

Prepared in cooperation with the
Georgia Department of Natural Resources, Environmental Protection Division

Water Use in Georgia by County for 2005; and Water-Use Trends, 1980–2005

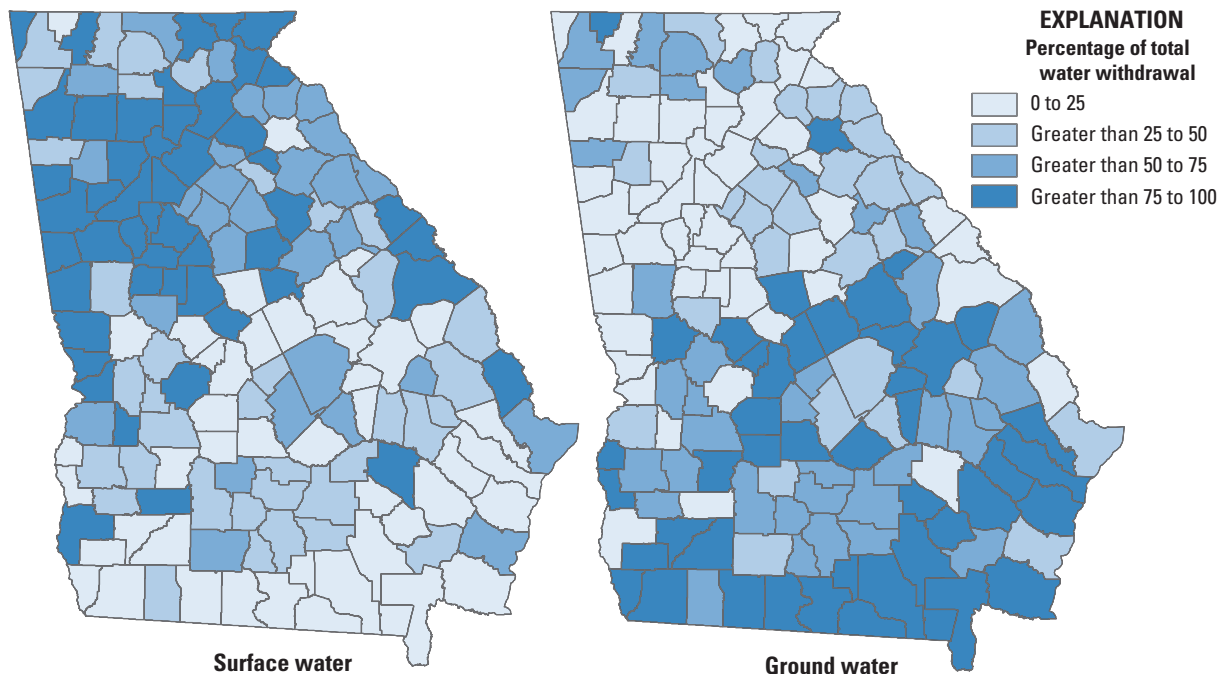
Water use for 2005 for each county in Georgia was estimated using data obtained from various Federal and State agencies and local sources. Total consumptive water use also was estimated for each county in Georgia for 2005. Water use is subdivided according to offstream and instream use. Offstream use is defined as water withdrawn or diverted from a ground- or surface-water source and transported to the place of use. Estimates for offstream water use include the categories of public supply, domestic, commercial, industrial, mining, irrigation, livestock, aquaculture, and thermoelectric power. Instream use is that which occurs within a stream channel for such purposes as hydroelectric-power generation, navigation, water-quality improvement, fish propagation, and recreation (Solley and others, 1988). The only category of instream use estimated was hydroelectric-power generation.

Georgia law (the Georgia Ground-Water Use Act of 1972 and the Georgia Water Supply Act of 1978 [Georgia Department of Natural Resources, 2008a,b]) requires any water user who withdraws more than 100,000 gallons per day on a monthly average to obtain a withdrawal permit from the Georgia Environmental Protection Division. Permit holders generally must report their withdrawals by month. The Georgia Water-Use Program collects the reported information under the withdrawal permit system and the drinking-water permit system and stores the data in the Georgia Water-Use Data System.

Total Water Use, 2005

Total offstream water use from ground- and surface-water sources was about 5,471 million gallons per day (Mgal/d) in 2005. Surface water used in the process of **thermoelectric-power** generation was the largest volume of water withdrawn with withdrawals of 2,717 Mgal/d in 2005. Estimated instream water use for **hydroelectric-power** generation was

54,096 Mgal/d. Withdrawals for **irrigation** totaled 752 Mgal/d with 65 percent supplied by ground-water sources. Surface water provided 78 percent of the 1,180 Mgal/d withdrawn for **public supply**. Many counties in the northern half of the State, an area of dense population, had a large percentage of withdrawals from surface-water sources. In contrast, in the southern half of the State, many counties had more withdrawals from ground-water sources.



Percentage of total water withdrawal by county and source in Georgia, 2005.

Water Use by Category, 2005

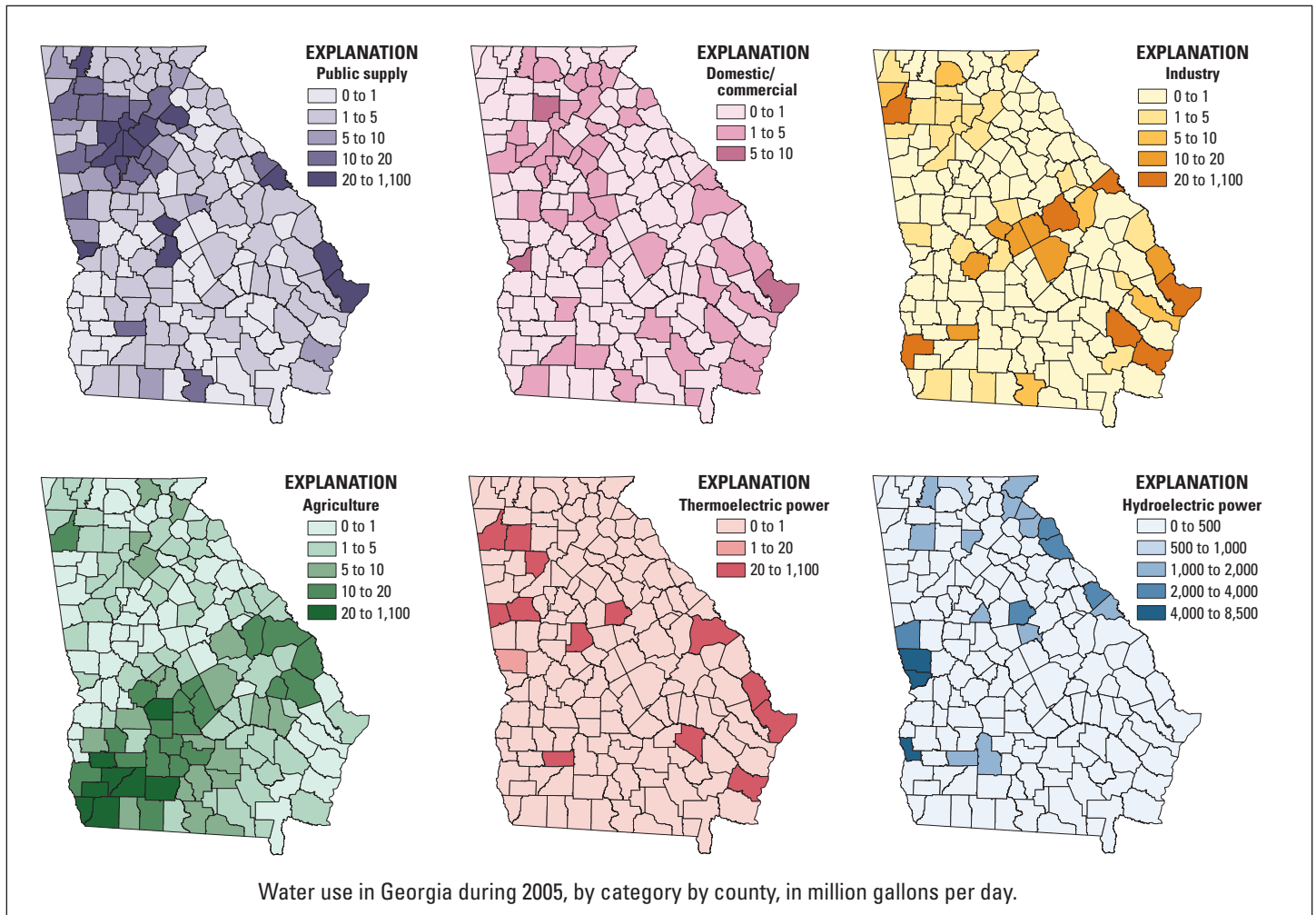
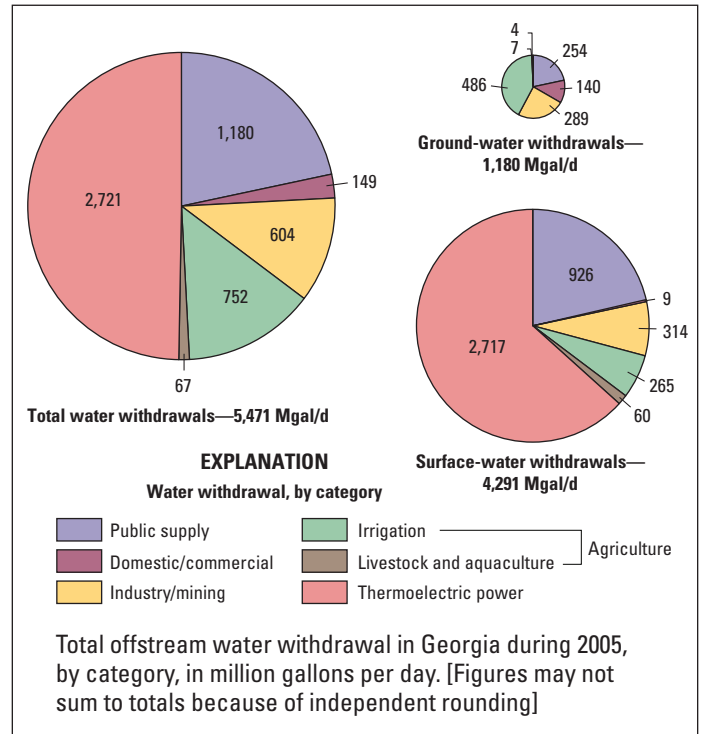
Public supply during 2005 was 1,180 Mgal/d, of which surface-water withdrawal accounted for about 78 percent (926 Mgal/d), and ground-water withdrawal accounted for about 22 percent (254 Mgal/d). The largest public suppliers are located in counties in the Metropolitan Atlanta area in northern Georgia with the largest population in the State, and surface water is the principal water source. Public-supply water use accounted for 22 percent of the total water use in Georgia.

Industries in Georgia used approximately 554 Mgal/d of water during 2005 (including 49 Mgal/d for mining use). The largest industrial water users in Georgia are pulp and paper mills (concentrated along the coast), textile industries (concentrated in northwestern Georgia), chemical manufacturers, and mining and mineral industries.

Agricultural water use during 2005, including water for irrigation, livestock, and aquaculture use totaled 819 Mgal/d (752 Mgal/d for irrigation, 28 Mgal/d for livestock, and 38 Mgal/d for aquaculture). The highest rate of irrigation occurs in the Coastal Plain physiographic province. Ground water is the source of about 65 percent of irrigation use.

Thermoelectric-power water use in Georgia includes 13 plants that operate using fossil fuels (such as oil, coal, or natural gas) and 2 nuclear powered plants. All thermoelectric-power water use in Georgia is self-supplied. Thermoelectric-power water use was estimated to be 2,721 Mgal/d in 2005, which is nearly 50 percent of total offshore use.

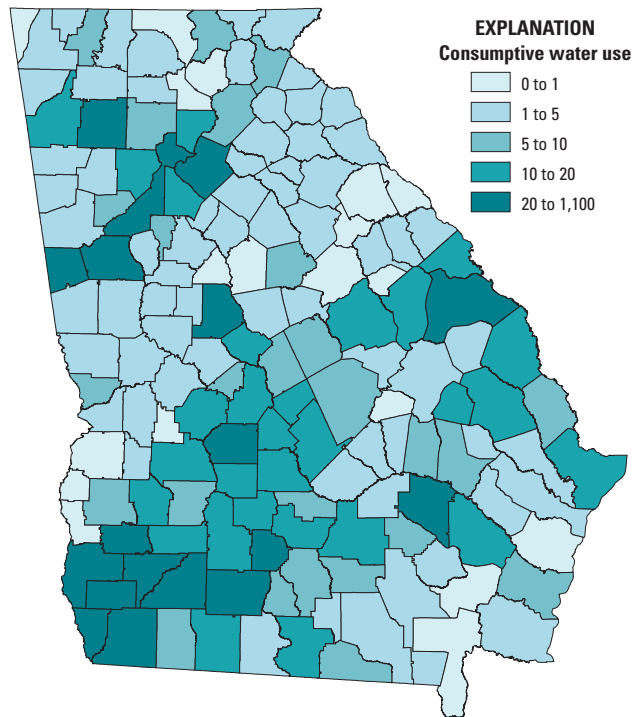
Hydroelectric power. In Georgia, the only instream use estimated is hydroelectric-power generation. Generating hydroelectric power requires significant amounts of water. During 2005, an estimated 54,096 Mgal/d was used instream to generate hydroelectric power.



Consumptive Water Use, 2005

The distinction between the amount of water withdrawn for use and the amount of water consumed during use is important for water planning and management. Consumptive water use is the part of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment (Hutson and others, 2004, p. 44). Because public supply delivered water to domestic, commercial, industrial, and thermoelectric-power users, consumptive use is estimated for those use categories and not for public supply. The total water used in the categories is the sum of water withdrawn (self-supplied water) and water delivered from public suppliers.

For **domestic and commercial** water use, consumptive use was estimated at 18 percent of the total use. For **industrial and mining** use, consumptive-use coefficients were determined by industry type and type of mining activity. **Irrigation** and **livestock** water uses are considered to be 100 percent consumed. Consumptive-use coefficients for **thermoelectric power** ranged from 0 to nearly 70 percent, and is determined by the type of plant cooling (once-through cooling or cooling towers or ponds). Consumptive use is negligible for in-stream **hydroelectric-power** generation. Consumptive use was estimated by county for 2005 and was estimated to be about 1,310 Mgal/d or 24 percent of total withdrawals in the State.



Consumptive water use in Georgia during 2005, by county, in million gallons per day.

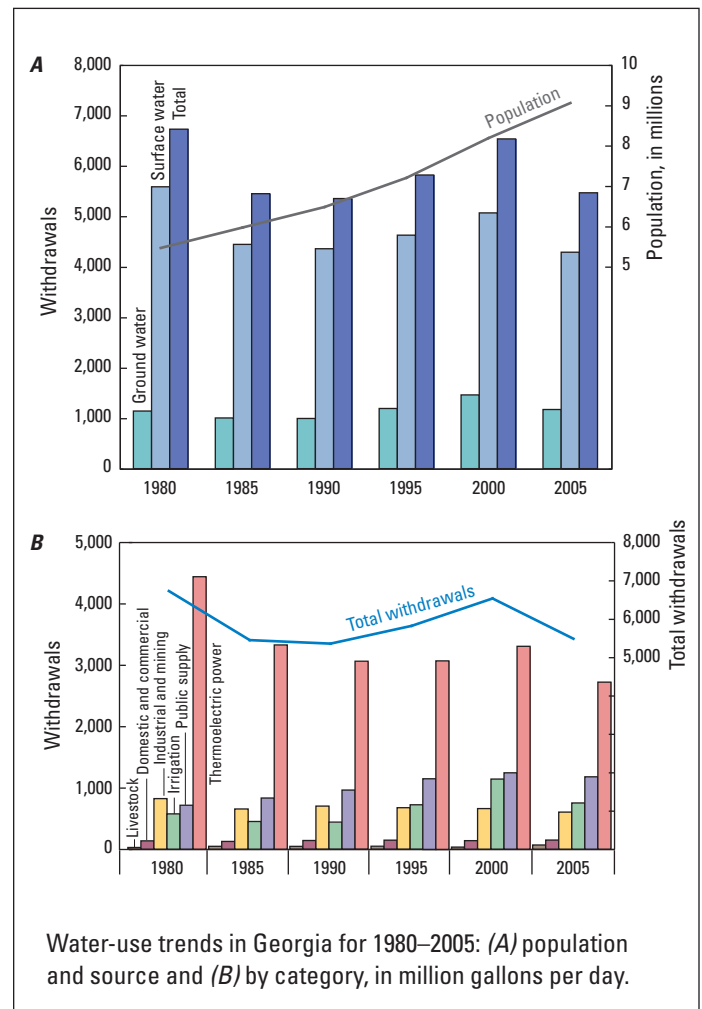
Water-Use Trends, 1980–2005

In Georgia, total estimated water use for 1980 was 6,725 Mgal/d (Pierce and others, 1982). By 1990, total estimated water use had declined about 31 percent to 5,353 Mgal/d. Statewide, water use increased in 1995 and 2000 to reach 6,487 Mgal/d. In 2005, estimated water use was 5,471 Mgal/d, a decrease of 1,015 Mgal/d (about 19 percent) since 2000.

Statewide **public-supply** water use steadily increased from 1980 to 2000, corresponding to an increase in population (from 4,189,000 to 8,186,450) during the same period; and slightly decreased from 2000 to 2005. **Commercial, domestic, and livestock** uses remained about the same for the period 1980–2005. **Industrial** water use fluctuated during the period 1980–2005.

Irrigation water use declined from 1980 to 1985 and again to 1990, increased from 1995 to 2000, and decreased markedly from 2000 to 2005 (30 percent). **Thermoelectric-power** withdrawal peaked in 1980, dropped sharply in 1985, and declined again in 1990 before increasing in 1995 and 2000. This rising trend was reversed in 2005 when thermoelectric power decreased by 24 percent from 2000 because of the decommissioning of three power plants and retrofitting cooling towers at several other plants.

From 1980 to 1995, **hydroelectric-power** water use was increasing. However, low-flow conditions related to drought in 1995 and 2000 resulted in a 19,000 Mgal/d decrease in usage. In 2005, water used for hydroelectric-power generation rose significantly (22,206 Mgal/d or 59 percent) to 54,096 Mgal/d.



Selected References

Fanning, J.L., 1997, Water use in Georgia by county for 1995: Georgia Geologic Survey Information Circular 101, 95 p.

Fanning, J.L., 2003, Water use in Georgia by county for 2000 and water-use trends for 1980–2000: Georgia Geologic Survey Information Circular 106, 176 p.

Fanning, J.L., Doonan, G.A., and Montgomery, L.T., 1992, Water use in Georgia by county for 1990: Georgia Geologic Survey Information Circular 90, 98 p.

Fanning, J.L., and Trent, V.P., 2009, Water use in Georgia by county for 2005; and water-use trends, 1980–2005: U.S. Geological Survey Scientific Investigations Report 2009–5002, 186 p., Web-only publication available at <http://pubs.usgs.gov/sir/2009/5002/>.

Georgia Department of Natural Resources, Environmental Protection Division, 2000, 1998–2000 Georgia drought report: Georgia Department of Natural Resources, 43 p.

Georgia Department of Natural Resources, Environmental Protection Division, 2008a, Existing rules and corresponding laws, 391-3-2 Groundwater Use, accessed July 24, 2008, at http://www.georgiaepd.org/Documents/rules_exist.html

Georgia Department of Natural Resources, Environmental Protection Division, 2008b, Existing rules and corresponding laws, 391-3-5 Safe Drinking Water, accessed July 24, 2008, at http://www.georgiaepd.org/Documents/rules_exist.html

Hutson, S.S., Barber, N.L., Kenny, J.F., Linsey, K.S., Lumia, D.S., and Maupin, M.A., 2004, Estimated use of water in the United States in 2000: U.S. Geological Survey Circular 1268, 46 p.

Pierce, R.R., Barber, N.L., and Stiles, H.R., 1982, Water use in Georgia by county for 1980: Georgia Geologic Survey Information Circular 59, 180 p.

Solley, W.B., Merk, C.F., and Pierce, R.R., 1988, Estimated use of water in the United States in 1985: U.S. Geological Survey Circular 1004, 82 p.

Trent, V.P., Fanning, J.L., and Doonan, G.A., 1990, Water use in Georgia by county for 1987: Georgia Geologic Survey Information Circular 85, 112 p.

Turlington, M.C., Fanning, J.L., and Doonan, G.A., 1987, Water use in Georgia by county for 1985: Georgia Geologic Survey Information Circular 81, 110 p.

U.S. Bureau of the Census, 2005, Estimates and projections of population, 2005: Washington, D.C., U.S. Department of Commerce, series P25, variously paged.

By Julia L. Fanning, U.S. Geological Survey, Atlanta, Georgia; and Victoria P. Trent, Georgia Environmental Protection Division, Atlanta, Georgia

This fact sheet is based on U.S. Geological Survey Scientific Investigations Report 2009–5002 (Fanning and Trent, 2009), which provides more detailed descriptions of water use in Georgia, including:

- Water-use estimates for selected water-use categories during 2005 reported by county, major river basin, and principal aquifer;
- Estimated consumptive use during 2005 reported by county; and
- Water-use trends during the period 1980–2005.

Data are presented in tabular form, with maps showing locations of major water users in 2005 and graphs showing 25-year water-use trends.

For more information on the Georgia Water-Use Program: visit the USGS Georgia Water Science Center Web site at <http://ga.water.usgs.gov/>

or contact the
Director, USGS Georgia Water Science Center
3039 Amwiler Road
Peachtree Business Center, Suite 130
Atlanta, Georgia 30360-2824
770-903-9100

