Monitoring of Ground-Water and Surface-Water Resources in the City of Lawrenceville Area

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Cooperator	City of Lawrenceville, Georgia
Year Started	2002

Problem

Ground water from wells completed in fractured crystalline rock provides about 6 percent (0.12 million gallons per day) of the water supply to the city of Lawrenceville, Georgia. Additional ground-water withdrawal is planned in the Redland–Pew Creek and Alcovy River Basins. To enable informed decisions, city managers want to be able to quantify the effects (if any) of ground-water pumping on the surface-water resource as development increases. In addition, city managers recognize a need to collect data to help evaluate the effects of natural and human factors on stream-water quality and, thus, evaluate best-management practices.

To support long-term management goals, the city of Lawrenceville, in cooperation with the U.S. Geological Survey, established a hydrologic monitoring network. The network consists of ground water (regolith and bedrock wells) and surface water (streamgages) sites in the two newly developed basins and in a background basin (upper Apalachee River Basin) that is not influenced by the main pumping centers. An additional streamgage was installed in each of the basins and, beginning in 2006, in the Shoal Creek Basin. The data and information collected during the study can be used by local resource managers to develop a sustainable ground-water supply while minimizing the effects on surface-water resources. The data also will help in understanding changes in surface-water quality over time.

Objectives

- Monitor the effect of increased ground-water withdrawal on ground-water levels and streamflow.
- Determine pre- and post-pumping hydrologic budgets of the Redland–Pew Creek Basin.
- Monitor surface-water flow and precipitation at four monitoring sites.
- Monitor surface-water quality at two of the four surface-water-flow monitoring sites.

Progress and Significant Results, 2006–2007

- Maintained two continuous ground-water-level recorders in the upper Alcovy River Basin, two in the Redland–Pew Creek River Basin, and one in the upper Apalachee River Basin.
- Obtained intermittent water-level measurements at 21 monitoring wells.
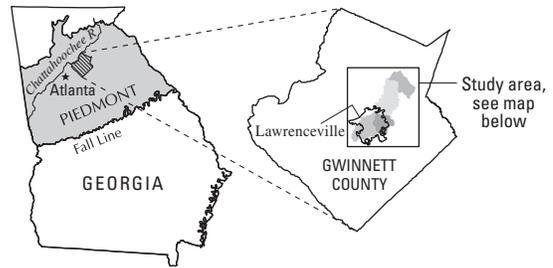
- Installed continuous-recording streamgage and water-quality monitoring station for the Shoal Creek Basin.
- Maintained continuous-recording streamgages at the outflow of the upper Alcovy River Basin, the upper Apalachee River Basin, the Redland–Pew Creek Basin, and the Shoal Creek Basin to establish information on base flow, runoff, and other hydrologic properties, including selected water-quality characteristics.
- Maintained and obtained streamflow readings at four additional staff-gage monitoring sites.
- Made low-flow (seepage) measurements during fall 2006 (22) and 2007 (8) low-flow period to quantify the ground-water contribution to streamflow in areas being monitored.
- Completed packer testing of well 14FF55 to investigate elevated uranium levels in water samples collected from specific intervals within the well.
- Updated the project Web site, which can be accessed at *http://ga.water.usgs.gov/projects/lawrencevillegw/*.
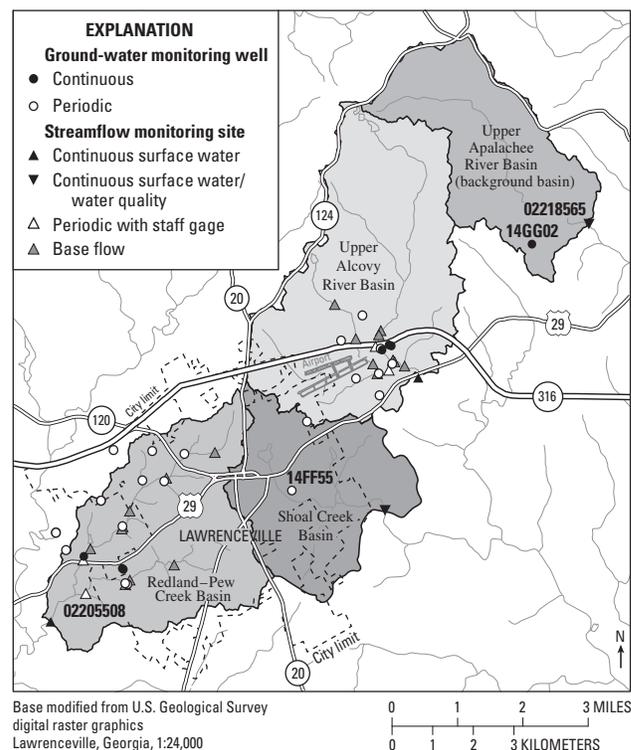
Location of the Lawrenceville study area in the Piedmont physiographic province of Georgia.

02218565 Apalachee River at Fence Road, near Dacula, Georgia
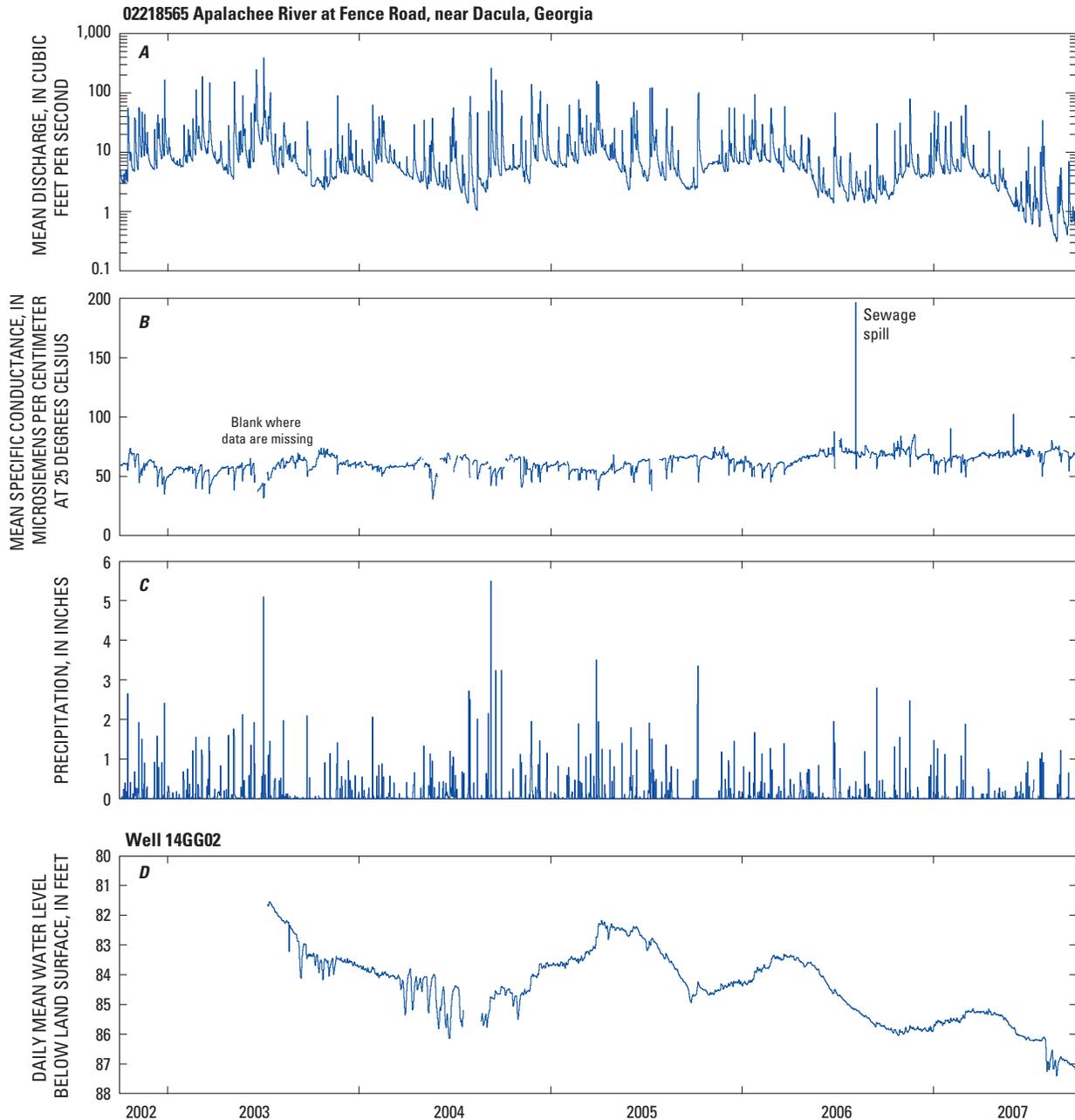
Hydrographs from monitoring sites in the upper Apalachee River Basin for (A) discharge, (B) specific conductance, and (C) precipitation from station 02218565 on the Apalachee River at Fence Road; and (D) water level in well 14GG02 near Dacula, Georgia. Data collected in the upper Apalachee River Basin represent an area that has been minimally affected by development of the ground-water resource (background watershed). Changes in stream water quality can be detected by using specific conductance data (B), which clearly show a sewage spill during late 2006. (Right) A hydrologic technician measures low flow by using an acoustic doppler velocity meter at station 02205508 along Pew Creek near Lawrenceville, Georgia. Photo by Alan M. Cressler, U.S. Geological Survey.