

## 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. Currently within an area of several square miles in downtown Brunswick, the aquifer yields water with a chloride concentration greater than 2,000 milligrams per liter (mg/L), 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, which has stimulated interest in the development of alternative sources of water supply, primarily from the shallower surficial and Brunswick aquifer systems.

### Objectives

- 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; 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, 2006–2007

- A network of 33 continuous ground-water-level monitoring wells was operated—12 wells in the Upper Floridan aquifer, 8 wells in the Lower Floridan aquifer, 8 wells in the Brunswick aquifer system, and 5 wells in the surficial aquifer system (A, facing page). Twenty of these wells are funded by the Georgia Environmental Protection Division (GaEPD) through the Coastal Georgia Sound Science Initiative.
- Potentiometric surfaces of the Upper Floridan aquifer were mapped as follows:
  - For July 2006, based on water-level measurements made in 35 wells.
  - For July and August 2007, based on water-level measurements made in 52 wells.
- Chloride concentration of the Upper Floridan was mapped as follows:

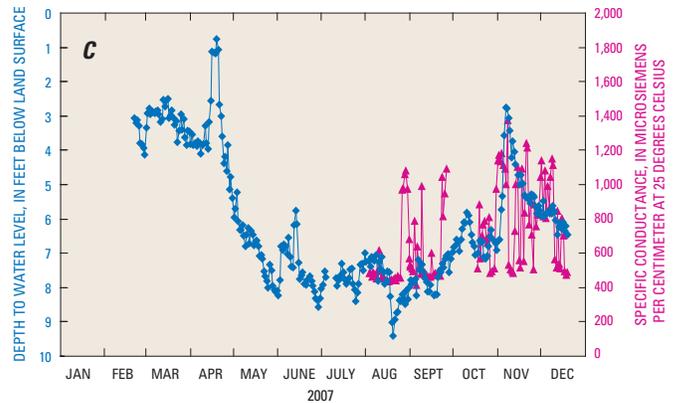
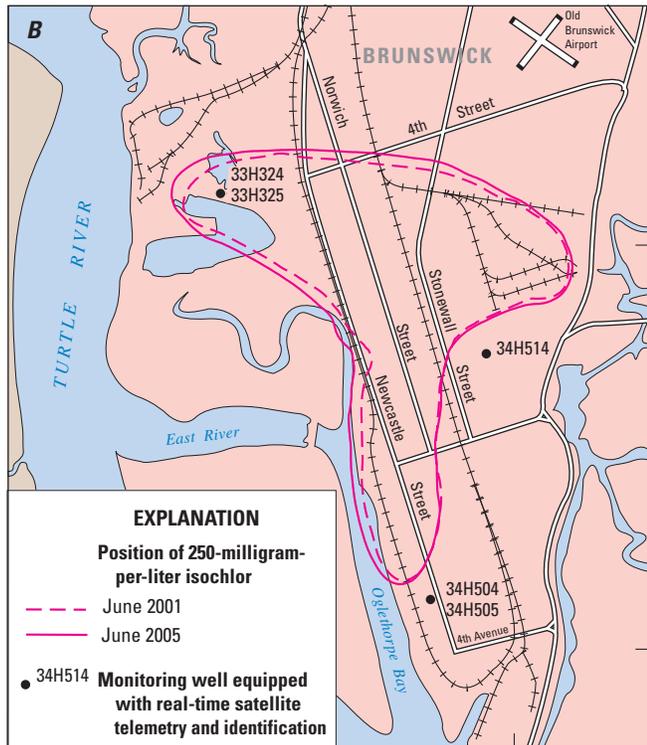
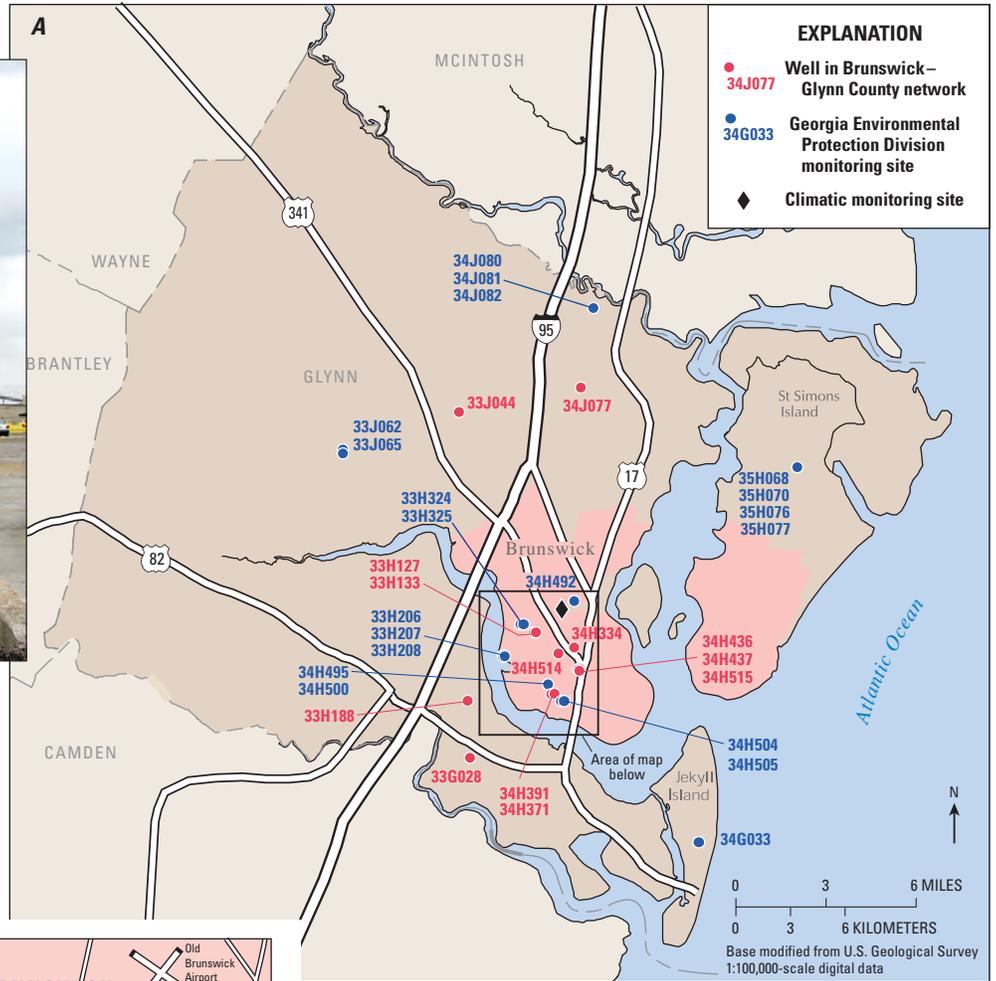
- For July 2006, based on analyses of chloride concentrations in samples collected from 71 wells.
- For July and August 2007, based on analyses of chloride concentrations in samples collected from 76 wells.
- Test wells that were completed in the surficial, Upper and Lower Floridan, and lower Brunswick aquifers in Glynn County and at a well-cluster site on St. Simons Island were incorporated into the GaEPD statewide network.
- The regional MODFLOW model of coastal Georgia and adjacent parts of Florida and South Carolina (Payne and others, 2005) was refined with higher resolution near Brunswick to simulate hydraulic gradients near pumping centers and help evaluate additional pumping in the Upper Floridan aquifer while containing the saltwater plume.
- Real-time monitoring systems were installed in wells completed in the upper and/or lower water-bearing zones of the Upper Floridan aquifer that surround the area of chloride contamination with the following continuous data collected:
  - Water levels at Southside Baptist Church (wells 34H504 and 34H505), Perry Park (well 34H514), and Georgia-Pacific Cellulose (wells 33H324 and 33H325).
  - Specific conductance at Southside Baptist Church (well 34H505), Perry Park (well 34H514; hydrograph, facing page) and Georgia-Pacific Cellulose (well 33H325).
- Information from the real-time ground-water-monitoring sites can be accessed at <http://ga.water.usgs.gov/projects/projectcoastalgwquality.html> and [http://waterdata.usgs.gov/ga/nwis/current/?type=gw&group\\_key=county\\_cd](http://waterdata.usgs.gov/ga/nwis/current/?type=gw&group_key=county_cd).

### References

- 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.
- Payne, D.F., Rumman M.A., and Clarke J.S., 2005, Simulation of ground-water flow in coastal Georgia and adjacent parts of South Carolina and Florida—Predevelopment, 1980, and 2000: U.S. Geological Survey Scientific Investigations Report 2005–5089, 91 p.; Web-only publication available at <http://pubs.usgs.gov/sir/2005/5089/>.
- 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, rev. July 1, 2000, p. 612–614.



Real-time water-level and specific-conductance monitoring well at the Georgia-Pacific Cellulose plant in Brunswick, Georgia. The mast holds a solar panel for power supply and an antenna for data transmittal. Photo by John S. Clarke, U.S. Geological Survey.



(A) Locations of study area and continuous ground-water-level monitoring network for the Brunswick–Glynn County area, Georgia; (B) positions of June 2001 and June 2005 chloride plumes in Upper Floridan aquifer; and locations of real-time monitoring wells; and (C) daily mean ground-water levels and periodic specific conductance in the Upper Floridan aquifer at well 34H514 during 2007. Ground-water-level data help in monitoring effects of pumping on flow directions, and real-time specific conductance data (a surrogate for chloride) provide information to track the current position of chloride contamination.