WATER USE IN COASTAL GEORGIA BY COUNTY AND SOURCE, 1997; AND WATER-USE TRENDS, 1980–97

by
Julia L. Fanning
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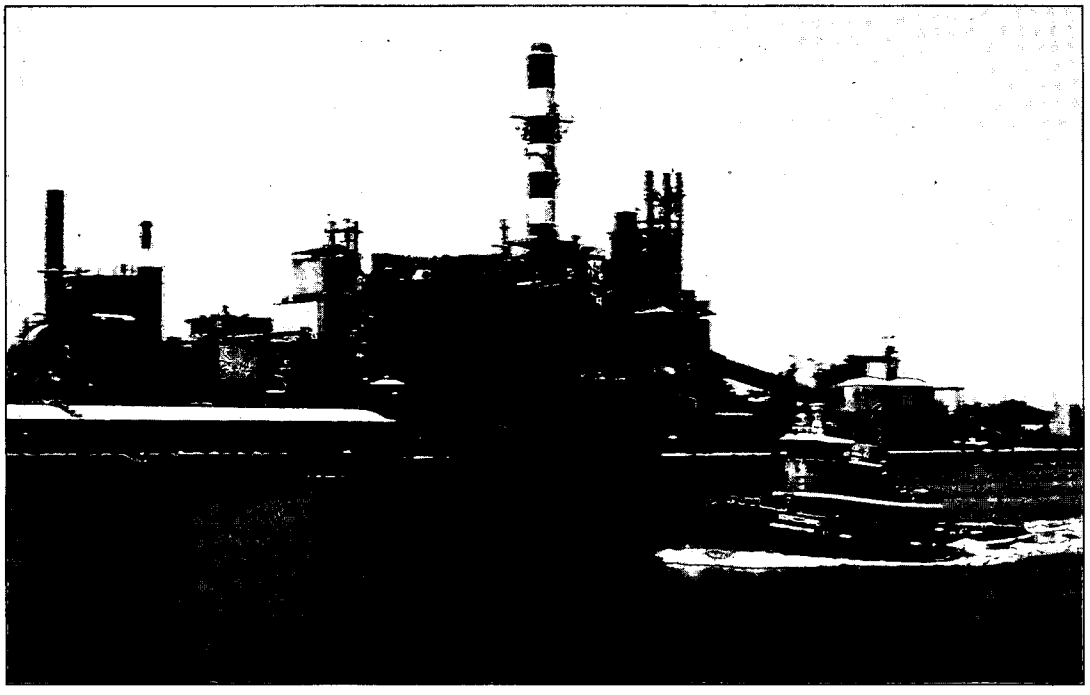

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

Prepared in cooperation with the

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INFORMATION CIRCULAR 104

COVER PHOTOGRAPH: Panoramic view of industrial water user, Savannah, Georgia, August 1990. *Photograph by* Richard E. Krause, U.S. Geological Survey.

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WATER USE IN COASTAL GEORGIA BY COUNTY AND SOURCE, 1997; AND WATER-USE TRENDS, 1980-97

By Julia L. Fanning[1/]

ABSTRACT

Water use during 1997 was estimated for each county in the 24-county area of coastal Georgia by water-use category, using data obtained from various Federal and State agencies. Categories of offstream water use include public supply, domestic, commercial, industrial, mining, irrigation, livestock, and thermoelectric power generation.

Total 1997 offstream water use from ground- and surface-water sources was estimated to be about 1,225 million gallons per day (Mgal/d) for the coastal area; of this total, ground water supplied 28 percent and surface water supplied 72 percent. Water withdrawal in coastal Georgia increased from 1,153 Mgal/d in 1980 to 1,225 Mgal/d in 1997, a 6-percent increase. During this period, surface-water withdrawal increased by 111 Mgal/d and ground-water withdrawal decreased by 38 Mgal/d.

INTRODUCTION

Water resources in the 24-county area of coastal Georgia (fig. 1) are stressed because of population growth and water demands for industrial and agricultural purposes. Excluding withdrawals for thermoelectric power generation, nearly 70 percent of all withdrawals in the coastal area are pumped from ground-water sources. Currently, management strategies are in place to protect these ground-water resources from increased pumpage and threats of saltwater intrusion. Consistent and accurate water-use data are an essential component of these management strategies.

The Georgia Department of Natural Resources, Environmental Protection Division's Sound Science Initiative, is a series of scientific and feasibility studies to determine how to limit or reduce saltwater intrusion problems in coastal Georgia. As part of this program, the U.S. Geological Survey (USGS), in cooperation with the Environmental Protection Division (EPD), Georgia Geologic Survey (GGS), is investigating the paths and rates of saltwater movement into the Upper Floridan aquifer, determining other areas where saltwater contamination could occur, assessing alternative sources of freshwater supplies, and developing a monitoring network to assess ground-water levels and quality. An additional effort under EPD's Sound Science Initiative by the Georgia Water-Use Program (also a cooperative effort of GGS and USGS), sought to compile consistent and accurate water-use data for the 24-county coastal area for 1997. The Georgia Water-Use Program also compiled trend data for the period 1980 to 1997.

Purpose and Scope

This report summarizes water use in coastal Georgia by source and water-use category for 1997, and describes water-use trends during the period 1980-97. Water-use values in this report may differ due to independent rounding.For each county, the data are provided in tabular form, and include maps showing the locations of major water users in 1997 and graphs showing water-use trends during the period 1980-97.

[1/]Hydrologist, U.S. Geological Survey, Atlanta, Ga.

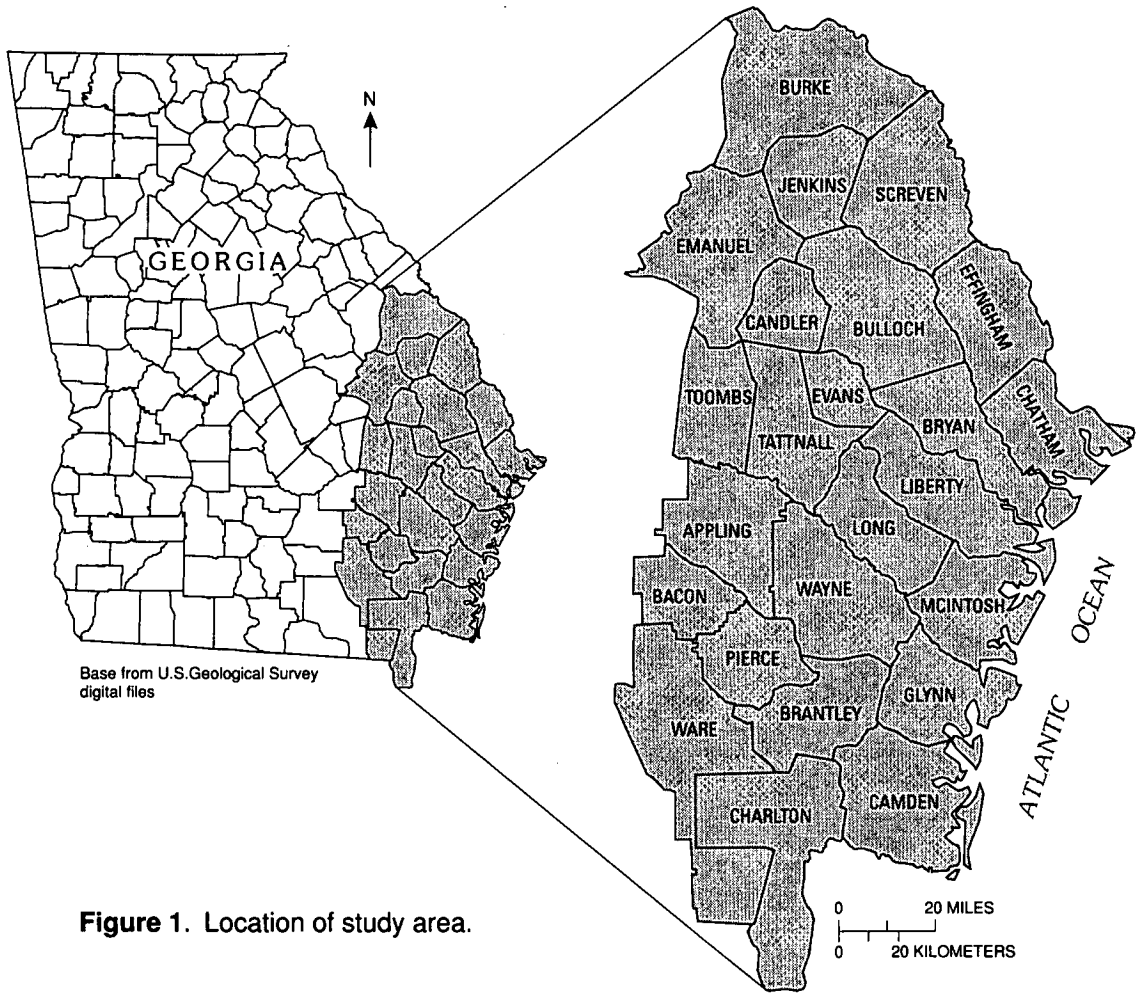


Figure 1. Location of study area.

Data Collection

The Georgia Water-Use Program began in 1979, with the goal of collecting, compiling, and disseminating information on water use and providing data needed by water managers, hydrologists, and others involved in managing, protecting, and investigating the water resources of Georgia. Water-use data are stored in the Georgia Water-Use Data System (GWUDS), a data base maintained by the USGS, which stores available site-specific data from 1980 to the present.

Water-use data for this report primarily were collected from EPD, and stored in the GWUDS data base. EPD requires cities, industries, and other water users that withdraw more than 100,000 gallons per day (gal/d) to obtain withdrawal permits and report monthly withdrawals. Withdrawals reported to EPD by permitted users comprise most of the data in this report. Non-permitted water use is estimated using other information from various Federal, State, and local sources. Sources of data used to estimate water use are listed in table 1.

Table 1. Water-use data sources for Georgia, 1997
[WRMP, Water Resources Management Program; EPD, Environmental Protection Division]

Water-use category	Data sources	Type of Data
Public supply	permit files, WRMP, EPD	withdrawals by permitted users
	mail survey of operators of large municipal systems	population served, interconnection of systems
	Ground-Water Management Program, WRMP, EPD	population served by small public suppliers (subdivisions and mobile home parks)
Domestic	U.S. Bureau of the Census	county and city populations
Commercial	permit files; WRMP; EPD	withdrawals by permitted users
Industrial	permit files; WRMP; EPD	withdrawals by permitted users
Livestock	Georgia Crop Reporting Service; Georgia Department of Agriculture; Cooperative Extension Service; U.S. Bureau of the Census	animal populations by county
Irrigation	Cooperative Extension Service, 1995 Irrigation Survey	crop and acreage by county
Thermoelectric power generation	permit files; WRMP; EPD	withdrawals by thermoelectric power plants
Hydroelectric power generation	power companies, plant owners	withdrawals by power plants, instream use by hydroelectric

Water use during the period 1980-95 was obtained from previous county-based water-use reports:

Title	Author(s)
Water Use in Georgia by County for 1980	Pierce, R.R., Barber, N.L., and Stiles, H.R.
Water Use in Georgia by County for 1985	Turlington, M.C., Fanning, J.L., and Doonan, G.A.
Water Use in Georgia by County for 1987	Trent, V.P., Fanning, J.L., and Doonan, G.A.
Water Use in Georgia by County for 1990	Fanning, J.L., Doonan, G.A., and Montgomery, L.T
Water Use in Georgia by County for 1995	Fanning, J.L.

WATER USE IN COASTAL GEORGIA, 1997

Water use was compiled for offstream and instream uses in coastal Georgia for 1997. Offstream use is water withdrawn or diverted from a ground- or surface-water source, and transported to the place of use. Categories of offstream water use include public supply, domestic, commercial, industrial, mining, irrigation, livestock, and thermoelectric power generation. Instream use is water use that occurs within a stream channel for such purposes as hydroelectric power generation, navigation, water-quality improvement, fish propagation, and recreation (Solley and others, 1998). Hydroelectric power generation is the only instream use compiled by the Georgia Water-Use Program. There are no hydroelectric power plants located in the study area.

In coastal Georgia, an estimated 1,225 million gallons per day (Mgal/d) of water were withdrawn for offstream uses during 1997 (table 2). In the study area, surface water accounted for about 72 percent of total withdrawal, of which about 83 percent was used for thermoelectric power generation. Ground-water withdrawal was largest for industrial and public-supply uses. Ground-water withdrawal in the study area was estimated at 347 Mgal/d, mostly from the Floridan aquifer system.

Most of the high-use counties, with withdrawal of 60 Mgal/d or greater, are counties in which thermoelectric plants are located (table 3). Glynn and Wayne Counties are exceptions—in these counties, large amounts of water are withdrawn for industrial supply. The largest industrial withdrawals in coastal Georgia are for paper and chemical manufacturing (table 4).

A summary of offstream water use by county in the 24-county coastal area for 1997 is provided in Appendix A. Appendix A includes:

- a listing of offstream water use by source (ground or surface water) and water-use category for 1997;
- a listing of withdrawals by major public-supply systems by source for 1997;
- a summary of industrial water use by Standard Industrial Classification (SIC) code for 1997;
- county maps showing the locations of major public supply and industrial users for 1997; and
- bar charts, showing water-use trends by source for the period 1980-97.

Water supplies for all categories of use during 1997 were from both ground- and surface-water sources. Total withdrawal during 1997 was greatest in Chatham County, where 76 Mgal/d of ground water and 477 Mgal/d of surface water was withdrawn. Large amounts of ground water, mostly for industrial purposes, were withdrawn in Camden, Glynn, and Wayne Counties (fig. 2). Besides Chatham County, only four other counties in the study area—Appling, Burke, Effingham, and Glynn—used substantial quantities of surface water. Thermoelectric power plants are located in each of these counties (fig. 3). Throughout the study area, most ground water was used for public supply and industrial use; whereas, most surface water was used for thermoelectric power generation (fig. 4).

Table 2. Water use in coastal Georgia, by source and category, 1997

Population: 779,660

Population served by public supply: 534,634

Acres irrigated: 131,870

Hydroelectric use (Mgal/d): 0.00

Source	Withdrawal, in million gallons per day						
	Public supply	Domestic and Commercial	Industry and Mining	Irrigation	Livestock	Thermoelectric	TOTALS
Ground water	78.63	32.23	184.56	46.25	0.37	4.71	346.75
Surface water	45.35	0.00	79.53	25.60	2.55	725.68	878.70
TOTALS	123.98	32.23	264.09	71.85	2.92	730.39	1,225.45

Table 3. Water use in coastal Georgia, by county, source, and category, 1997
[GW, ground water; SW, surface water]

County	Withdrawal, in million gallons per day							
	Source	Public supply	Domestic and commercial	Industrial and mining	Irrigation	Livestock	Thermoelectric	Totals
Appling	GW	0.96	0.75	0.00	0.72	0.02	0.17	2.61
	SW	0.00	0.00	0.00	0.85	0.23	59.29	60.37
Bacon	GW	0.46	0.48	0.21	1.23	0.01	0.00	2.39
	SW	0.00	0.00	0.00	0.24	0.09	0.00	0.33
Brantley	GW	0.46	0.80	0.00	0.07	0.01	0.00	1.34
	SW	0.00	0.00	0.00	0.11	0.10	0.00	0.21
Bryan	GW	1.31	0.97	0.00	0.14	0.00	0.00	2.42
	SW	0.00	0.00	0.00	0.07	0.01	0.00	0.08
Bulloch	GW	2.92	1.75	0.91	6.16	0.04	0.00	11.78
	SW	0.00	0.00	0.00	3.05	0.22	0.00	3.26
Burke	GW	1.17	0.96	0.00	7.08	0.03	0.78	10.02
	SW	0.68	0.00	0.00	1.87	0.15	62.83	65.53
Camden	GW	3.03	2.86	31.06	3.17	0.00	0.00	40.12
	SW	0.00	0.00	7.74	0.00	0.01	0.00	7.75
Candler	GW	0.59	0.37	0.00	0.98	0.02	0.00	1.96
	SW	0.00	0.00	0.00	1.12	0.11	0.00	1.23
Charlton	GW	0.49	0.55	0.00	0.01	0.01	0.00	1.06
	SW	0.00	0.00	0.00	0.07	0.07	0.00	0.14
Chatham	GW	31.40	5.01	31.65	4.40	0.01	3.60	76.07
	SW	0.00	0.00	35.68	0.16	0.03	441.00	476.87
Effingham	GW	2.03	1.24	1.85	0.10	0.01	0.13	5.36
	SW	44.67	0.00	13.21	0.10	0.05	130.00	188.03
Emanuel	GW	1.71	0.59	1.50	1.40	0.03	0.00	5.23
	SW	0.00	0.00	0.00	0.27	0.14	0.00	0.41
Evans	GW	0.58	0.05	1.37	0.31	0.01	0.00	2.32
	SW	0.00	0.00	0.00	0.76	0.10	0.00	0.86
Glynn	GW	12.72	4.84	45.26	2.47	0.00	0.03	65.33
	SW	0.00	0.00	22.90	0.00	0.01	32.56	55.47
Jenkins	GW	0.46	0.33	0.00	2.92	0.03	0.00	3.74
	SW	0.00	0.00	0.00	1.54	0.13	0.00	1.67
Liberty	GW	6.01	3.59	8.15	0.00	0.00	0.00	17.75
	SW	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Long	GW	0.28	0.33	0.00	0.03	0.00	0.00	0.64
	SW	0.00	0.00	0.00	0.15	0.04	0.00	0.19
Mcintosh	GW	0.76	0.68	0.00	0.00	0.00	0.00	1.44
	SW	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Pierce	GW	0.50	0.98	0.00	2.61	0.02	0.00	4.10
	SW	0.00	0.00	0.00	1.81	0.09	0.00	1.90
Screven	GW	1.14	0.73	1.86	3.24	0.03	0.00	7.00
	SW	0.00	0.00	0.00	1.36	0.14	0.00	1.S0
Tattnall	GW	1.16	1.84	0.00	6.66	0.03	0.00	9.69
	SW	0.00	0.00	0.00	8.19	0.58	0.00	8.77
Toombs	GW	2.67	0.53	0.00	1.31	0.03	0.00	4.54
	SW	0.00	0.00	0.00	2.89	0.09	0.00	2.98
Ware	GW	4.10	0.99	0.15	0.53	0.02	0.00	5.79
	SW	0.00	0.00	0.00	0.46	0.09	0.00	0.55
Wayne	GW	1.72	1.01	60.59	0.71	0.01	0.00	64.04
	SW	0.00	0.00	0.00	0.53	0.05	0.00	0.58
Study area	GW	78.63	32.23	184.56	46.25	0.37	4.71	346.75
	SW	45.35	0.00	79.53	25.60	2.55	725.68	878.70

Table 4. Industrial water use in coastal Georgia, by major Standard Industrial Classification (SIC) code (Executive Office of the President, 1987)

SIC Code	Withdrawal, in million gallons per day	
	Ground water	Surface Water
14—Mining	0.20	0.00
20—Food	5.59	0.00
22—Textiles	2.07	0.00
26—Paper	98.38	67.76
28—Chemicals	76.22	11.77
29—Petroleum	0.39	0.00
30—Rubber	0.15	0.00
32—Stone, clay	0.31	0.00
33—Primary metals	0.70	0.00

Public Supply

The public-supply category includes water that is withdrawn by public and private water suppliers and delivered to various users. Small communities and subdivisions that supply water to at least 25 people, or that have a minimum of 15 hookups or water connections, are considered public-supply systems. Public suppliers provide water for various purposes, such as domestic, commercial, and industrial uses.

The EPD, Water Resources Management Program, provides data on the total amount of water withdrawn from ground- and surface-water sources, and these data are included in the GWUDS data base. A 1995 survey of the 84 largest public-water suppliers in the State, conducted by the Georgia Water-Use Program, provided data on the population served and the number of connections. The public suppliers surveyed in 1995 accounted for 85 percent of the total public-supply withdrawal in Georgia. Nine of the public suppliers surveyed in 1995 were located in the 24-county coastal area and accounted for 64 percent of the total withdrawal for public supply. Additional information was obtained from a 1987 survey of small public suppliers in Georgia (Trent and others, 1990).

Estimated total public-supply water withdrawal in 1997 was 124 Mgal/d in the study area. Ground water accounted for about 63 percent of this total and surface water accounted for about 37 percent.

Domestic and Commercial

Domestic use is defined as water used for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, washing cars, and watering lawns and gardens. Most domestic water is supplied by public suppliers; however, some households—generally in rural areas—are supplied by individual water systems such as wells. Self-supplied households in Georgia are assumed to use ground water (from wells and springs). The number of self-supplied domestic water users was estimated by subtracting estimates of the number of persons served by public-supply systems from the total population, by county (U.S. Bureau of the Census, 1998). An unpublished 1983 survey of subdivisions in the Athens, Ga., area, conducted by the Georgia Water-Use Program (U.S. Geological Survey, Atlanta, Ga., written commun., 1983), indicated that on the average, each person uses 75 gal/d. This estimate was used with the self-supplied population data, to obtain the total self-supplied domestic water use of about 19 Mgal/d in the study area. Domestic use makes up 9 percent of ground water in the study area (fig. 4).

Commercial users include restaurants, hotels, retail stores, and other businesses; government and military facilities; prisons, schools, hospitals, and other institutions; and recreational facilities. Because only a few commercial users withdraw enough water to require permits from EPD, reported data on commercial withdrawals are limited. These data were compiled and combined with estimates for smaller users to develop a total estimated commercial withdrawal of 14 Mgal/d in 1997. All commercial users in the study area are supplied by ground water (fig. 4).

Industrial and Mining

Industrial water use includes water for such purposes as fabricating, processing, washing, and cooling in facilities that manufacture products. All industrial water-use information was compiled from withdrawals reported to EPD for 1997. The Standard Industrial Classification (SIC) codes of the major categories of industrial users are described in Appendix B.

Self-supplied industries in coastal Georgia withdrew approximately 264 Mgal/d during 1997, accounting for more than half of the withdrawals in the study area, excluding thermoelectric power. The largest industrial water users in Georgia are pulp and paper mills that are concentrated along the coast. Ground water provided 70 percent of self-supplied industrial withdrawals and surface water provided 30 percent (fig. 4).

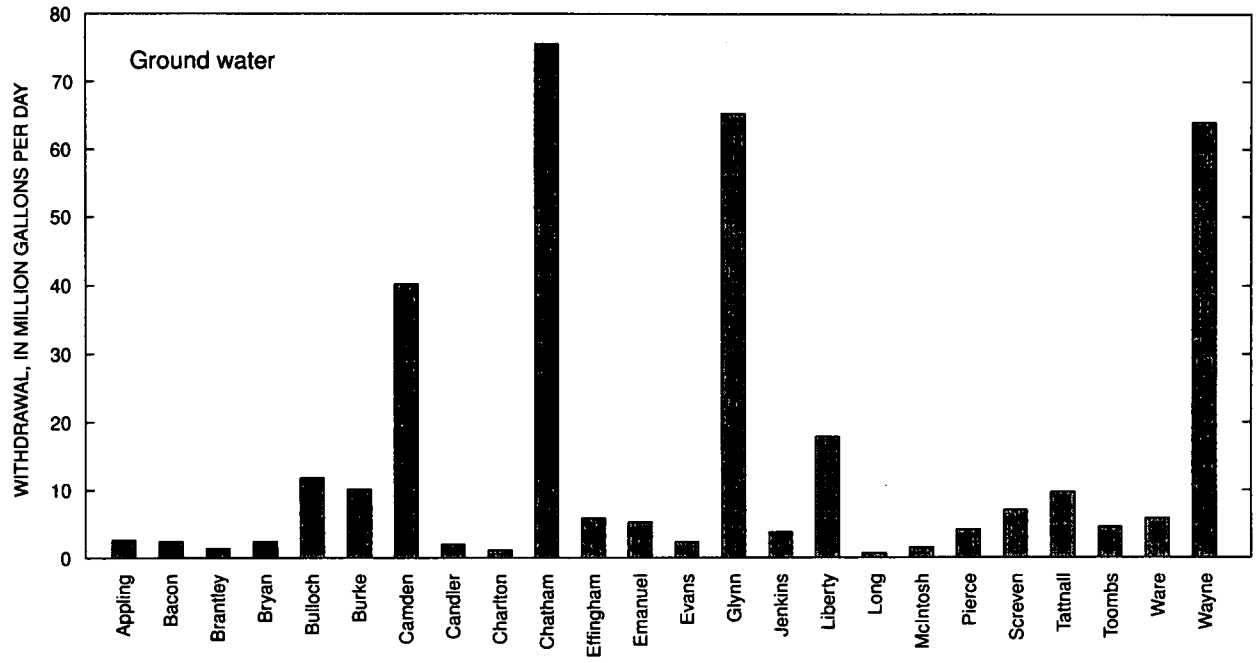


Figure 2. Ground-water use by county in coastal Georgia, 1997.

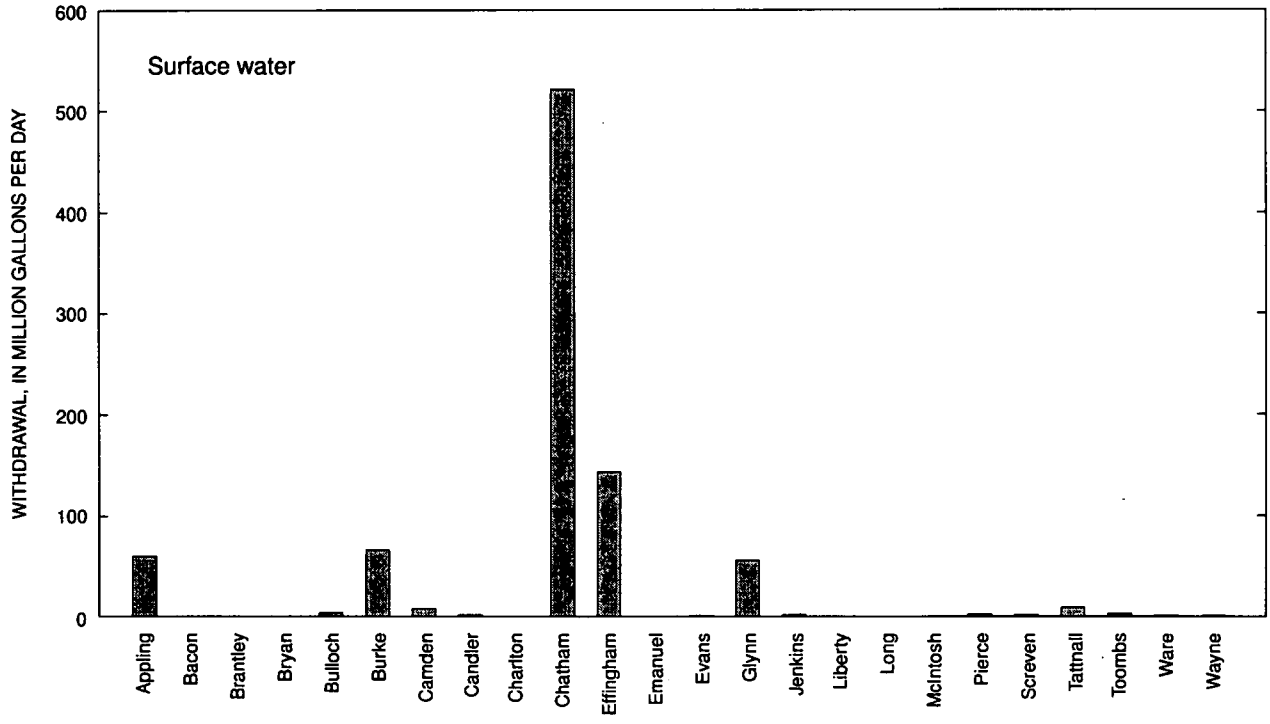
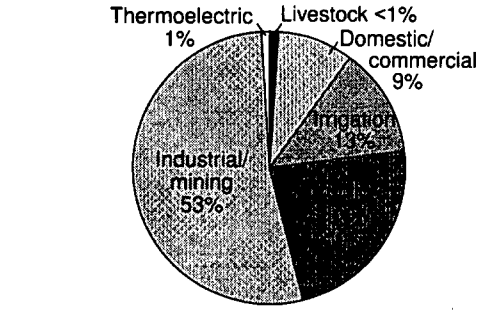
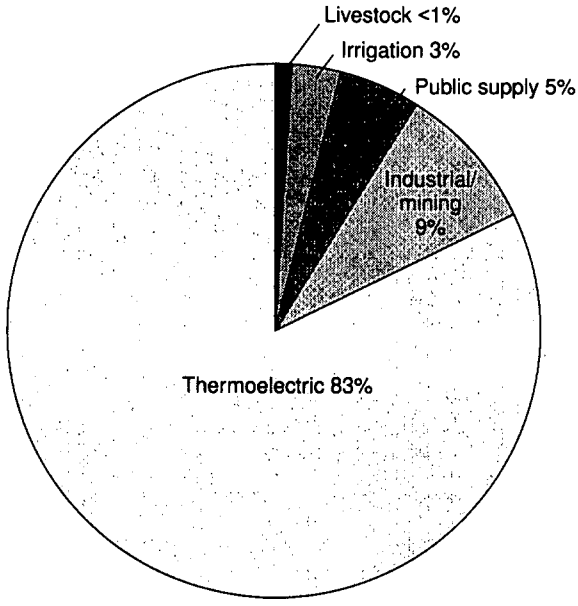


Figure 3. Surface-water use by county in coastal Georgia, 1997.



Ground water, 347 Mgal/d



Surface water, 879 Mgal/d

Figure 4. Water use by category and source in coastal Georgia, 1997.

Mining water use is defined as water used for the extraction of naturally occurring minerals. These mining operations do not require large quantities of water; dewatering of ground water accounts for most mining water-use values. The mining withdrawal data were obtained from EPD permit files, reports by mining companies, and estimates based on average water requirements for each ton of material mined. In the 24-county study area, mining withdrawal was estimated to be 0.2 Mgal/d in 1997, all from ground-water sources.

Irrigation

Irrigation water use includes water withdrawn for crops, large nurseries, athletic fields, and golf courses. Estimates of irrigation use are based on a 1995 survey of County Extension Agents conducted by the University of Georgia, Cooperative Extension Service (Kerry Harrison, Cooperative Extension Service, Tifton, Ga., written commun., 1995) and were also reported in the report Water-Use in Georgia by County, 1995 (Fanning, 1997). The survey of County Extension Agents includes data on crop acreage and application rates by crop for each county. The survey also estimated percentages of ground- and surface-water use. Application rates and acreages were assumed to be the same in 1997 as in 1995.

In 1997, irrigation water withdrawal was estimated to be 72 Mgal/d in the 24-county study area, with 64 percent from ground water and 36 percent from surface-water (fig. 4).

Livestock

Water withdrawal for livestock use is estimated for cattle, pigs and hogs, horses, several kinds of poultry, and for catfish farms. Water-use estimates for each animal type were calculated by multiplying animal populations of each county by the average water requirement for each animal (cattle, pigs and hogs, horses, and poultry). The 1995 information for horses was determined using data obtained from surveys conducted in 1970 (Pullin, 1970). The water sources for livestock use generally are not known; therefore, the proportions of ground- and surface-water withdrawals were estimated in each county. Estimated livestock water withdrawal was 3 Mgal/d in the 24-county area in 1997, mostly from surface-water (87 percent) (fig. 4).

Thermoelectric Power Generation

Thermoelectric power water use is water withdrawn for cooling purposes at thermoelectric power plants. The thermoelectric power category includes withdrawal by all self-supplied fossil fuel and nuclear facilities. Information concerning this water-withdrawal category was obtained from plant operators and includes four thermoelectric plants powered by fossil fuels, such as oil, coal, or natural gas; and two nuclear-powered plants. Estimated withdrawal for thermoelectric power generation was 730 Mgal/d in 1997, derived mostly from surface water (99 percent) (fig. 4). In this study area, the amount of water not returned to the source ranges from about 0.01 percent to 100 percent for the thermoelectric plants.

WATER-USE TRENDS IN COASTAL GEORGIA, 1980-97

Water withdrawal in the coastal area increased by 6 percent from about 1,153 Mgal/d in 1980 to about 1,225 Mgal/d in 1997. Although there was a slight decrease in total withdrawal from 1980 to 1985, there was a steady increase in total withdrawal from 1985 to 1997 (fig. 5). The largest percentage increase was in Effingham County (83 Mgal/d or 27 percent). During the period 1980-97, withdrawal from surface water in the coastal area increased by about 111 Mgal/d; whereas, withdrawal from ground water decreased by about 38 Mgal/d. Significant changes were reported in several counties:

- irrigation water use in Tattnall County increased by 85 percent;
- surface-water use in Camden County decreased by 50 percent, largely because of decreased industrial use;
- ground-water use in Glynn County decreased by 34 percent, largely because of decreased industrial water use;
- industrial water use in Effingham County increased by 96 percent; and
- surface-water use in Burke County increased by 59 Mgal/d, because of the Vogtle thermoelectric power plant began producing power in 1987.

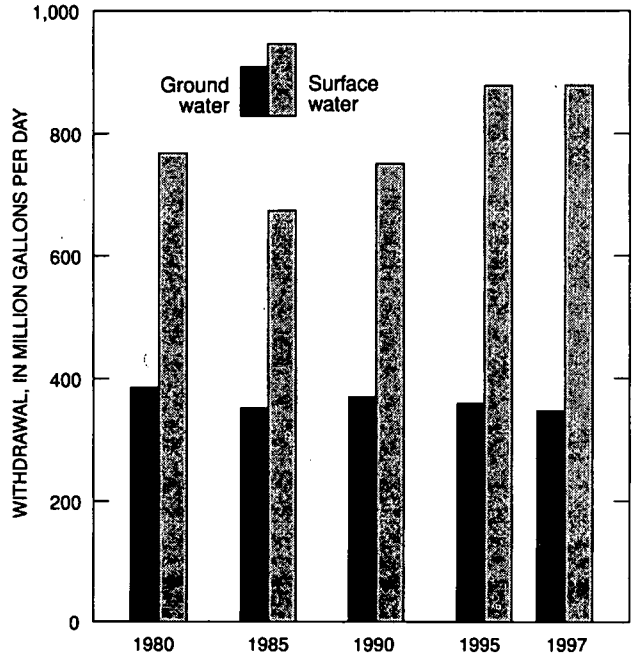


Figure 5. Water-use trends by source in coastal Georgia, 1980–97.

Decreased industrial water use in Glynn and Camden Counties was largely because of the closing of chemical and paper plants, and more efficient water-use practices at the remaining plants. Throughout 1980-97, the largest withdrawals were in Chatham County and the smallest were in Long County.

SUMMARY

Water-use data for 1997 for the 24-county area of coastal Georgia were compiled by the Georgia Water-Use Program, a cooperative effort between the U.S. Geological Survey and the Georgia Geologic Survey. The data were compiled by county and the categories of water use—public supply, domestic and commercial, industrial and mining, irrigation, livestock, and thermoelectric power generation.

In coastal Georgia during 1997, an estimated 1,225 million gallons per day (Mgal/d) of water was withdrawn for offstream uses. Although surface water provided 72 percent of the total withdrawal in the coastal area (879 Mgal/d), this quantity includes thermoelectric power generation. Excluding thermoelectric use, ground water was the main source of water in the coastal area during 1997, providing about 347 Mgal/d of the total withdrawal.

Water withdrawal in the coastal area increased from 1,153 Mgal/d in 1980 to 1,225 Mgal/d in 1997, a 6-percent increase. During this period, withdrawal from surface-water sources increased by about 111 Mgal/d, and withdrawal from ground-water sources decreased by about 38 Mgal/d. Throughout the period 1980-97, the relative amount of withdrawal was largest in Chatham County and smallest in Long County.

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APPENDIX A

Ground- and Surface-Water Use in Coastal Georgia, by County for 1997; and Trends 1980-97

[GW, ground water; SW, surface water; SIC, Standard Industrial Classification—*see Appendix B*]

APPLING COUNTY

Population: 16,390
Population served by public supply: 6,600
Acres irrigated: 3,710
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

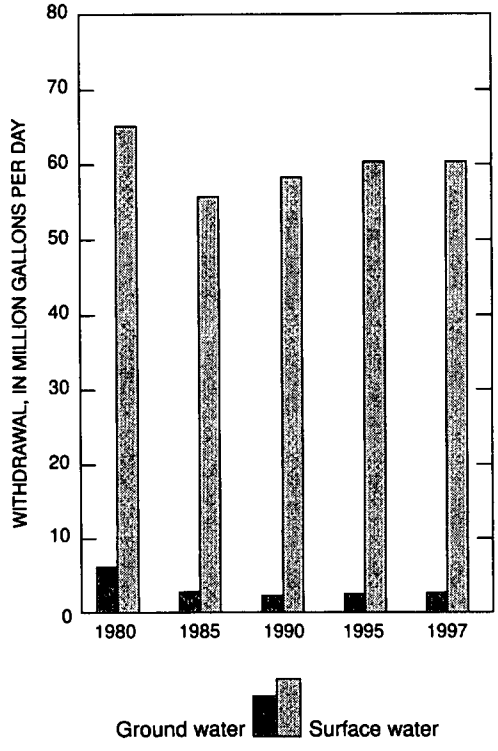
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.96	0.75	0.00	0.72	0.02	0.17	2.62
Surface Water	0.00	0.00	0.00	0.85	0.23	59.29	60.37
TOTALS	0.96	0.75	0.00	1.57	0.25	59.46	62.99

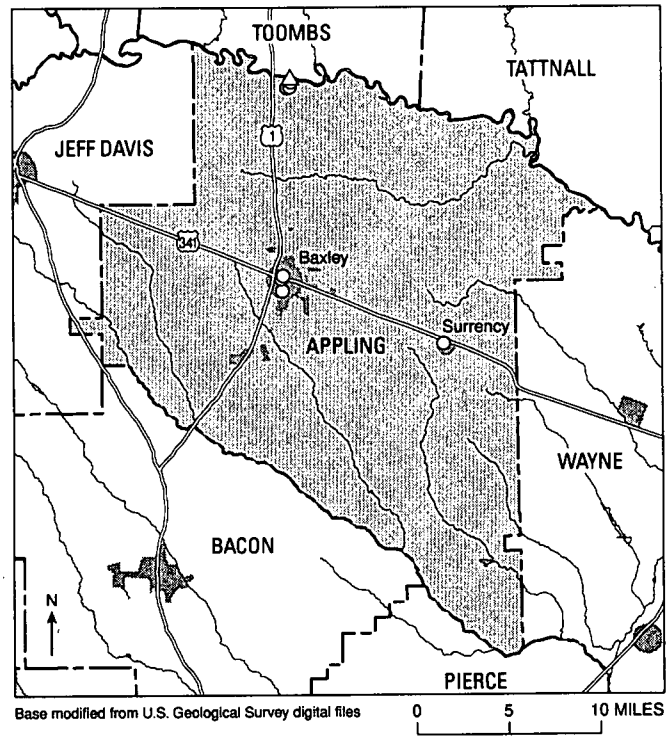
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Baxley	0.89	0.00
Town of Surrency	0.04	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





BACON COUNTY

Population: 10,340
Population served by public supply: 4,000
Acres irrigated: 2,860
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

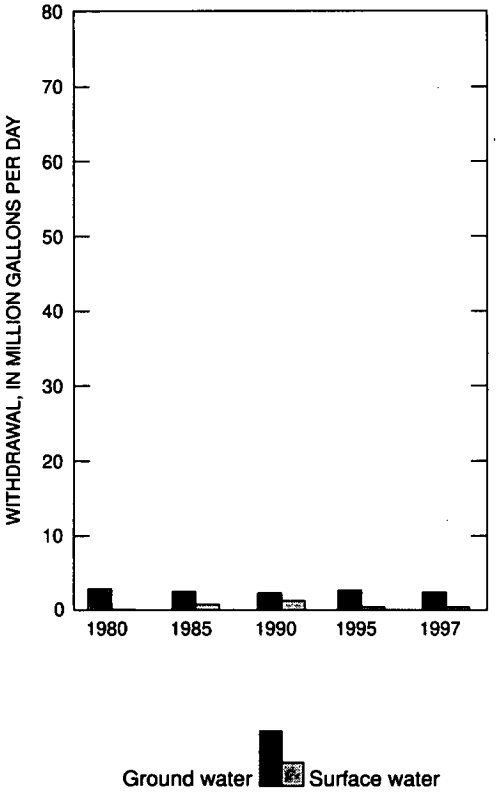
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.46	0.48	0.21	1.23	0.01	0.00	2.39
Surface Water	0.00	0.00	0.00	0.24	0.09	0.00	0.33
TOTALS	0.46	0.48	0.21	1.47	0.10	0.00	2.72

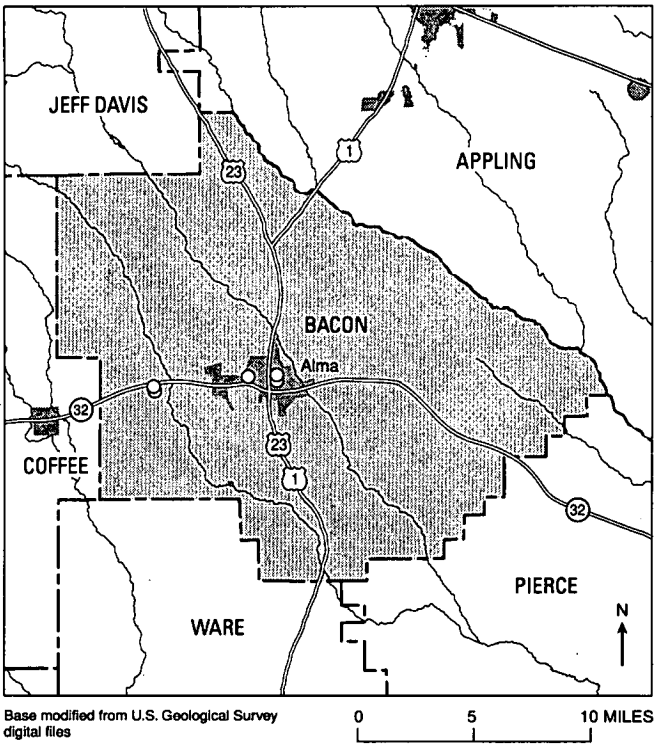
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Alma	0.45	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
22 Textiles	0.21	0.00





BRANTLEY COUNTY

Population: 13,380
Population served by public supply: 2,840
Acres irrigated: 640
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

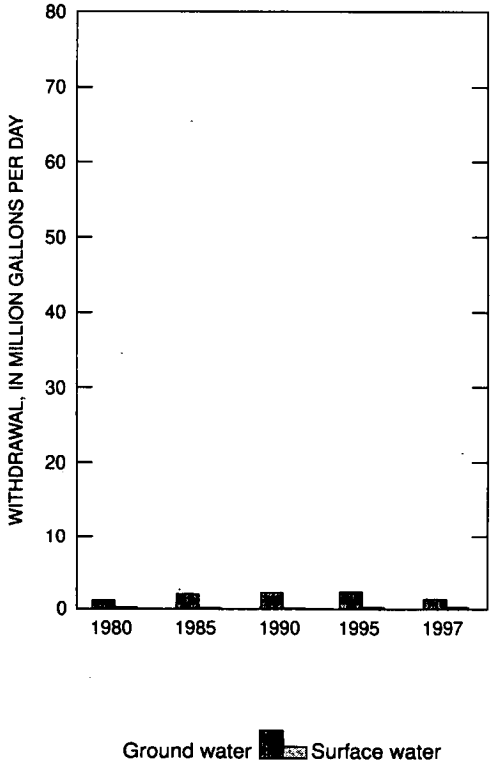
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.46	0.80	0.00	0.07	0.01	0.00	1.34
Surface Water	0.00	0.00	0.00	0.11	0.10	0.00	0.21
TOTALS	0.46	0.80	0.00	0.18	0.11	0.00	1.55

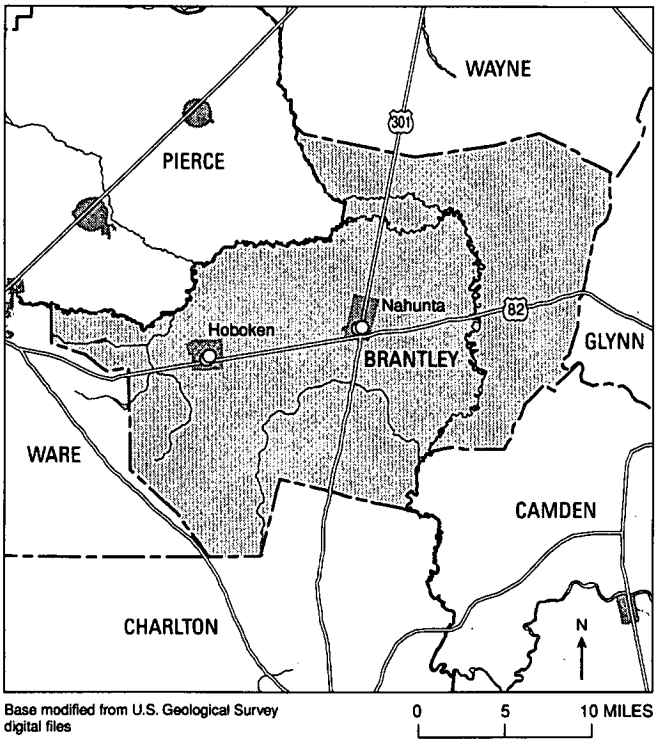
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Hoboken	0.21	0.00
City of Nahunta	0.15	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





BRYAN COUNTY

Population: 23,090
Population served by public supply: 10,290
Acres irrigated: 80
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

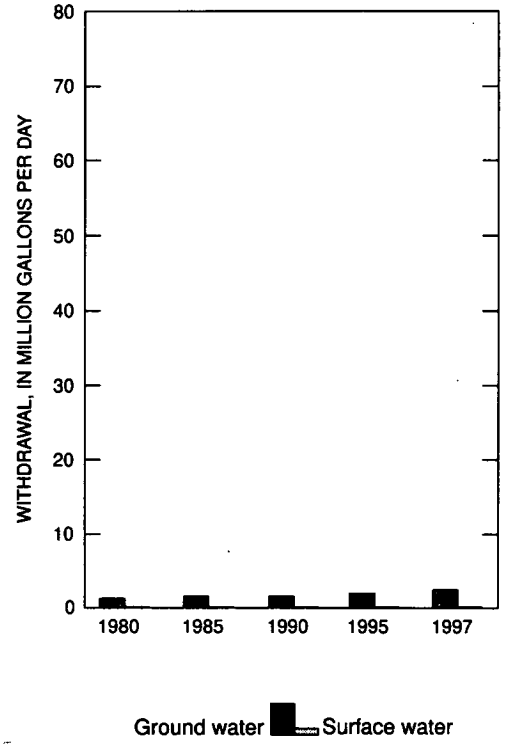
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	1.31	0.97	0.00	0.14	0.00	0.00	2.42
Surface Water	0.00	0.00	0.00	0.07	0.01	0.00	0.08
TOTALS	1.31	0.97	0.00	0.21	0.01	0.00	2.50

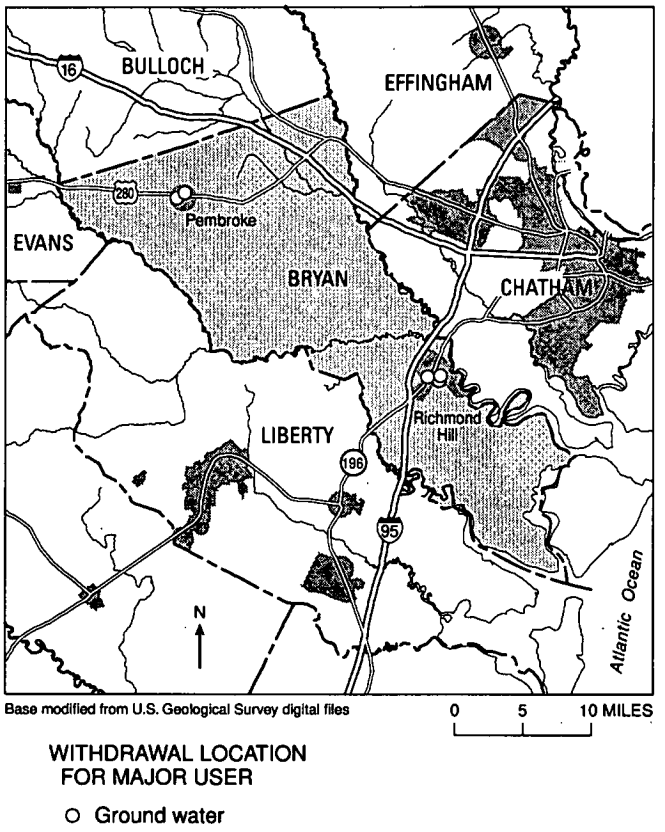
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Pembroke	0.24	0.00
City of Richmond Hill	0.78	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





BULLOCH COUNTY

Population: 49,860
Population served by public supply: 32,410
Acres irrigated: 14,270
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

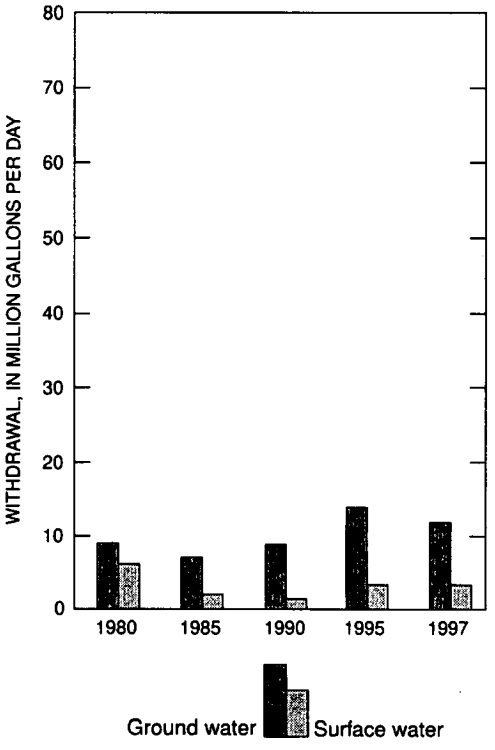
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	2.92	1.75	0.91	6.16	0.04	0.00	11.78
Surface Water	0.00	0.00	0.00	3.05	0.22	0.00	3.26
TOTALS	2.92	1.75	0.91	9.21	0.26	0.00	15.04

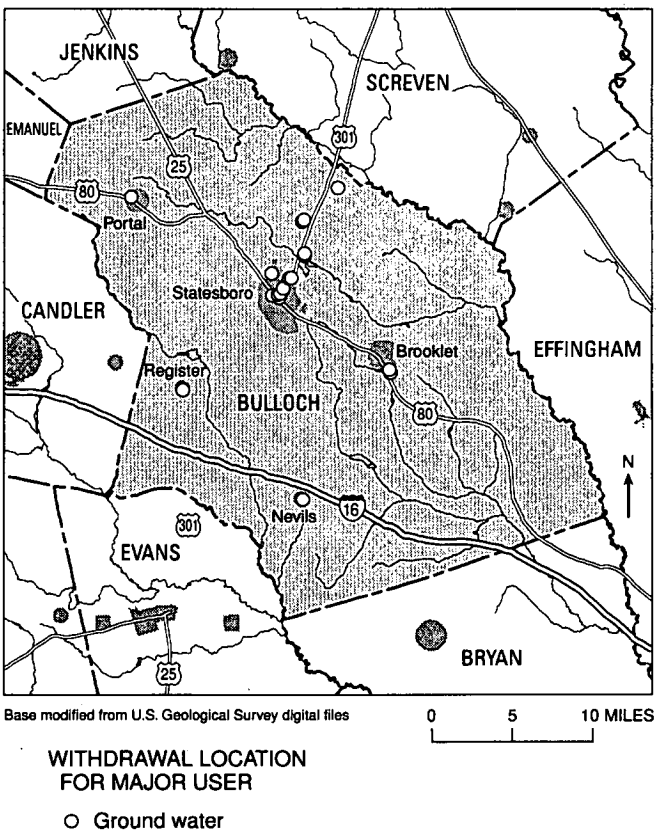
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
Town of Brooklet	0.12	0.00
Nevils Water Association	0.02	0.00
Town of Portal	1.30	0.00
Register Water System	0.01	0.00
City of Statesboro	0.88	0.00
Statesboro-Brooks Instruments	0.08	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
33 Primary metals	0.70	0.00





BURKE COUNTY

Population: 22,720
Population served by public supply: 10,120
Acres irrigated: 23,070
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

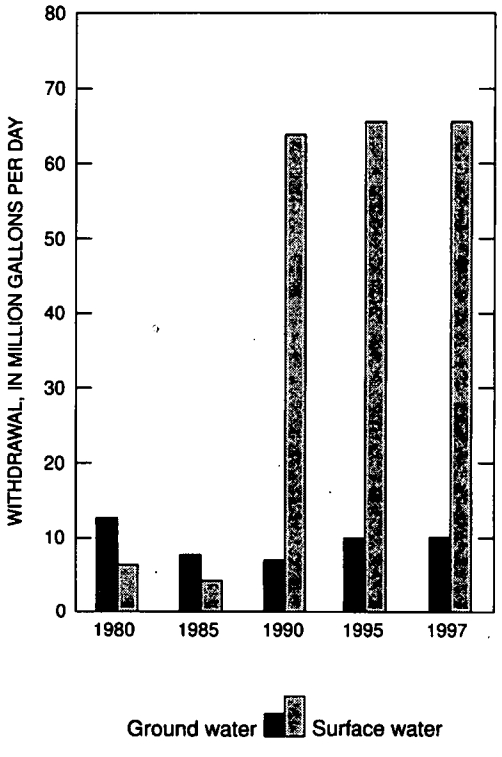
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	1.17	0.96	0.00	7.08	0.03	0.78	10.02
Surface Water	0.68	0.00	0.00	1.87	0.15	62.83	65.53
TOTALS	1.85	0.96	0.00	8.95	0.18	63.61	75.55

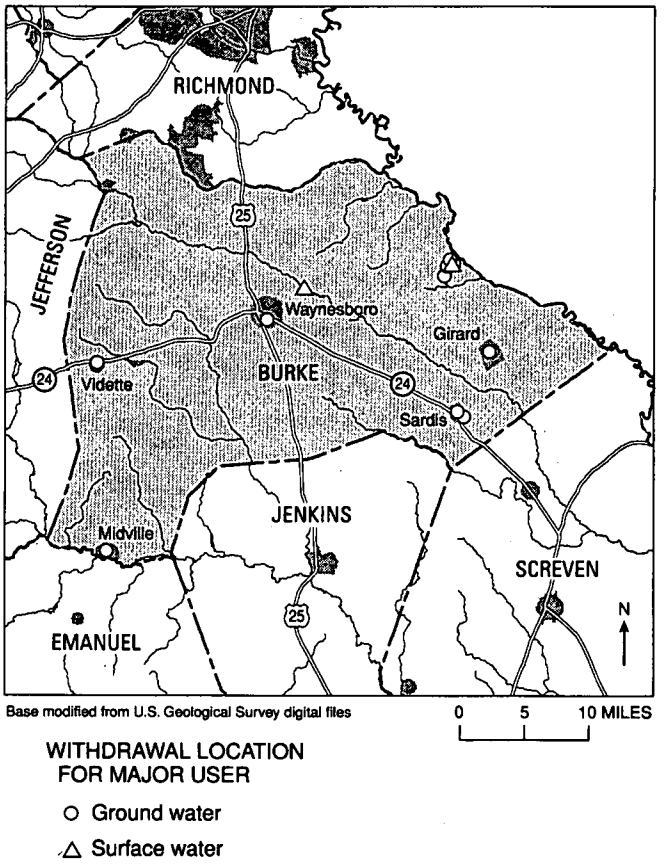
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
Town of Girard	0.02	0.00
City of Midville	0.11	0.00
Town of Sardis	0.10	0.00
City of Vidette	0.01	0.00
City of Waynesboro	0.82	0.68

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





CAMDEN COUNTY

Population: 45,150
Population served by public supply: 28,660
Acres irrigated: 580
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

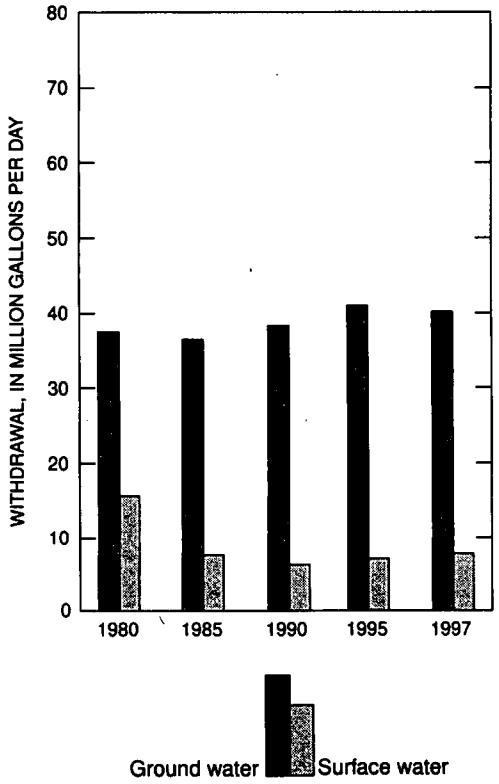
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	3.03	2.86	31.06	3.17	0.00	0.00	40.12
Surface Water	0.00	0.00	7.74	0.00	0.01	0.00	7.75
TOTALS	3.03	2.86	38.80	3.17	0.01	0.00	47.87

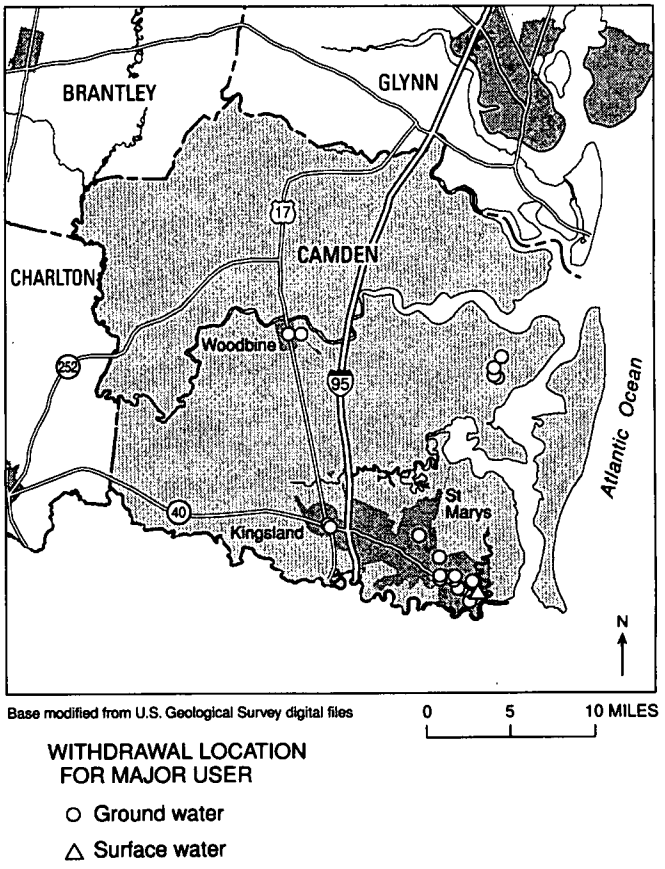
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Kingsland	1.43	0.00
City of St. Marys	1.03	0.00
City of Woodbine	0.12	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
26 Paper	30.74	7.74
28 Chemicals	0.32	0.00





CANDLER COUNTY

Population: 8,910
Population served by public supply: 4,040
Acres irrigated: 10,320
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

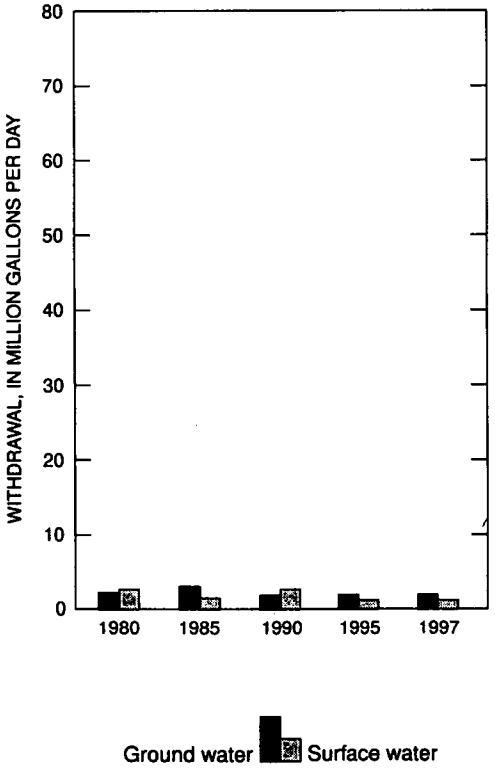
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.59	0.37	0.00	0.98	0.02	0.00	1.96
Surface Water	0.00	0.00	0.00	1.12	0.11	0.00	1.23
TOTALS	0.59	0.37	0.00	2.10	0.13	0.00	3.19

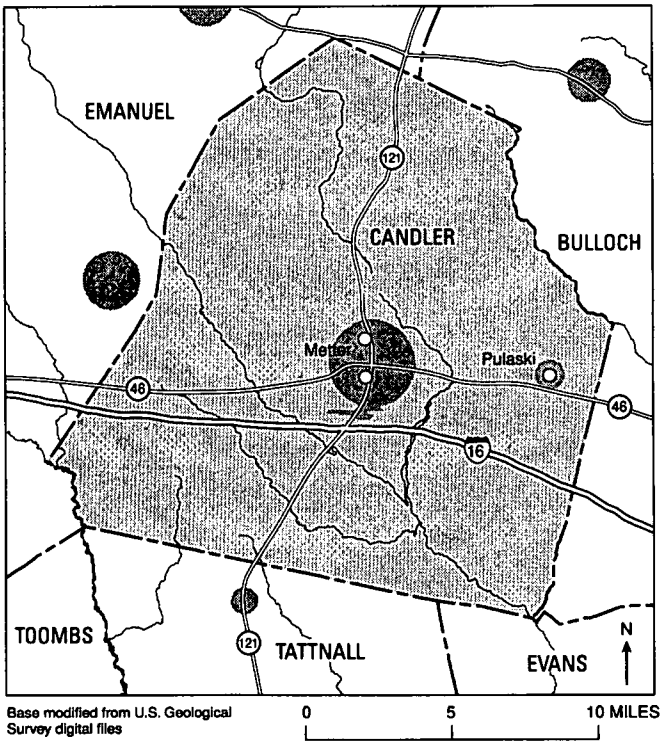
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Metter	0.55	0.00
Town of Pulaski	0.03	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





CHARLTON COUNTY

Population: 9,270
Population served by public supply: 3,700
Acres irrigated: 110
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

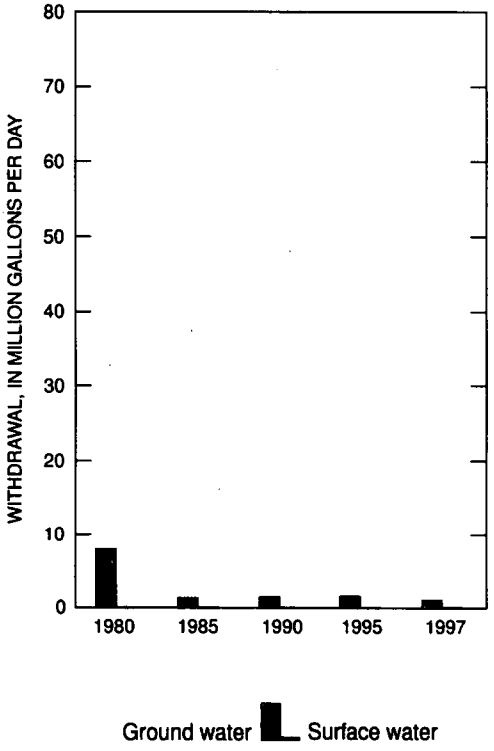
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.49	0.55	0.00	0.01	0.01	0.00	1.06
Surface Water	0.00	0.00	0.00	0.07	0.07	0.00	0.14
TOTALS	0.49	0.55	0.00	0.08	0.08	0.00	1.20

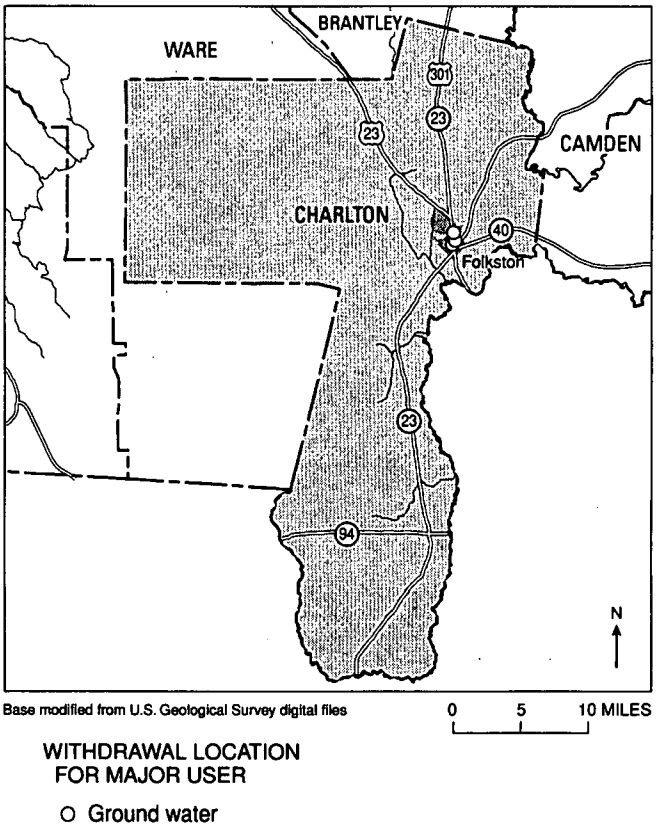
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Folkston	0.49	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





CHATHAM COUNTY

Population: 225,930
Population served by public supply: 190,939
Acres irrigated: 1,450
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

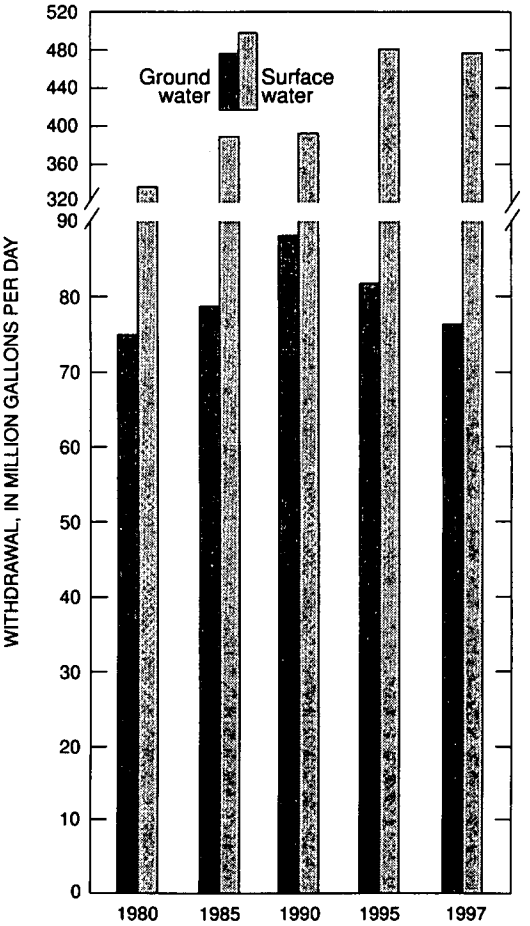
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	31.40	5.01	31.65	4.40	0.01	3.60	76.07
Surface Water	0.00	0.00	35.68	0.16	0.03	441.00	476.87
TOTALS	31.40	5.01	67.33	4.56	0.04	444.60	552.94

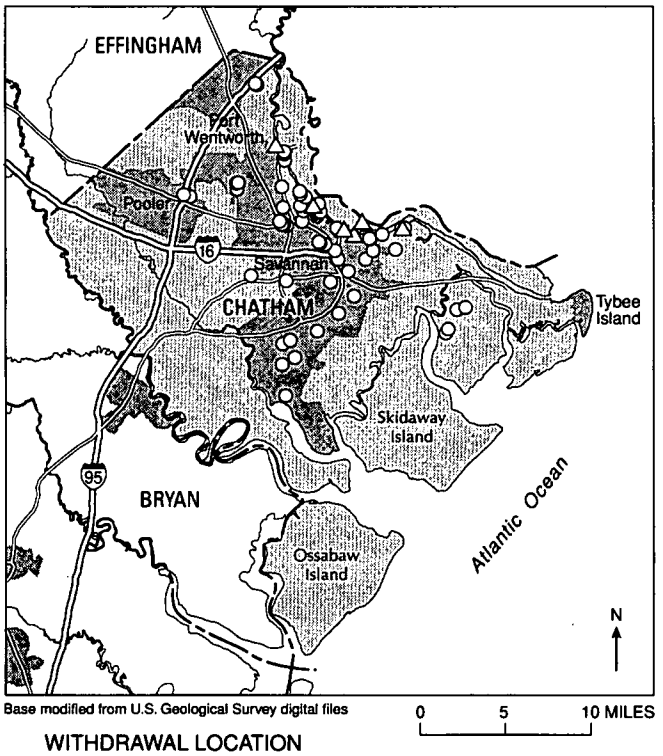
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Savannah-Travis Fld	0.43	0.00
City of Savannah-Wilm. Is	1.04	0.00
City of Garden City	1.17	0.00
City of Savannah	21.90	0.00
Town of Pooler	0.52	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
14 Mining	0.20	0.00
20 Food	2.05	0.00
26 Paper	22.04	23.91
28 Chemicals	6.80	11.77
29 Petroleum	0.39	0.00
32 Stone, clay	0.18	0.00





EFFINGHAM COUNTY

Population: 35,060
Population served by public supply: 18,595
Acres irrigated: 560
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

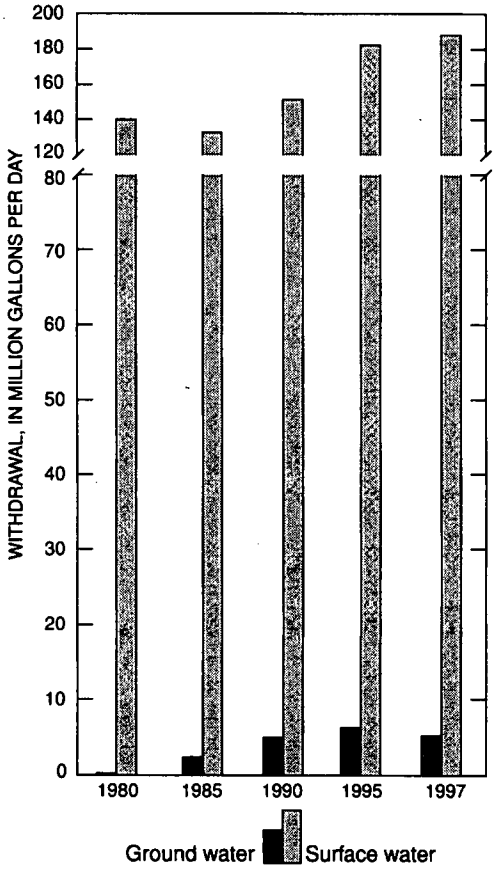
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	2.03	1.24	1.85	0.10	0.01	0.13	5.36
Surface Water	44.67	0.00	13.21	0.10	0.05	130.00	188.03
TOTALS	46.70	1.24	15.06	0.20	0.06	130.13	193.39

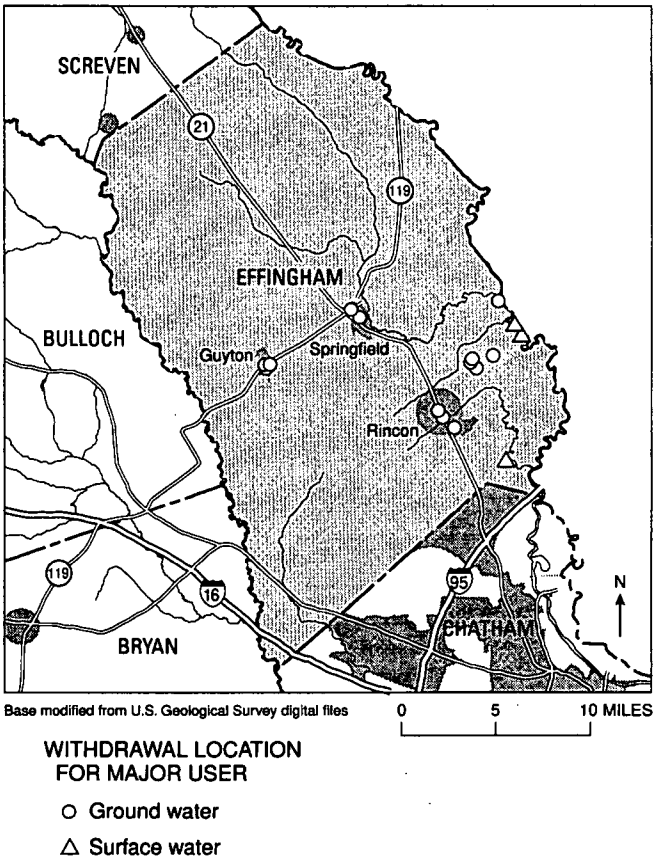
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
Coastal Water & Sewer Comm.	0.10	0.00
City of Guyton	0.15	0.00
Town of Rincon	0.25	0.00
City of Springfield	0.25	0.00
Exley Water System	0.16	0.00
South Rincon Development	0.72	0.00
Savannah Ind. & Dom.Water Sys.	0.00	44.04

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
26 Paper	1.85	13.21





EMANUEL COUNTY

Population: 21,010
Population served by public supply: 13,250
Acres irrigated: 4,800
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

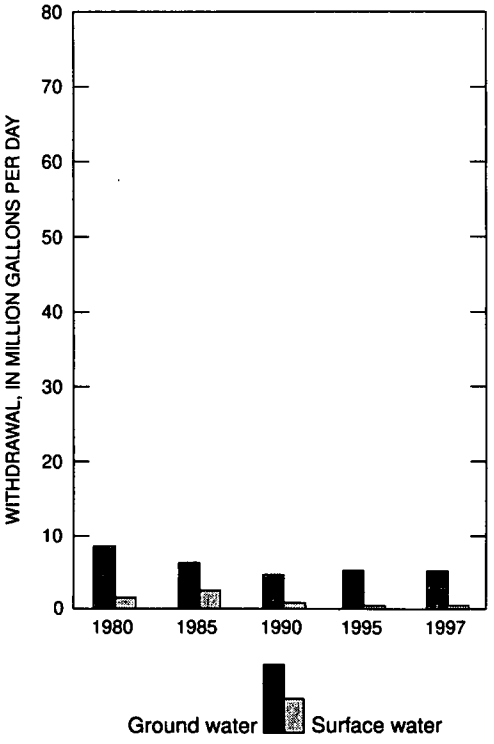
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	1.71	0.59	1.50	1.40	0.03	0.00	5.23
Surface Water	0.00	0.00	0.00	0.27	0.14	0.00	0.41
TOTALS	1.71	0.59	1.50	1.67	0.17	0.00	5.64

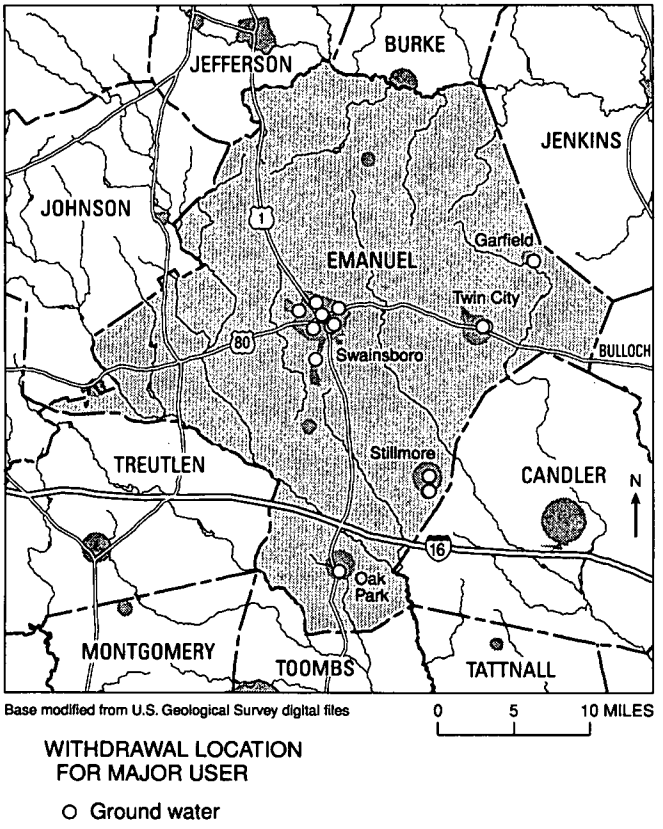
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Adrian	0.10	0.00
Town of Garfield	0.03	0.00
Town of Oak Park	0.03	0.00
Town of Stillmore	0.04	0.00
City of Swainsboro	1.28	0.00
City of Twin City	0.13	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
20 Food	1.50	0.00





EVANS COUNTY

Population: 9,750
Population served by public supply: 9,060
Acres irrigated: 2,640
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

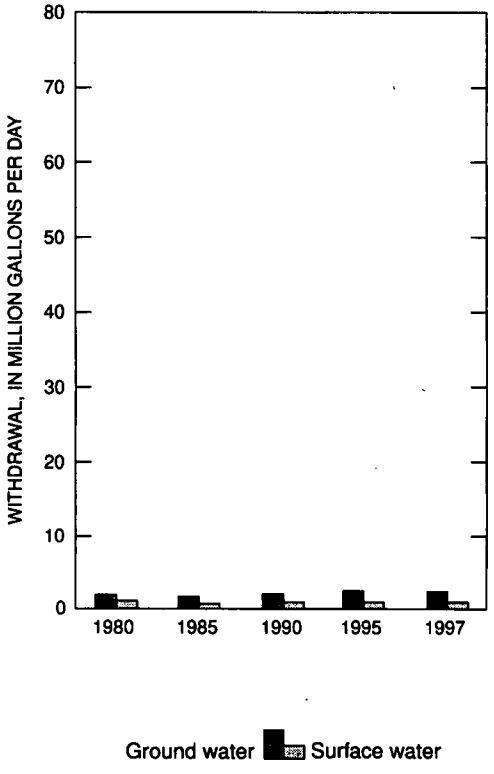
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.58	0.05	1.37	0.31	0.01	0.00	2.32
Surface Water	0.00	0.00	0.00	0.76	0.10	0.00	0.86
TOTALS	0.58	0.05	1.37	1.07	0.11	0.00	3.18

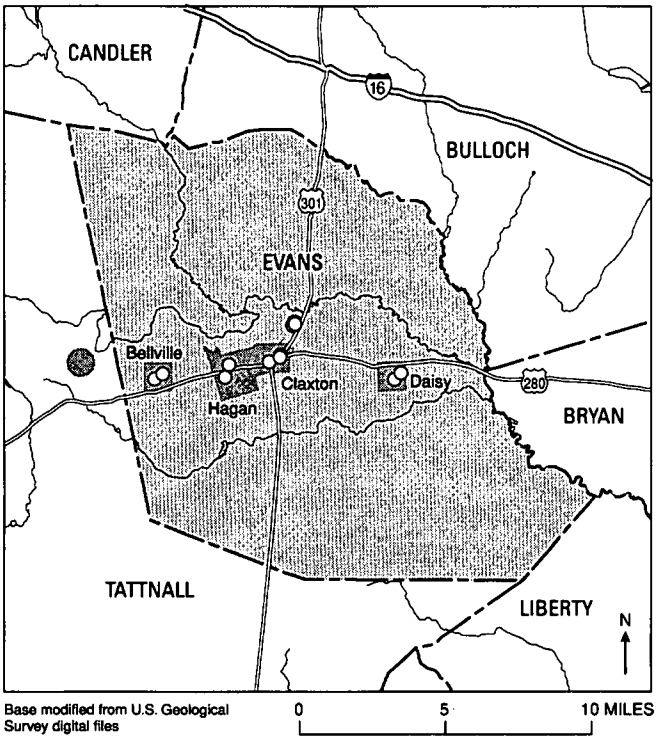
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Bellville	0.04	0.00
City of Claxton	0.42	0.00
City of Daisy	0.02	0.00
City of Hagan	0.09	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
20 Food	1.39	0.00





GLYNN COUNTY

Population: 66,650
Population served by public supply: 58,050
Acres irrigated:
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

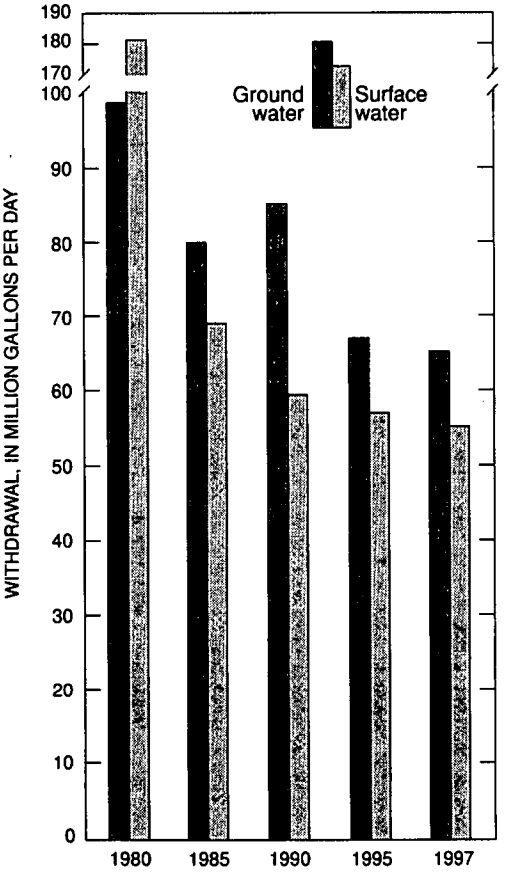
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	12.72	4.84	45.26	2.47	0.00	0.03	65.33
Surface Water	0.00	0.00	22.90	0.00	0.01	32.56	55.47
TOTALS	12.72	4.84	68.16	2.47	0.01	32.59	120.80

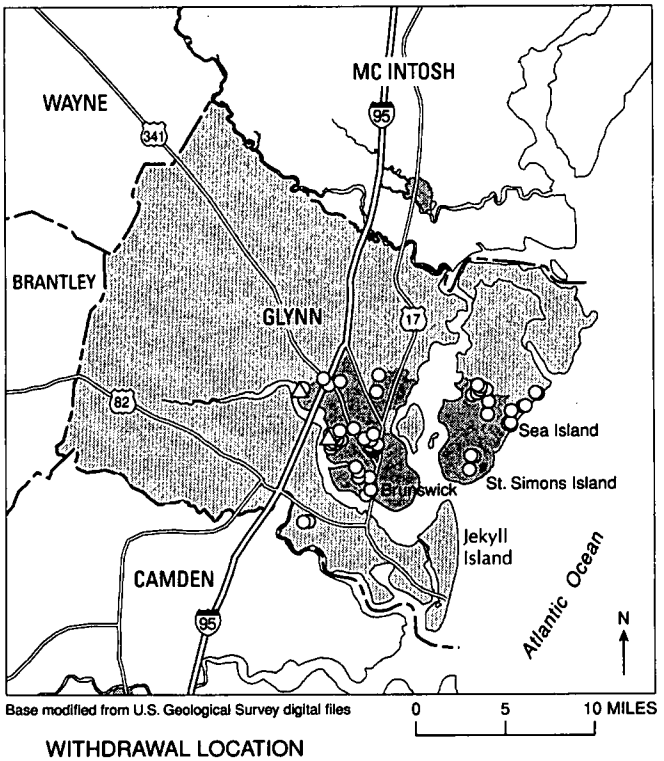
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
Glynn County Govt.-Ridgewood	0.32	0.00
City of Brunswick	5.24	0.00
Brunswick I95 Interchange	0.54	0.00
Jekyll Island Water System	1.85	0.00
St Simons Island Water & Sewer	2.79	0.00
Sea Palms Development Corp.	0.30	0.00
Sea Island Services	1.30	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
20 Food	0.66	0.00
26 Paper	35.60	22.90
28 Chemicals	8.52	0.00
32 Stone, clay	0.13	0.00





JENKINS COUNTY

Population: 8,410
Population served by public supply: 3,980
Acres irrigated: 8,570
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

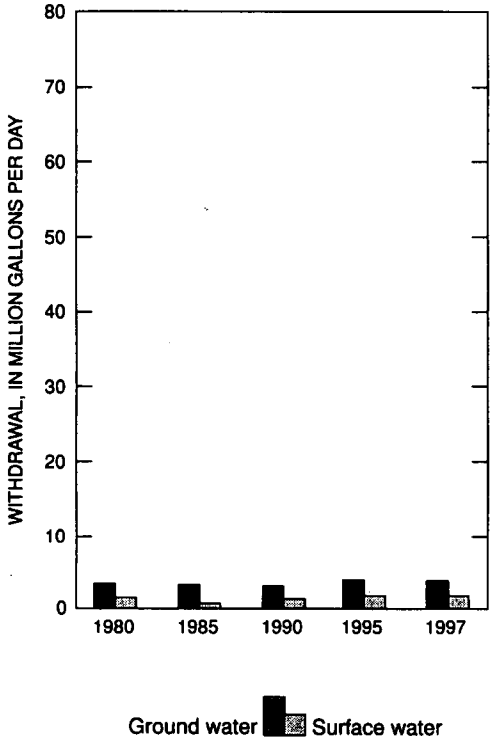
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.46	0.33	0.00	2.92	0.03	0.00	3.74
Surface Water	0.00	0.00	0.00	1.54	0.13	0.00	1.67
TOTALS	0.46	0.33	0.00	4.46	0.16	0.00	5.41

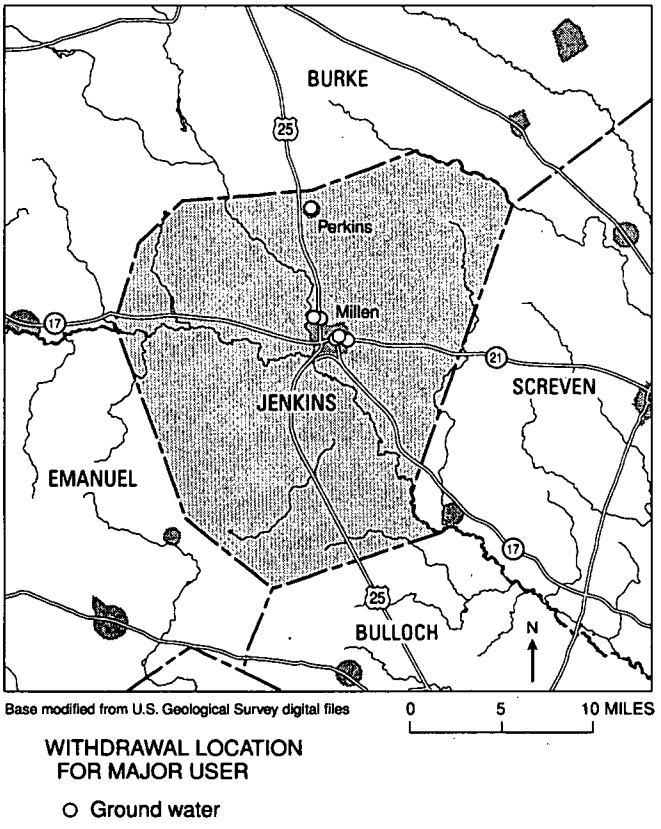
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Millen	0.45	0.00
Perkins Water Auth.	0.01	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





LIBERTY COUNTY

Population: 60,020
Population served by public supply: 48,730
Acres irrigated:
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

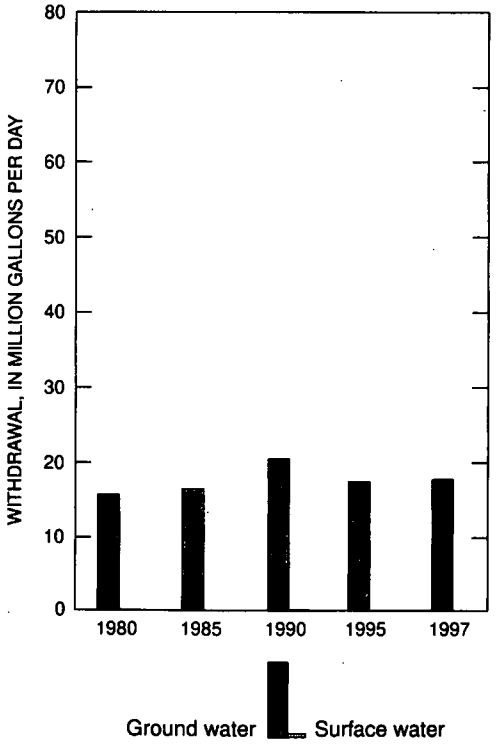
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	6.01	3.59	8.15	0.00	0.00	0.00	17.75
Surface Water	0.00	0.00	0.00	0.00	0.01	0.00	0.01
TOTALS	6.01	3.59	8.15	0.00	0.01	0.00	17.76

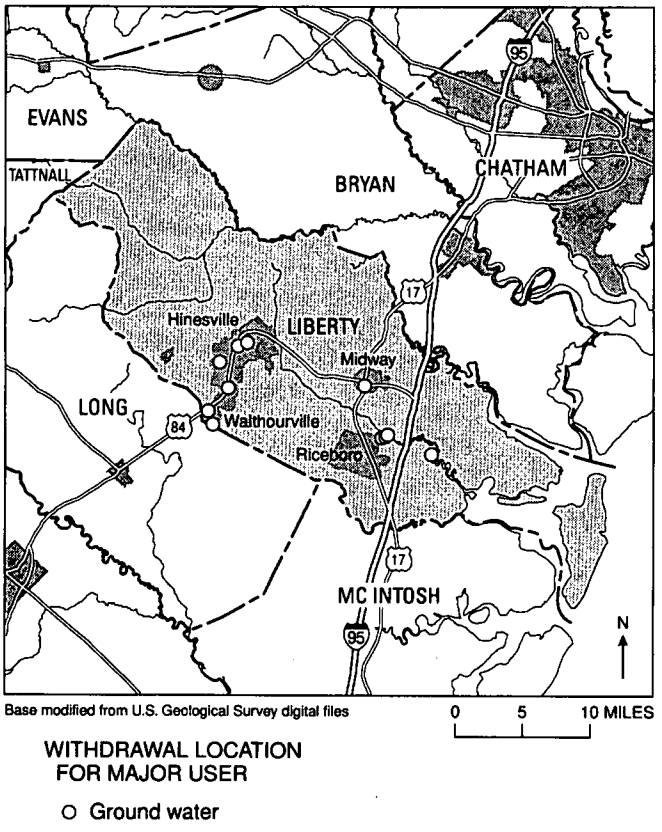
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Hinesville	3.00	0.00
City of Midway	0.02	0.00
City of Walthourville	0.17	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
26 Paper	8.15	0.00





LONG COUNTY

Population: 8,340
Population served by public supply: 3,910
Acres irrigated: 290
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

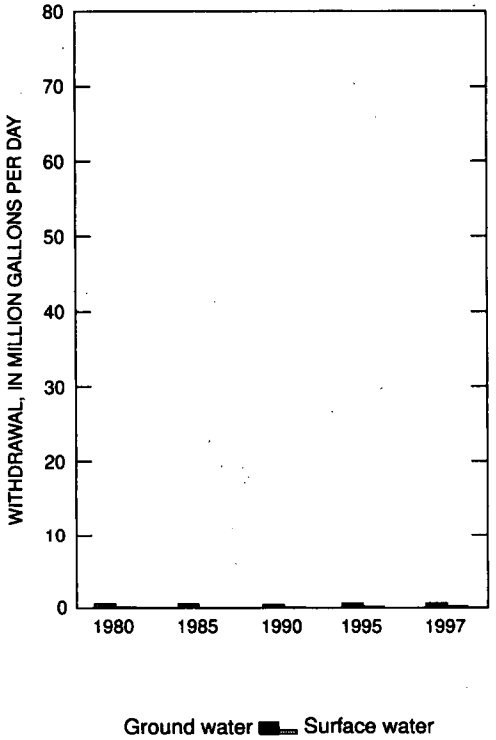
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.28	0.33	0.00	0.03	0.00	0.00	0.64
Surface Water	0.00	0.00	0.00	0.15	0.04	0.00	0.19
TOTALS	0.28	0.33	0.00	0.18	0.04	0.00	0.83

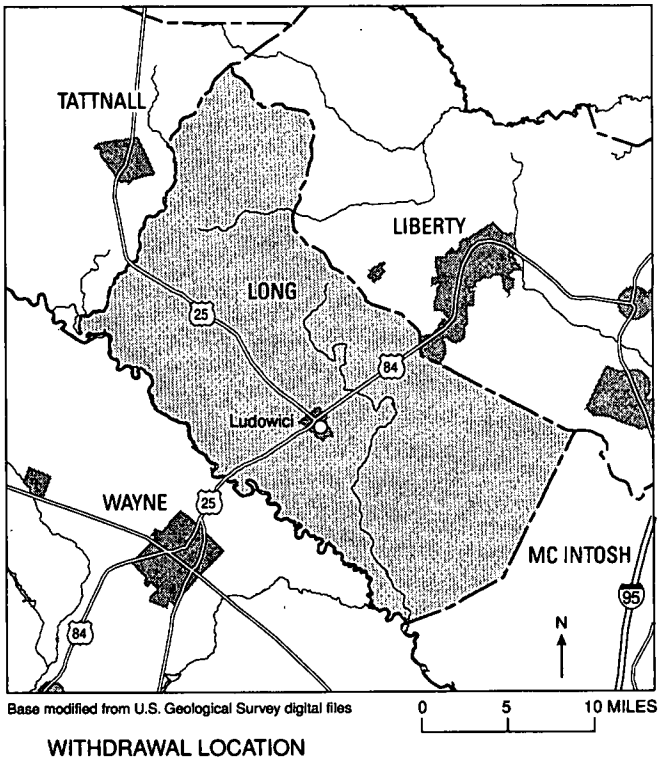
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Ludowici	0.14	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





MCINTOSH COUNTY

Population: 9,940
Population served by public supply: 7,610
Acres irrigated:
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

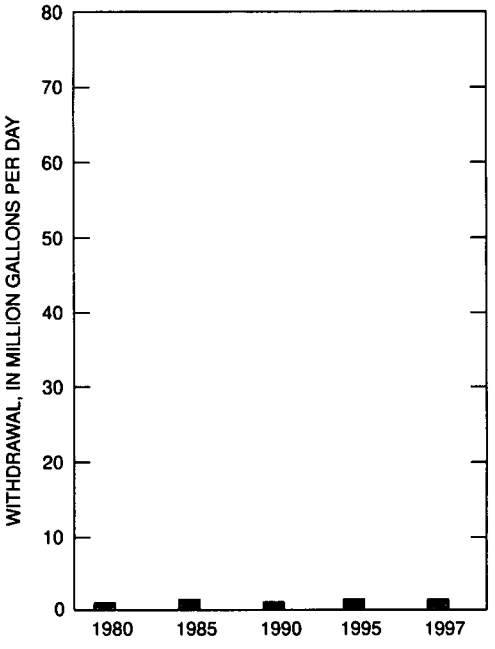
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.76	0.68	0.00	0.00	0.00	0.00	1.44
Surface Water	0.00	0.00	0.00	0.00	0.01	0.00	0.01
TOTALS	0.76	0.68	0.00	0.00	0.01	0.00	1.45

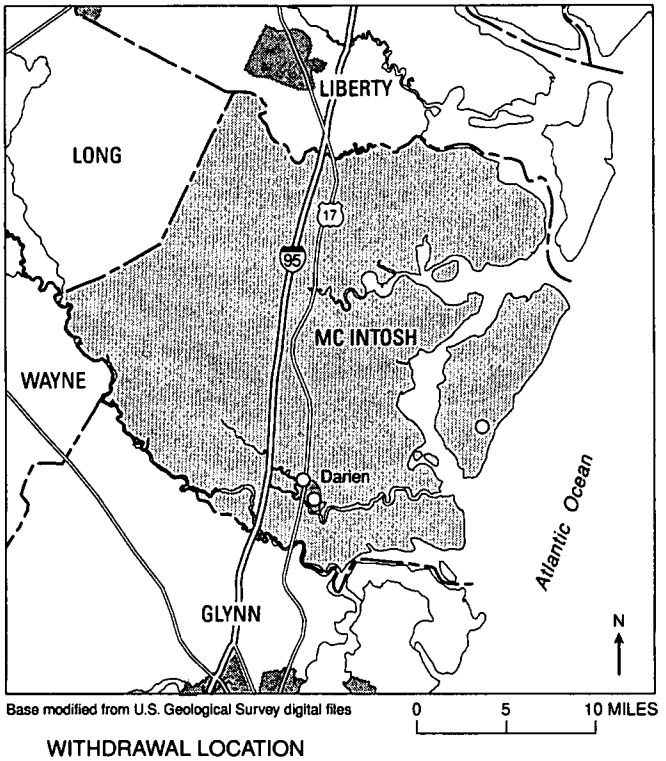
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Darien	0.40	0.00
Hog Hammock Commission	0.02	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





PIERCE COUNTY

Population: 15,480
Population served by public supply: 4,500
Acres irrigated: 14,920
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

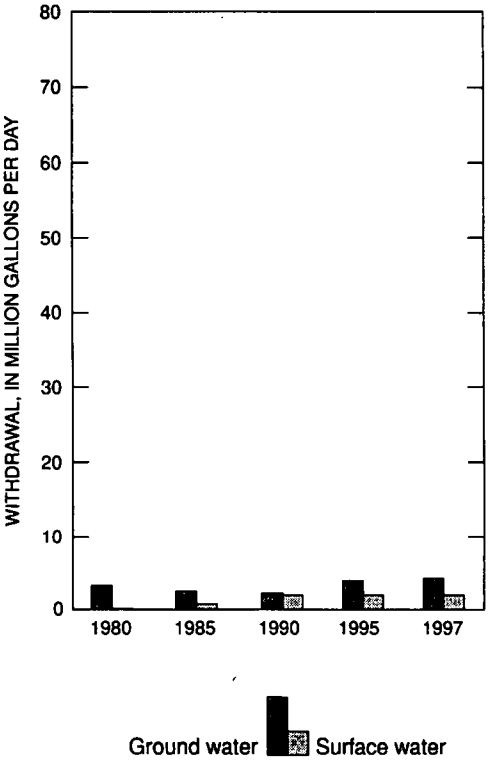
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	0.50	0.98	0.00	2.61	0.02	0.00	4.10
Surface Water	0.00	0.00	0.00	1.81	0.09	0.00	1.90
TOTALS	0.50	0.98	0.00	4.42	0.11	0.00	6.00

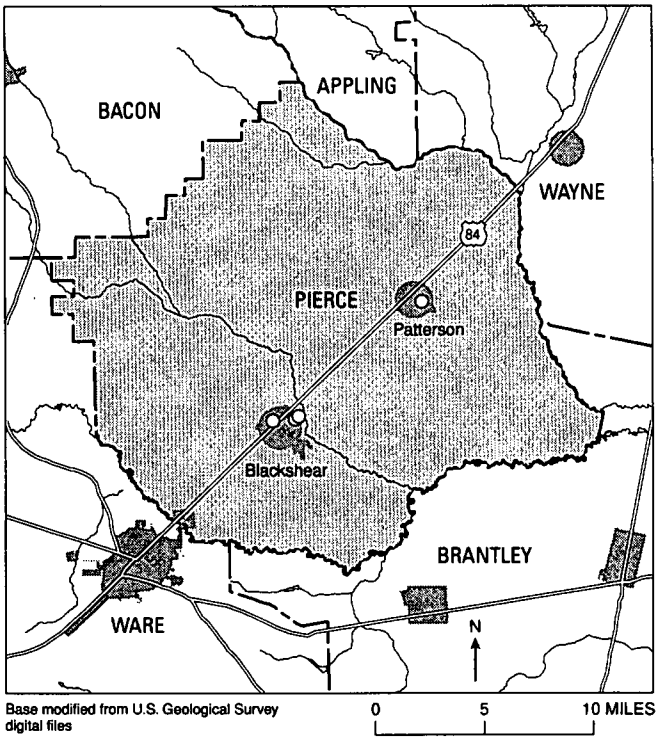
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Blackshear	0.43	0.00
City of Patterson	0.03	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





SCREVEN COUNTY

Population: 14,400
Population served by public supply: 5,590
Acres irrigated: 10,730
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

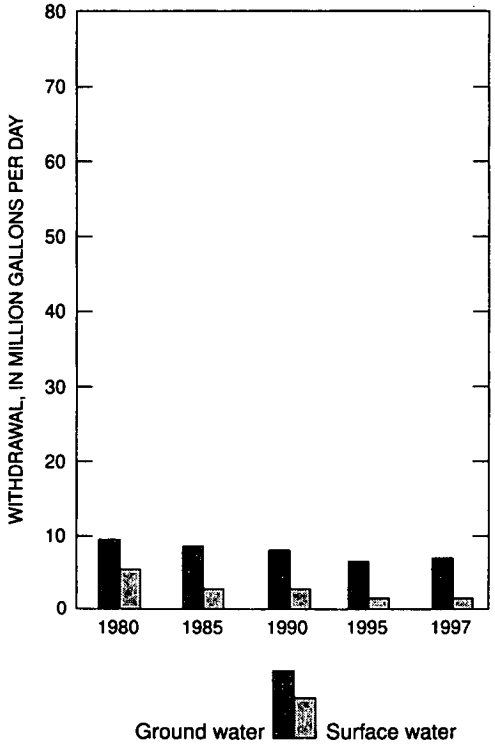
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	1.14	0.73	1.86	3.24	0.03	0.00	7.00
Surface Water	0.00	0.00	0.00	1.36	0.14	0.00	1.50
TOTALS	1.14	0.73	1.86	4.60	0.17	0.00	8.50

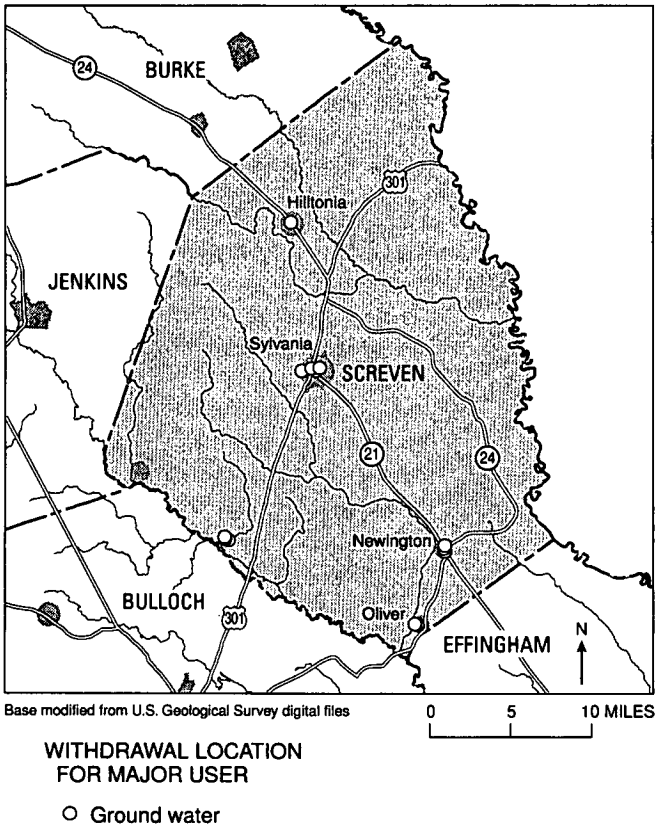
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Hiltonia	0.02	0.00
Town of Newington	0.05	0.00
City of Oliver	0.03	0.00
City of Sylvania	1.01	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
22 Textiles	1.86	0.00





TATTNALL COUNTY

Population: 19,060
Population served by public supply: 8,330
Acres irrigated: 17,140
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

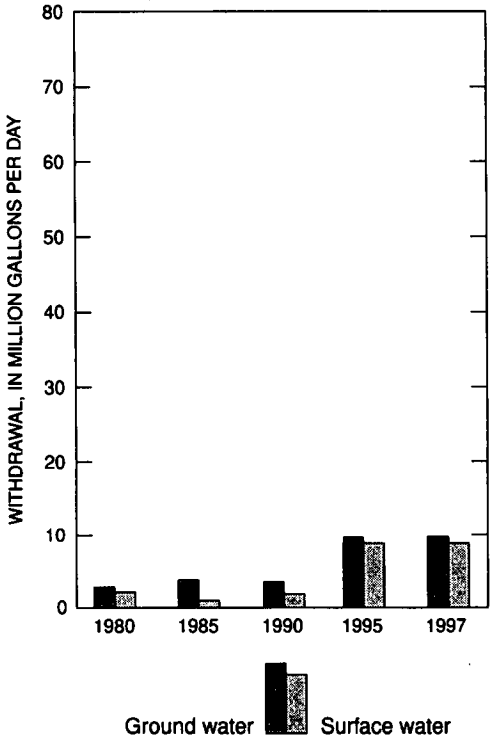
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	1.16	1.84	0.00	6.66	0.03	0.00	9.69
Surface Water	0.00	0.00	0.00	8.19	0.58	0.00	8.77
TOTALS	1.16	1.84	0.00	14.85	0.61	0.00	18.46

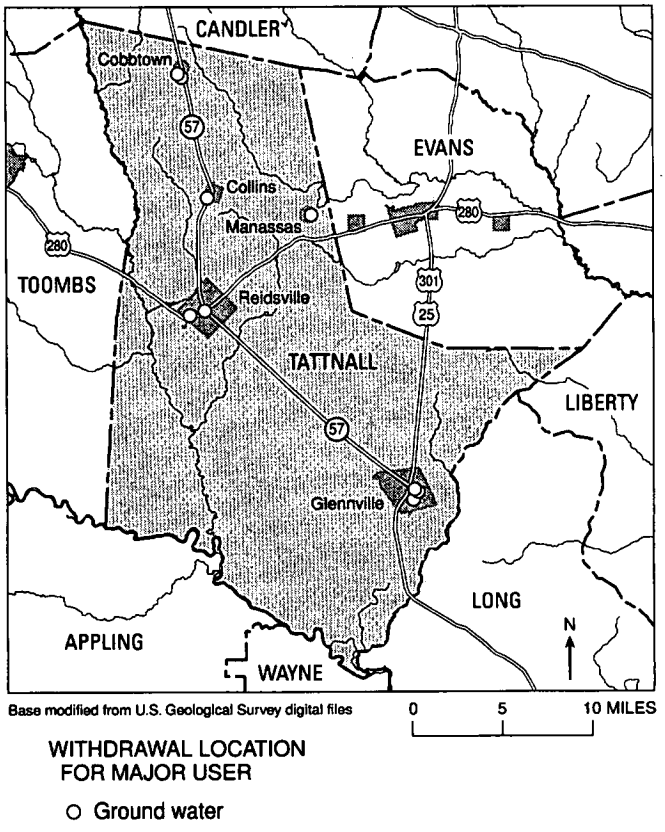
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Cobbtown	0.07	0.00
City of Collins	0.06	0.00
City of Glennville	0.71	0.00
City of Manassas	0.02	0.00
City of Reidsville	0.29	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





TOOMBS COUNTY

Population: 25,610
Population served by public supply: 18,630
Acres irrigated: 8,950
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

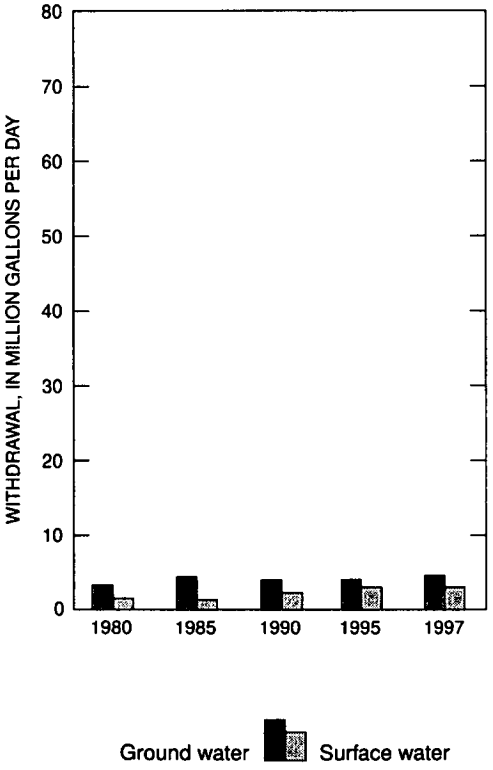
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	2.67	0.53	0.00	1.31	0.03	0.00	4.54
Surface Water	0.00	0.00	0.00	2.89	0.09	0.00	2.98
TOTALS	2.67	0.53	0.00	4.20	0.12	0.00	7.52

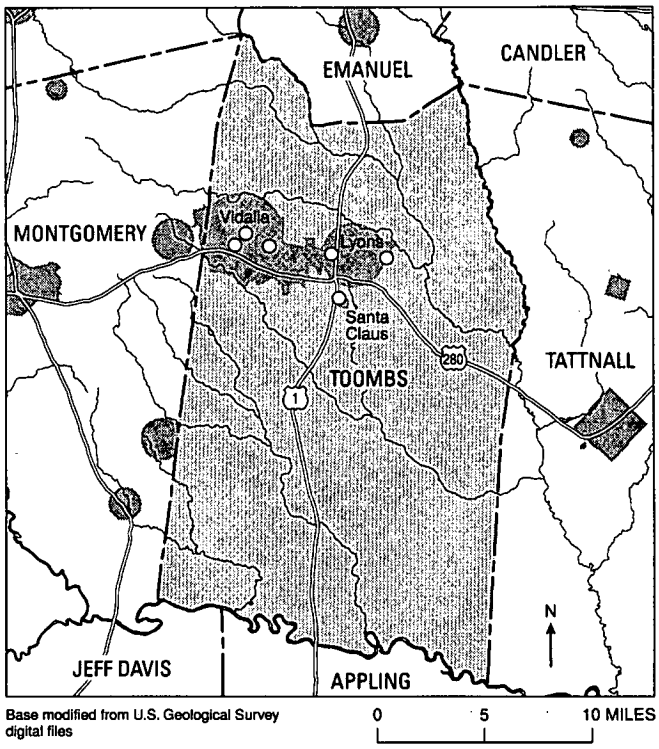
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Lyons	0.57	0.00
City of Santa Claus	0.01	0.00
City of Vidalia	2.02	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		





WARE COUNTY

Population: 35,820
Population served by public supply: 28,480
Acres irrigated: 2,470
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

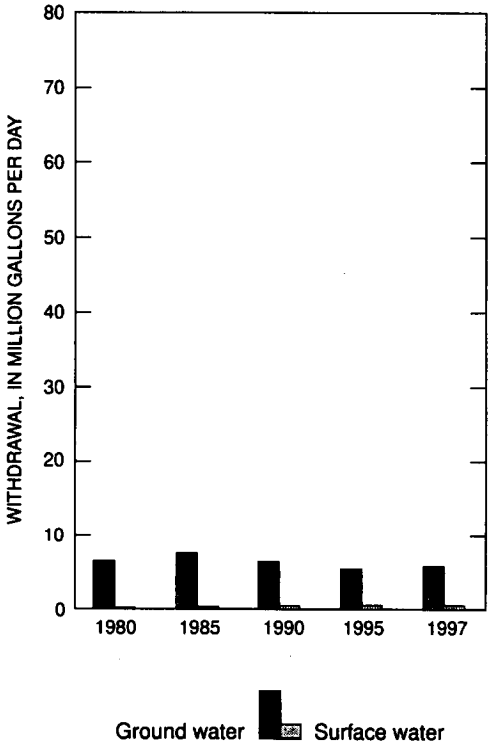
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	4.10	0.99	0.15	0.53	0.02	0.00	5.79
Surface Water	0.00	0.00	0.00	0.46	0.09	0.00	0.55
TOTALS	4.10	0.99	0.15	0.99	0.11	0.00	6.34

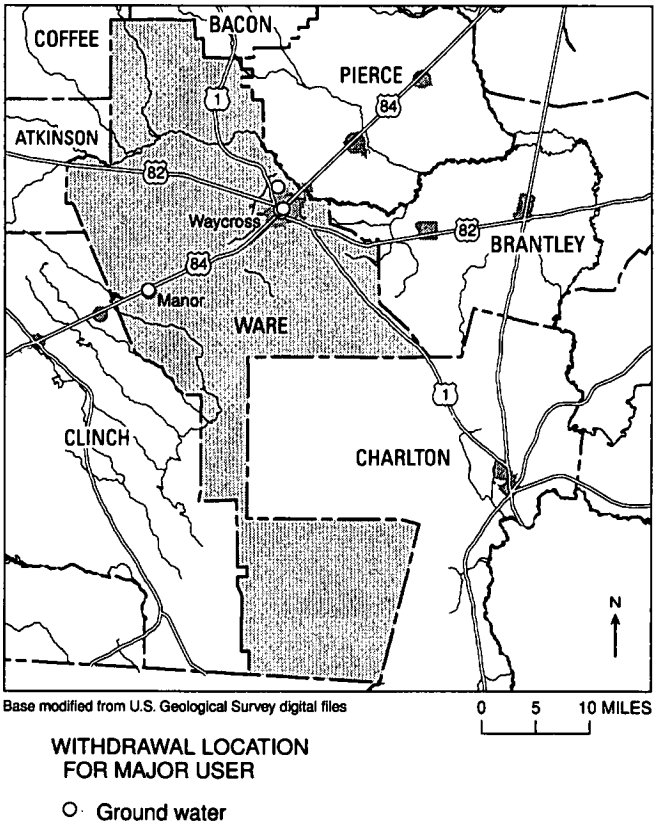
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Manor	0.37	0.00
Ware County Water System	1.20	0.00
City of Waycross	2.07	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
30 Rubber	0.15	0.00





WAYNE COUNTY

Population: 25,070
Population served by public supply: 12,320
Acres irrigated: 3,710
Hydroelectric use (Mgal/d): 0.00

1997 WITHDRAWAL, IN MILLION GALLONS PER DAY

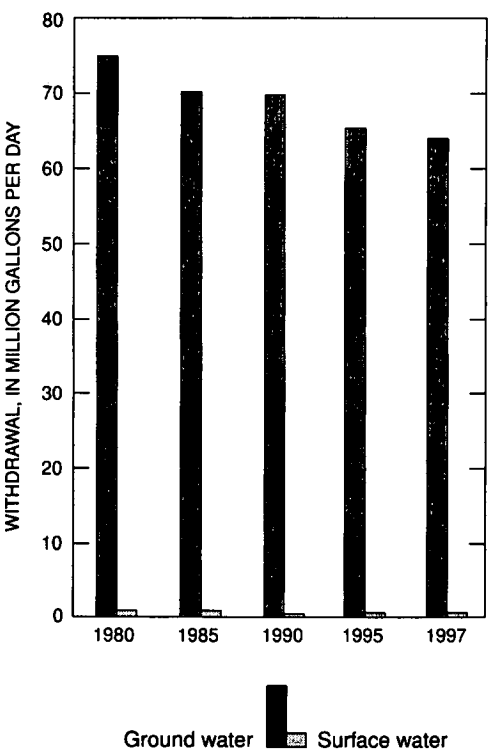
	Public Supply	Domestic & Commercial	Industrial & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Ground Water	1.72	1.01	60.59	0.71	0.01	0.00	64.04
Surface Water	0.00	0.00	0.00	0.53	0.05	0.00	0.58
TOTALS	1.72	1.01	60.59	1.24	0.06	0.00	64.62

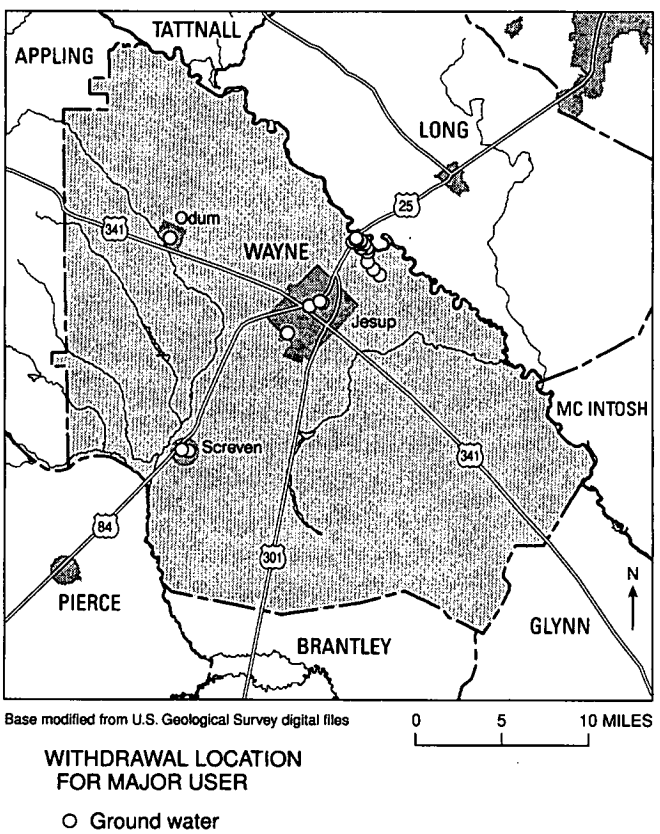
Withdrawal by Major Public Suppliers (Mgal/d):

	GW	SW
City of Jesup	1.53	0.00
Town of Odum	0.02	0.00
City of Screven	0.09	0.00

Withdrawal by Major Industrial Groups (Mgal/d):

SIC	GW	SW
28 Chemicals	60.59	0.00





APPENDIX B

Standard Industrial Classification (SIC) Codes

Standard Industrial Classification (SIC) Codes

Industrial water use is given by industry type and classified by Standard Industrial Classification (SIC) Code. A brief description of the codes used in this publication is given below.

14—MINING AND QUARRYING OF NONMETALLIC MINERALS, EXCEPT FUELS

This major group includes establishments engaged in mining or quarrying, developing mines, or exploring for nonmetallic minerals, except fuels. Also included are certain well and brine operations, and primary preparation plants, such as those engaged in crushing, grinding, washing, or other concentration.

20—FOOD AND KINDRED PRODUCTS

This major group includes establishments manufacturing or processing foods and beverages for human consumption, and certain related products—such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls.

22—TEXTILE MILL PRODUCTS

This major group includes establishments engaged in performing any of the following operations: (1) preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine, and cordage; (2) manufacturing broad woven fabric, narrow woven fabric, knit fabric and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacture of knit apparel and other finished articles from yarn; and (6) the manufacture of felt goods, lace goods, nonwoven fabrics and miscellaneous textiles.

26—PAPER AND ALLIED PRODUCTS

This major group includes the manufacture of pulps from wood and other cellulose fibers, and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products such as paper coated off the paper machine, paper bags, paper boxes, and envelopes.

28—CHEMICALS AND ALLIED PRODUCTS

This major group includes establishments producing basic chemicals, and establishments manufacturing products by predominantly chemical processes. Establishments classified in this major group manufacture three general classes of products: (1) basic chemicals such as acids, alkalies, salts, and organic chemicals; (2) chemical products to be used in further manufacture such as synthetic fibers, plastics materials, dry colors, and pigments; and (3) finished chemical products to be used for ultimate consumption such as drugs, cosmetics, and soaps, or to be used as materials or supplies in other industries such as paints, fertilizers, and explosives.

29—PETROLEUM REFINING AND RELATED INDUSTRIES

This major group includes establishments primarily engaged in petroleum refining, manufacturing paving and roofing materials, and compounding lubricating oils and greases from purchased materials.

30—RUBBER AND MISCELLANEOUS PLASTICS PRODUCTS

This major group includes establishments manufacturing from natural, synthetic, or reclaimed rubber, gutta percha, balata, or gutta siak, rubber products such as tires, rubber footwear, mechanical rubber goods, heels and soles, flooring, and rubber sundries.

32—STONE, CLAY, GLASS, AND CONCRETE PRODUCTS

This major group includes establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, etc., from materials taken principally from the earth in the form of stone, clay, and sand.

33—PRIMARY METAL INDUSTRIES

This major group includes establishments engaged in the smelting and refining of ferrous and nonferrous metals from ore, pig, or scrap; in the rolling, drawing, and alloying of ferrous and non-ferrous metals; in the manufacture of castings and other basic products of ferrous and nonferrous metals; and in the manufacture of nails, spikes, and insulated wire and cable.

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