	Mn	Cl	SO_4	NO_2 & NO_3	Ba	Sr	Spec. Cond.	Other Parameters Detected	Other Screens Tested
UNITS	SU	----------mg/L----------				ug/L	ug/L	mg/l	mg/L	mgN/L	ug/L	ug/L	umho/cm		
DETECTION LIMITS	---	0.0	0.0	0.0	0.5	10	10	0.1	2.0	0.02	10	10	---		
Well ID#															
GWN-VR009 Polk County #2 Polk County 08/06/1987	7.7	33.9	12.7	1.3	ND	ND	ND	3.0	2.4	1.19	11	25	248		

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Editor: Patricia Allgood

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