

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

Study Chief     John S. Clarke  
 Cooperator     City of Lawrenceville, Georgia  
 Year Started    2002

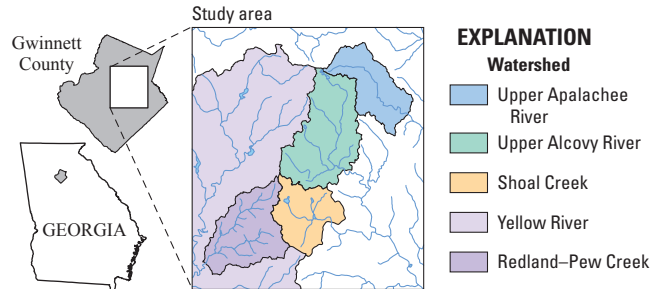
### Problem

To meet Lawrenceville's growing need for water, the city is expanding development of its groundwater supply. During 1995–2007, Lawrenceville obtained 4–7 percent of its drinking water from groundwater (from a single well); the remainder of the drinking water was obtained from surface-water sources. In addition to a well near the center of town, the city plans additional groundwater withdrawal in the Redland–Pew Creek and upper Alcovy River watersheds. To enable informed decisions, city managers want to be able to quantify the effects (if any) of groundwater pumping on the surface-water resources as development increases. In addition to understanding groundwater resources, successful watershed management requires an understanding of how stream water quality is affected by watershed characteristics.

To support long-term management goals, the City of Lawrenceville, in cooperation with the U.S. Geological Survey (USGS), established a hydrologic monitoring network. The network consists of groundwater (regolith and bedrock wells) and surface-water (streamgages) sites in the two newly developed watersheds and in a background watershed (upper Apalachee River watershed) that is not influenced by the main pumping centers. In addition, sites in the Yellow River watershed are monitored to provide an indication of changes along the northern boundary of the Redland–Pew Creek watershed. An additional streamgage was installed in the adjacent Shoal Creek watershed. The data and information collected during the study can be used by local resource managers to develop a sustainable groundwater supply while minimizing the effects on surface-water resources. The data also will help in understanding changes in surface-water quality over time.

### Objectives

A cooperative water program (CWP) between the USGS and the City of Lawrenceville has been in place since 1994. The initial purpose of the CWP was to provide a better understanding of the geologic controls on groundwater availability in fractured crystalline rock. In 2002, the program was modified to incorporate groundwater and stream monitoring to assess the effects of groundwater development. Stream water-quality monitoring was added to the program in 2005.

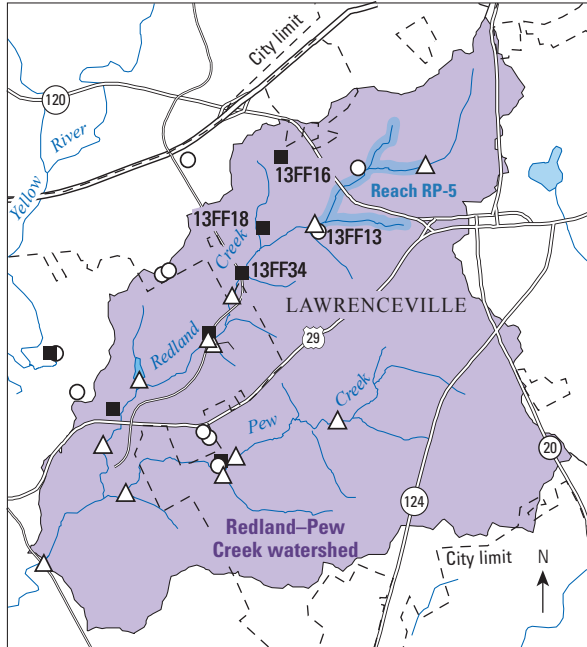


### Progress and Significant Results, 2008–2009

- Monitored groundwater levels in 26 wells, 3 of which recorded continuously, 21 wells were measured periodically, and 2 wells were continuously monitored during part of the year and measured periodically during the remainder of the year.
- Monitored streamflow and precipitation continuously at three sites, two of which included continuous water-quality monitoring of water temperature, specific conductance, and turbidity. In addition to these three continuously monitored surface-water sites, the network included periodic streamflow measurements at 22 other sites (the number of locations measured in a given year varied over the reporting period).
- Collected synoptic stream base-flow measurements in September 2008 to locate and quantify gains or losses to streamflow resulting from groundwater interaction (groundwater seepage). Measurements were not collected during the fall of 2009 because of above-normal precipitation and high streamflows.
- Collected borehole geophysical logs in well 13FF34, a 605-foot-deep test well drilled by the City of Lawrenceville in June 2008 to explore additional water resources in the Redland–Pew Creek watershed.
- Published study results in USGS Scientific Investigations Report 2010–5032, “Hydrologic conditions, stream-water quality, and selected groundwater studies conducted in the Lawrenceville area, Georgia, 2003–2008.”
- Updated the project Web site, which can be accessed at <http://ga.water.usgs.gov/projects/lawrenceville/>.

### Reference

Clarke, J.S., and Williams, L.J., 2010, Hydrologic conditions, stream-water quality, and selected groundwater studies conducted in the Lawrenceville area, Georgia, 2003–2008: U.S. Geological Survey Scientific Investigations Report 2010–5032, 55 p.; available online at <http://pubs.usgs.gov/sir/2010/5032/>.



EXPLANATION  
 △ Surface-water station  
 ○ Groundwater monitoring well  
 ■ Existing or proposed bedrock production well  
 ■ River reach

Groundwater level and streamflow monitoring data are used to evaluate effects of groundwater pumping in the Lawrenceville area. In the Redland–Pew Creek watershed during 2003–2007, groundwater levels in wells 13FF13 and 13FF16 showed a similar, slightly downward trend in response to decreased precipitation. In 2008, water levels in well 13FF16 showed little change, whereas well 13FF13 showed a sharp decline of nearly 37 ft. This sharp decline was in response to the initiation of pumping in well 13FF18, located about 0.3 mile west of well 13FF13. In reach RP-5 along Redland Creek, streamflow gain was indicated throughout 2003–2008, with a decrease related to low precipitation during the drought period of 2006–2008. There was no appreciable difference in streamflow gain since the initiation of pumping in well 13FF18 (modified from Clarke and Williams, 2010).

