

Coastal Sound Science Initiative

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Cooperator Georgia Department of Natural Resources, Environmental Protection Division, Geologic Survey Branch
Year Started 2000



Problem

Pumping from the Upper Floridan aquifer has resulted in substantial water-level decline and saltwater intrusion at the northern end of Hilton Head Island, South Carolina, and at Brunswick, Georgia. This saltwater contamination has constrained further development of the Upper Floridan aquifer in the coastal area and created competing demands for the limited supply of water. The Georgia Environmental Protection Division (EPD) has capped permitted withdrawal from the Upper Floridan aquifer at 1997 rates in parts of the coastal area, prompting interest in the development of alternative sources of water supply, primarily from the shallower upper and lower Brunswick aquifers and surficial aquifers.

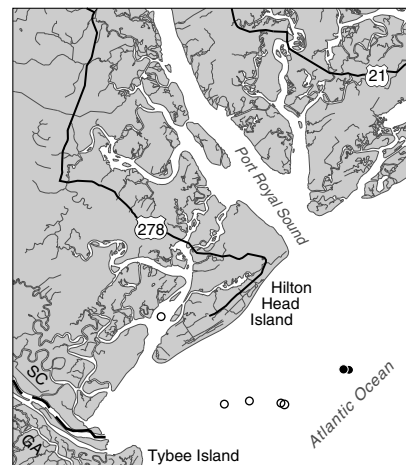
Objectives

- Better define mechanisms of ground-water flow and movement of saltwater;
- Delineate paths and rates of ground-water flow and intrusion of saltwater into the Upper Floridan aquifer and develop models to simulate a variety of water-management scenarios;
- Delineate areas where saltwater is entering the Floridan aquifer system offshore of the Savannah–Hilton Head Island area;
- Assess long-term ground-water levels and quality, and develop and maintain a comprehensive ground-water database; and
- Assess alternative sources of water supply from:
 - a. seepage ponds connected to the surficial aquifer,
 - b. the Lower Floridan aquifer, and
 - c. the upper and lower Brunswick aquifers.

Progress and Significant Results, 2001

- Constructed three deep test wells penetrating the Lower Floridan aquifer and collected geologic and water-quality samples and geophysical logs from those wells. There are now 6 new Lower Floridan test wells in coastal Georgia, for a total of 13. Conducted pumping tests at the new sites to assess water-bearing properties.
- Completed borings at two sites offshore of Hilton Head Island, South Carolina, to investigate areas of possible paleo-river incision into the Upper Floridan aquifer and related effects on ground-water quality, head, and hydraulic properties (five other borings were drilled in previous years). Collected geologic and water-chemistry samples and geophysical logs from each of the borings.

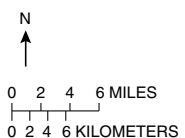
- Completed calibration of ground-water-flow model for Brunswick seepage pond site. Completed field investigation of water availability at a seepage pond site in Bulloch County. This included installing test wells and monitoring equipment, conducting a pumping test, developing a detailed water budget, and developing a ground-water-flow model.
- Continued development of project database. Installed water-level recorders in 10 test wells and collected geophysical logs from 15 new and existing wells. Completed development of nonagricultural water-use database for Georgia. Data for 90 wells were incorporated into the U.S. Geological Survey (USGS) National Water Information System (NWIS) database.
- Continued development of ground-water-flow and solute transport models. Completed development of Geographic Information System (GIS) coverages and user interfaces for models. Preliminary solute transport models were developed for the Savannah–Hilton Head Island and Brunswick areas.
- Published reports describing (1) stratigraphy of Oligocene and younger units; and (2) coastal ground water at risk (poster). A project Web site was developed describing saltwater contamination in coastal Georgia, monitoring data, and ongoing project activities, which can be accessed at URL: <http://ga2.er.usgs.gov/coastal>.



EXPLANATION

Offshore boring

- Completed in 2001
- Completed in previous years



Base from U.S. Geological Survey 1:100,000-scale digital data



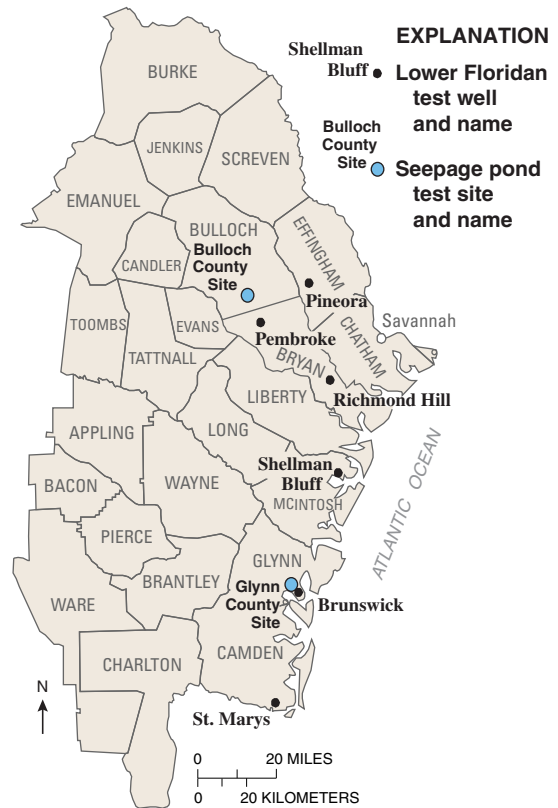
A 1,863-foot-deep exploratory boring was completed at a site in northern McIntosh County during 2001. Geologic, hydrologic, water-quality, and geophysical data are being evaluated to assess the viability of the Lower Floridan aquifer as a source of water and to support ground-water modeling investigations in coastal Georgia. In addition to the McIntosh County well, two additional wells were completed in Bryan and Effingham Counties during 2001. Photo by John S. Clarke, USGS.



The U.S. Army Corps of Engineers jack-up barge was used as a platform for drilling offshore test borings. Core, hydrologic, water-quality, and geophysical data were collected at five sites during 1999–2001. Data are being used to investigate the position of the freshwater-saltwater interface and to better define hydraulic head and hydraulic properties offshore of Tybee Island, Georgia, and Hilton Head Island, South Carolina. Photo by Michael F. Peck, USGS.



A USGS hydrologic technician takes a stage reading at a seepage pond in Bulloch County during a pumping test during May 2001. The test is being conducted to assess the viability of seepage ponds as an irrigation water supply. Test sites at Bulloch and Glynn Counties were instrumented with test wells, weather stations, and stage recorders to develop a detailed hydrologic budget and determine pond-aquifer relations. Photo by Alan M. Cressler, USGS.



The map on the left (facing page) shows locations of offshore test borings, coastal Georgia and South Carolina. Borings located at varying distances offshore of Tybee Island, Georgia, are being used to better define the position of the freshwater-saltwater interface. Locations of borings were guided, in part, by marine seismic surveys conducted by Georgia Southern University and the Skidaway Institute of Oceanography.

Locations of Lower Floridan test wells and seepage pond test sites in coastal Georgia that are part of the Coastal Sound Science Initiative.