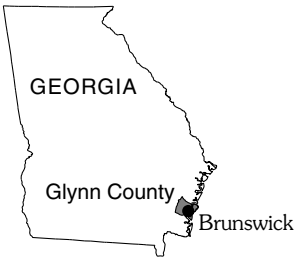
## City of Brunswick and Glynn County Cooperative Water-Resources Program




Study Chief David C. Leeth and Gregory S. Cherry

Cooperator City of Brunswick
Glynn County
Jekyll Island Authority

Year Started 1959

### *Problem*

In the Brunswick area, saltwater has contaminated the Upper Floridan aquifer for nearly 50 years. Currently (2003) within an area of several square miles of downtown Brunswick, the aquifer yields water that has a chloride concentration greater than the 250 milligrams per liter (mg/L) State and Federal drinking-water standard (Georgia Environmental Protection Division, 1997; U.S. Environmental Protection Agency, 2000) and in some areas exceeds 2,250 mg/L. Saltwater contamination has constrained further development of the Upper Floridan aquifer in the Brunswick area and prompted interest in the development of alternative sources of water supply, primarily from the shallower surficial and Brunswick aquifer systems, and from the deeper Lower Floridan aquifer.

### *Objectives*

- Better define mechanisms of ground-water flow and movement of saltwater in the Floridan aquifer system.
- Define the vertical geometry of the high-chloride plume.
- Assess alternative sources of water supply from the surficial and Brunswick aquifer systems, and the Lower Floridan aquifer.
- Monitor long-term ground-water levels and quality, and develop and maintain a comprehensive ground-water database.

### *Progress and Significant Results, 2002–03*

- During 2002 and 2003, a network of 22 continuous ground-water-level monitoring wells was operated (13 in the Upper Floridan aquifer, 4 in the Lower Floridan aquifer, 4 in the Brunswick aquifer system, and 1 in the surficial aquifer system). Nine wells were removed from service during January 2004 because of the rising cost of monitoring.
- Potentiometric surfaces of the upper Floridan aquifer were mapped:
  - During June 2002, based on water-level measurements collected in 95 wells.
  - During June 2003, based on water-level measurements collected in 56 wells.
- Choropleths of the Upper Floridan aquifer were mapped:
  - During June 2002, based on analysis of chloride samples collected in 66 wells.
  - During June 2003, based on chloride samples collected in 88 wells.
- New well information was incorporated into the U.S. Geological Survey (USGS) National Water Information System database, including seven additional Miocene wells and three Floridan aquifer wells.
- During 2003, the Georgia Geologic Survey installed three wells at a site on St. Simons Island (Lawrence Road site). Drilling and geophysical logging revealed the confined portion of the surficial aquifer system was present from 110 feet (ft) to 170 ft below land surface (bls); the upper Brunswick aquifer at this site was present from 360 to 370 ft bls, and the lower Brunswick aquifer was from 445 to 525 ft bls. An Upper Floridan aquifer monitor well also was installed and was completed from 640 to 780 ft as open hole.
- Geophysical logs were collected from 10 wells during 2002 and 2003.
- The Web site was updated for the Brunswick program that may be accessed at *http://ga2.er.usgs.gov/brunswick/*

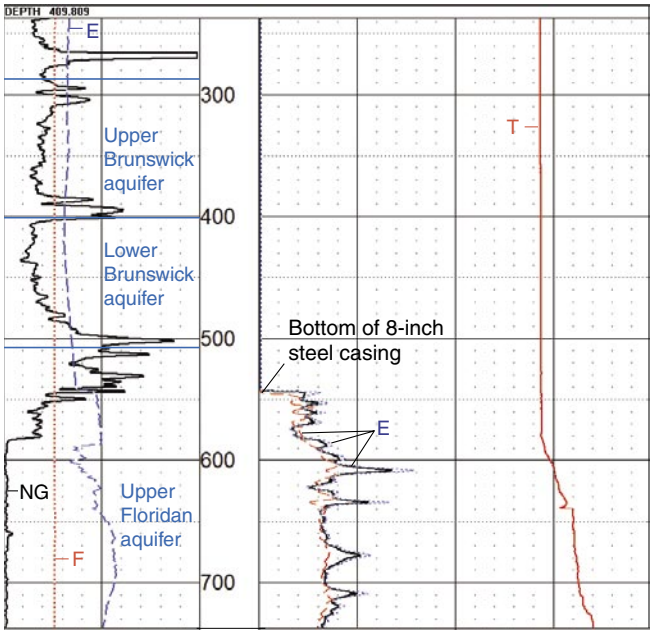
### *References Cited*

Georgia Environmental Protection Division, 1997, Secondary maximum contaminant levels for drinking water: Environmental Rule 391-3-5-19, revised October 1997: Official Code of Georgia Annotated Statutes, Statute 12-5-170 (Georgia Safe Drinking Water Act), variously paginated.

U.S. Environmental Protection Agency, 2000, Maximum contaminant levels (Part 143, National Secondary Drinking Water Regulations): U.S. Code of Federal Regulations, Title 40, Parts 100–149, revised as of July 1, 2000, p. 612–614.

*Fluid resistivity log being collected from an observation well completed in the surficial aquifer at Brunswick, Georgia. The log is being collected to determine the integrity of the well casing and to locate zones where saltwater may be entering the well. Photo by Michael F. Peck, USGS.*

*A geologist for the Georgia Department of Natural Resources, Environmental Protection Division, processes geophysical logs collected from a surficial aquifer well at Brunswick, Georgia. These logs are being used to determine the source of saltwater entering the well. Photo by Michael F. Peck, USGS.*




*Examples of geophysical logs collected from an unused production well on Jekyll Island using a multiparameter logging tool. The natural-gamma (NG) and electric (E) logs are used to determine different water-bearing zones and well construction, the fluid resistivity (F) log indicates zones of higher conductivity, and the temperature (T) log measures borehole fluid temperature.*

*An unused production well on Jekyll Island is being converted into an observation well for continuous monitoring of ground-water levels. The 751-foot-deep well is completed in the Upper Floridan aquifer. Geophysical logs were collected to assess the integrity of the well casing and suitability for incorporation into the Georgia statewide ground-water-level monitoring network. A continuous ground-water-level recorder was installed at the well on October 25, 2004, at which time the water level was 21.83 feet above land surface. Photo by Michael F. Peck, USGS.*