City of Brunswick and Glynn County Cooperative Water Program

Study Chief 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, so that currently within an area of several square miles in downtown Brunswick, the aquifer yields water that has a chloride concentration greater than 2,000 milligrams per liter (mg/L) and is above the State and Federal secondary drinking-water standard of 250 mg/L (Georgia Environmental Protection Division, 1997; U.S. Environmental Protection Agency, 2000). Saltwater contamination has constrained further development of the Upper Floridan aquifer in the Brunswick area prompting interest in the development of alternative sources of water supply, primarily from the shallower surficial and Brunswick aquifer systems.

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.
- Provide information to the Glynn County Water Resources Management Committee to mitigate saltwater intrusion in the Brunswick area.

Progress and Significant Results, 2004–2005

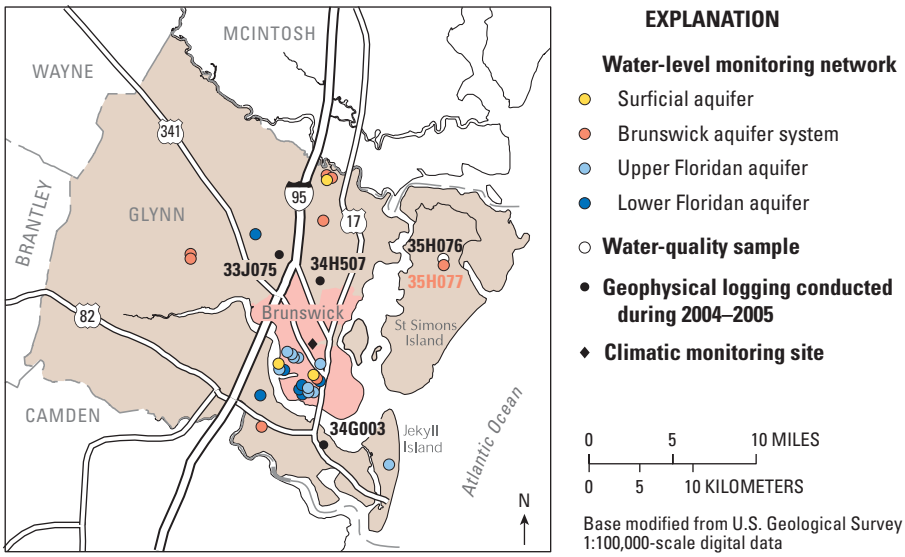
- During 2004 and 2005, a network of 28 continuous ground-water-level monitoring wells was operated—10 in the Upper Floridan aquifer, 7 in the Lower Floridan aquifer, 8 in the Brunswick aquifer system, and 3 in the surficial aquifer system (map, facing page). Fifteen of these wells are funded by the Georgia Environmental Protection Division.
- Potentiometric surfaces of the Upper Floridan aquifer were mapped (see page 35):
  - During June 2004, based on water-level measurements collected in 41 wells.
  - During June 2005, based on water-level measurements collected in 38 wells.
- Chloride concentration of the Upper Floridan was mapped (see page 57):
  - During June 2004, based on analysis of chloride concentrations in samples collected in 88 wells.
  - During June 2005, based on analysis of chloride concentrations in samples collected in 70 wells.
- Test wells at Lawrence Road test site on St. Simons Island were pumped for determination of yield, water chemistry (table, facing page), and hydraulic properties of the surficial and Brunswick aquifer systems during 2005:
  - Well 35H077 (lower Brunswick aquifer) was pumped at a rate of 170 gallons per minute with a maximum drawdown of 52 feet.
  - Well 35H076 (confined surficial aquifer) was pumped at a rate of 305 gallons per minute with a maximum drawdown of 37 feet.
- Borehole geophysical logs were collected from three wells during 2004–2005 (logs, facing page):
  - Well 34H507 (260 feet) at the Federal Law Enforcement Training Center in the north-central part of Glynn County.
  - Well 33J075 (560 feet) near Georgia Highway 99 in the western part of the county.
  - Well 34G003 (690 feet) at the western end of the Jekyll Island causeway.
- The Web site was updated for the Brunswick program and may be accessed at *http://ga.water.usgs.gov/projects/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.

The U.S. Geological Survey (USGS) continuously records water levels at 28 wells in the Brunswick–Glynn County area, shown on the map at right. Data from these wells are available at http://ga.waterdata.usgs.gov/nwis/.



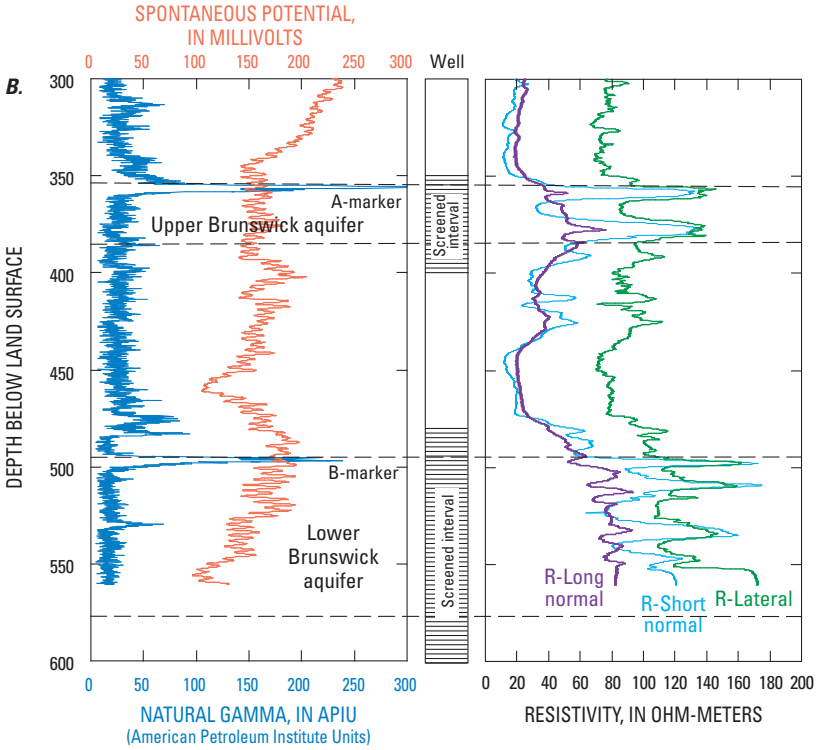
Water samples were collected from test wells on St. Simons Island during 2005 for evaluation of water chemistry of the surficial and Brunswick aquifer systems. Water from the test wells generally was within secondary drinking-water standards for major constituents; concentrations of iron were lower than the maximum secondary standard of 300 micrograms per liter.

[Ca, calcium; Mg, magnesium; Na, sodium; K, potassium; Fe, iron; Mn, manganese; Cl, chloride; SO_4, sulfate; $CaCO_3$, alkalinity; mg/L, milligram per liter; µg/L, microgram per liter]

Well number	Aquifer	Sample date during 2005	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Fe (µg/L)	Mn (µg/L)	Cl (mg/L)	SO_4 (mg/L)	$CaCO_3$ (mg/L)
35H076	Confined surficial	May 3	62.1	2.4	16.7	1.7	29.5	6.8	30.1	5.3	184
35H077	Lower Brunswick	March 22	37.4	23.8	28.2	2.7	31.4	0.31	23.1	94.9	114

A.

B.



(A) *Drillers install a new public-supply well with production from the upper and lower Brunswick aquifers in Glynn County. The completed well will serve surrounding communities currently (2005) under development near the Interstate-95 corridor. Photo by Gregory S. Cherry, USGS.* (B) *The USGS assisted the county with geophysical logging of the test hole using a multi-parameter logging tool. The natural-gamma, spontaneous potential, and resistivity logs are used to determine water-bearing units for well construction.*