

# SUMMARY OF SELECTED U.S. GEOLOGICAL SURVEY PROGRAMS IN GEORGIA, WITH EMPHASIS ON WATER RESOURCES INVESTIGATIONS

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**Abstract.** The U.S. Geological Survey (USGS) is the Nation's largest natural sciences and civilian mapping agency and provides reliable and impartial scientific information to natural-resource managers, planners, the public, and other customers and stakeholders throughout the Nation. This information contributes to sound conservation and management of natural resources; enhances the quality of life by monitoring water, biological, energy, and mineral resources; and minimizes losses from numerous natural hazards. USGS disseminates results of data-collection programs and technical investigations in a wide variety of formats—including numerous scientific reports, maps, various databases, CD-ROMs, and other products.

USGS data-collection activities and technical investigations in Georgia are conducted in cooperation with numerous local, State, and Federal agencies. Cooperating agencies include the City of Brunswick and Glynn County; Albany Water, Gas, and Light Commission; City of Lawrenceville; Georgia Department of Natural Resources; University System of Georgia; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; and National Park Service. In addition, some projects are funded through direct Congressional appropriation of Federal funds.

## USGS WATER RESOURCES PROGRAMS IN GEORGIA

The USGS has been collecting water resources data and conducting technical investigations in Georgia since the 1890's. The USGS operates and collects data at approximately 120 continuous-record and 77 partial-record streamflow-gaging stations, 18 reservoir stage-and-contents gaging stations, and 180 continuous-record monitoring wells.

Numerous water resources investigations are currently being conducted by the USGS in Georgia. The objectives of these studies vary widely; a few examples of these studies are:

- *Coastal Georgia Ground-Water Investigation*—Study to evaluate effects of ground-water pumping on the water quality (saltwater intrusion) in the Upper Floridan aquifer, and investigate alternative sources of ground and surface water;
- *Evaluation of Saltwater Contamination, Brunswick Area*—Study to describe ground-water flow and transport processes in the Upper Floridan aquifer, predict the effects of various ground-water withdrawal scenarios, and evaluate alternative ground-water management practices within the constraint of minimizing saltwater intrusion;
- *Ground-Water Resources of the Georgia Piedmont in the vicinity of Lawrenceville*—Study to delineate the hydrogeologic characteristics of fractured crystalline-rock aquifers, and evaluate effects of ground-water withdrawal in a rapidly developing urban area;
- *Hydrogeologic Monitoring and Evaluation in the Albany area*—Program to better define ground-water resources, monitor ground-water levels and quality, establish and maintain a hydrogeologic database, assess water chemistry and recharge mechanisms, and assess the hydrogeology of the area's well fields;
- *Water Use in Georgia*—Program to collect and compile water-use data, and conduct assessments to improve the methodology for estimating irrigation water use;
- *Statewide Flood Investigations*—Continuing operation of a statewide network of crest-stage gages, conduct flood-frequency analyses, and conduct hydraulic analyses of selected stream reaches;
- *National Water-Quality Assessment (NAWQA) Program*—Program to provide consistent description of current water-quality conditions for surface- and ground-water resources; define long-term trends (or lack of trends) in water quality; and identify, describe, and explain the major factors that affect water-quality conditions and trends. There are three NAWQA studies currently being conducted in Georgia: (1) *Apalachicola*

*Chattahoochee-Flint River basin*—study began in 1991 and is based in Atlanta, Ga.; (2) *Georgia-Florida Coastal Plain*—study began in 1991 and is based in Tallahassee, Fla.; and (3) *Mobile River basin*—study began in 1991 and is based in Montgomery, Ala.;

- *Drinking Water Initiative*—Cryptosporidium Sampling/Analysis Methods Research to develop and field test sample-collection and processing techniques to improve the recovery and precision of analyses for Cryptosporidium.

- *Surface-Water Quality of Gwinnett County*—Study to describe status and trends for six streams, evaluate relations between water quality and watershed characteristics, and assess potential use of these relations to develop techniques to predict water quality from watershed characteristics.

- *Department of Defense Environmental Contamination Program*—Studies to provide assistance in the hydrologic evaluation of military facilities. Sites currently being evaluated include the Naval Submarine Base Kings Bay, Air Force Plant 6 in Marietta, Marine Corps Logistics Base near Albany, and U.S. Army Signal Center at Fort Gordon near Augusta.

- *Water, Energy, and Biogeochemical Budgets at Panola Mountain State Park*—Study to investigate processes controlling movement and solute composition of streamwater in a forested watershed; determine relative contributions of various sources including primary mineral weathering, cation exchange, and atmospheric deposition, to cations observed in streamwater; and investigate processes controlling the regulation of soil chemistry.

- *Geographic Information Systems*—Study to develop environmental and ancillary spatially referenced databases for use in hydrologic investigations.

#### **Recently Completed USGS Investigations in Georgia are:**

- *Evaluation of Ground-Water Levels, Ground-Water Flow, and Ground-Water Quality in the Vicinity of the Savannah River Site, Georgia and South Carolina*—Comprehensive study of ground-water flow and stream-aquifer relations to evaluate the potential for contaminants to infiltrate into ground water and flow beneath the Savannah River from South Carolina to Georgia;

- *Apalachicola-Chattahoochee-Flint (ACF) and Alabama-Coosa-Tallapoosa (ACT) River basins ground-water resources*—Study was conducted in support of efforts by the U.S. Army Corps of Engineers and the States of Georgia, Alabama, and Florida to develop a tri-State water-allocation formula.

#### **OTHER USGS PROGRAMS IN GEORGIA**

The USGS also conducts investigations in Georgia that concern biological and mineral resources, and mapping. Examples of these are:

- *Effects of Dredge-Spoil Runoff on the Quality of Aquatic Habitat in the Lower Savannah River*;

- *Abundance and Reproductive Status of Striped Bass in the Savannah River Estuary*;

- *Evaluation of Mineral Resources and Impacts of Mineral-Resource Development*;

- *Production of Statewide Digital Line Graph Coverages for Transportation and Hydrography Data Categories*.

#### **DISSEMINATION OF USGS INFORMATION AND PRODUCTS**

The results of USGS data-collection programs and technical investigations are disseminated in a wide variety of formats, including numerous scientific reports, maps, World Wide Web sites, various databases, CD-ROMs, and other products. For further information about USGS activities in Georgia, visit the USGS World Wide Web site for Georgia at <<http://georgia.usgs.gov/>>; for further information about the USGS in general, visit the USGS Home Page at <<http://www.usgs.gov/>>. Selected, recently published USGS reports that mainly pertain to water resources in Georgia are provided below.

#### **Recently Published USGS Reports in Georgia**

Atkins, J.B., Journey, C.A., and Clarke, J.S., 1996, *Estimation of ground-water discharge to streams in the central Savannah River basin of Georgia and South Carolina*: U.S. Geological Survey Water-Resources Investigations Report 96-4179, 36 p.

Berndt, M.P., Hatzell, H.H., Crandall, C.A., Turtora, Michael, Pittman, J.R., and Oaksford, E.T., 1998, *Water quality in the Georgia-Florida Coastal Plain, 1992-96*: U.S. Geological Survey Circular 1151, 34 p.

Chapman, M.J., and Peck, M.F., 1997a, *Ground-water resources of the upper Chattahoochee River basin in Georgia—Subarea 1 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River basins*: U.S. Geological Survey Open-File Report 96-363, 43 p.

\_\_\_\_\_, 1997b, *Ground-water resources of the middle Chattahoochee River basin in Georgia and Alabama, and upper Flint River basin in Georgia—Subarea 2 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River basins*: U.S. Geological Survey Open-File Report 96-492, 48 p.

- Chapman, M.J., Crawford, T.J., and Tharpe, W.T., 1999, *Geology and ground-water resources of the Lawrenceville area, Georgia*: U.S. Geological Survey Water-Resources Investigations Report 98-4233, 45 p.
- Clarke, J.S., and West, C.T., 1998a, *Ground-water levels, predevelopment ground-water flow, and stream-aquifer relations in the vicinity of the Savannah River Site, Georgia and South Carolina*: U.S. Geological Survey Water-Resources Investigations Report 97-4197, 120 p.
- \_\_\_\_\_, 1998b, *Simulation of ground-water flow and stream-aquifer relations in the vicinity of the Savannah River Site, Georgia and South Carolina, predevelopment through 1992*: U.S. Geological Survey Water-Resources Investigations Report 98-4062, 134 p.
- Couch, C.A., Hopkins, E.H., and Hardy, P.S., 1996, *Influences of environmental settings on aquatic ecosystems in the Apalachicola-Chattahoochee-Flint River basin*: U.S. Geological Survey Water-Resources Investigations Report 95-4278, 58 p.
- Craigg, S.D., (compiler/editor), 1999, *USGS programs in Georgia*: U.S. Geological Survey Fact Sheet FS-011-99, 4 p.
- Cressler, A.M., 1998, *Ground-water conditions in Georgia, 1997*: U.S. Geological Survey Open-File Report 98-172, 104 p. [report is published annually].
- Dyar, T.R., and Alhadeff, S.J., 1997, *Stream-temperature characteristics in Georgia*: U.S. Geological Survey Water-Resources Investigations Report 96-4203, 150 p.
- Frick, E.A., Buell, G.R., and Hopkins, E.H., 1996, *Nutrient sources and analysis of nutrient water-quality data, Apalachicola-Chattahoochee-Flint River basin, Georgia, Alabama, and Florida, 1972-90*: U.S. Geological Survey Water-Resources Investigations Report 96-4101, 120 p.
- Frick, E.A., Hippe, D.J., Buell, G.R., Couch, C.A., Hopkins, E.H., Wangsness, D.J., and Garrett, J.W., 1998, *Water quality in the Apalachicola-Chattahoochee-Flint River basin, Georgia, Alabama, and Florida, 1992-95*: U.S. Geological Survey Circular 1164, 38 p.
- Garrett, J.W., Perlman, H.A., and Scholz, Judith, 1997, *World Wide Web access to publications and data for the Apalachicola-Chattahoochee-Flint River basin—Georgia, Florida, and Alabama, 1992-95*: U.S. Geological Survey Fact Sheet FS-78-97, 4 p.
- Garza, Reggina, and Krause, R.E., 1996, *Water-supply potential of major streams and the Upper Floridan aquifer in the vicinity of Savannah, Georgia*: U.S. Geological Survey Water-Supply Paper 2411, 38 p.
- Hess, G.W., and Stamey, T.C., 1993, *Annual peak discharges and stages for gaging stations in Georgia through September 1990*: U.S. Geological Survey Open-File Report 92-113, 277 p.
- Hippe, D.J., Wipperfurth, C.J., Hopkins, E.H., Frick, E.A., and Wangsness, D.J., 1997, *Everyone lives downstream—water-quality issues related to urban development of the upper Chattahoochee River watershed*: U.S. Geological Survey Water-Resources Investigations Report 96-4302 (poster).
- Huntington, T.G., 1996, *Assessment of the potential role of atmospheric acidic deposition in the pattern of Southern Pine Beetle infestation in the northwestern Coastal Plain of Georgia, 1992-95*: U.S. Geological Survey Water-Resources Investigations Report 96-4131, 75 p.
- Inman, E.J., 1995, *Flood-frequency relations for urban streams in Georgia—1994 update*: U.S. Geological Survey Water-Resources Investigations Report 95-4017, 27 p.
- \_\_\_\_\_, 1997, *Comparison of the 2-, 25-, and 100-year recurrence interval floods computed from observed data with the 1995 urban flood-frequency estimating equations for Georgia*: U.S. Geological Survey Water-Resources Investigations Report 97-4118, 14 p.
- Journey, C.A., and Atkins, J.B., 1997, *Ground-water resources of the Tallapoosa River basin in Georgia and Alabama—Subarea 5 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River basins*: U.S. Geological Survey Open-File Report 96-433, 48 p.
- Leeth, D.C., 1999, *Hydrogeology of the surficial aquifer in the vicinity of a former landfill, Naval Submarine Base Kings Bay, Camden County, Georgia*: U.S. Geological Survey Water-Resources Investigations Report 98-4246, 28 p.
- Mayer, G.C., 1997, *Ground-water resources of the lower-middle Chattahoochee River basin in Georgia and Alabama, and middle Flint River basin in Georgia—Subarea 3 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River basins*: U.S. Geological Survey Open-File Report 96-483, 47 p.
- McSwain, K.M., 1999, *Hydrogeology of the Upper Floridan aquifer in the vicinity of the Marine Corps Logistics Base near Albany, Georgia*: U.S. Geological Survey Water-Resources Investigations Report 98-4202, 49 p.
- Perlman, H.A., 1998, *Water science for schools*: U.S. Geological Survey Water-Resources Investigations Report 98-4086, CD-ROM and World Wide Web site <<http://water.usgs.gov/droplet/>>.

- Robinson, J.L., Journey, C.A., and Atkins, J.B., 1997, *Ground-water resources of the Coosa River basin in Georgia and Alabama—Subarea 6 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River basins*: U.S. Geological Survey Open-File Report 96-177, 53 p.
- Stamey, T.C., 1996a, *Summary of data-collection activities and effects of flooding from Tropical Storm Alberto in parts of Georgia, Alabama, and Florida, July 1994*: U.S. Geological Survey Open-File Report 96-228, 23 p.
- \_\_\_\_\_, 1996b, *Streamflow characteristics at selected sites in southwestern Georgia, southeastern Alabama, and northwestern Florida, near Lake Seminole*: U.S. Geological Survey Open-File Report 95-455, 11 p.
- \_\_\_\_\_, 1998, *Methods for estimating tributary streamflow in the Chattahoochee River basin between Buford Dam and Franklin, Georgia*: U.S. Geological Survey Open-File Report 98-63, 18 p.
- Stamey, T.C., and Hess, G.W., 1993, *Techniques for estimating magnitude and frequency of floods in rural basins of Georgia*: U.S. Geological Survey Water-Resources Investigations Report 93-4016, 75 p.
- Stokes, W.R. III, and McFarlane R.D., 1998, *Water resources data for Georgia [v. 1—South Atlantic region, 415 p.; v. 2—Gulf of Mexico and Tennessee River basin regions, 383 p.]*: U.S. Geological Survey Water-Data Report GA-97-1 and GA-97-2 [report is published annually].
- Torak, L.J., Davis, G.S., Strain, G.A., and Herndon, J.G., 1996, *Geohydrology and evaluation of stream-aquifer relations in the Apalachicola-Chattahoochee-Flint River basin, southeastern Alabama, northwestern Florida, and southwestern Georgia*: U.S. Geological Survey Water-Supply Paper 2460, 94 p.
- Torak, L.J., and McDowell, R.J., 1996, *Ground-water resources of the lower Apalachicola-Chattahoochee-Flint River basin in parts of Alabama, Florida, and Georgia—Subarea 4 of the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River basins*: U.S. Geological Survey Open-File Report 95-321, 145 p.
- Warner, Debbie, 1997, *Hydrogeologic evaluation of the Upper Floridan aquifer in the southwestern Albany area, Georgia*: U.S. Geological Survey Water-Resources Investigations Report 97-4129, 27 p.