

Sustainability of Ground-Water Resources in the City of Lawrenceville Area

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Cooperator City of Lawrenceville, Georgia

Year Started 2002

Problem

The city of Lawrenceville currently is planning the installation of at least one additional ground-water treatment plant west of the city that will receive water from new municipal wells in the Redland–Pew Creek Basin and will upgrade its existing treatment plant to receive additional flows from wells located in the Upper Alcovy River Basin. Because the long-term effects of ground-water withdrawal in this area are largely unknown, the U.S. Geological Survey, in cooperation with the city of Lawrenceville, began a study to investigate the sustainability of ground-water resources as additional municipal wells become operational.

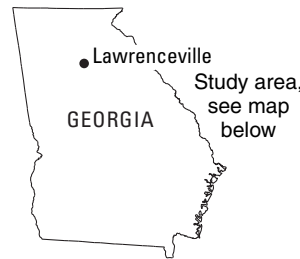
The hydrologic monitoring network consists of both ground-water (regolith and bedrock wells) and surface-water (stream gages) sites in each of the newly developed basins and in a control basin that is not influenced by the main pumping centers. Ground-water levels and surface-water monitoring provide the necessary data to determine the effects of pumping and manage the city municipal wells. As ground-water development continues to increase in the Piedmont region of Georgia, it is important to monitor the effects of ground-water withdrawal to better manage the resource.

Objectives

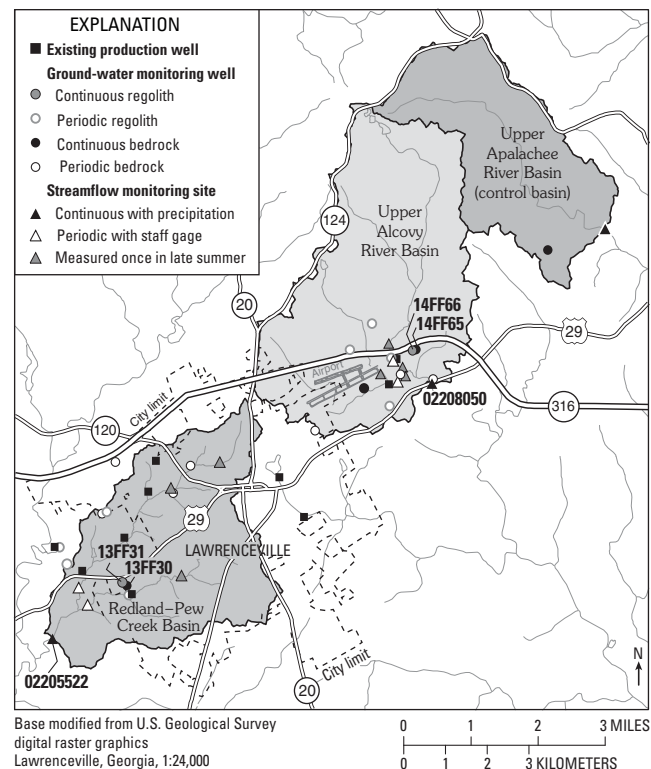
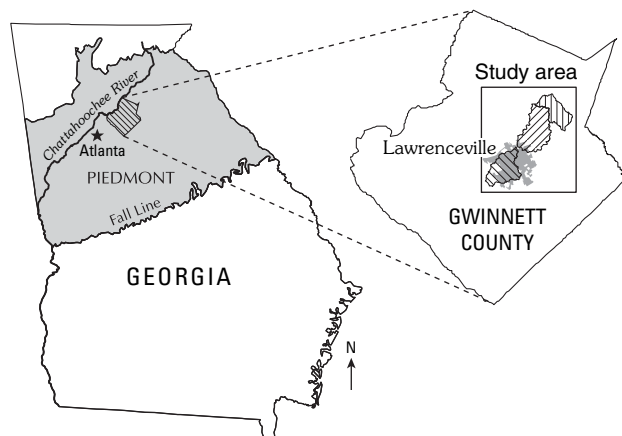
- Monitor the effect of increased ground-water withdrawal by additional municipal wells on surrounding ground-water levels and streamflow.
- Determine pre- and post-pumping hydrologic budgets of the Alcovy and Pew–Redland Creek Basins.
- Provide drawdown data from surrounding monitoring wells to the city of Lawrenceville and estimate the zone of influence of active municipal wells.

Progress and Significant Results, 2004–2005

- 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 biweekly water-level measurements at 21 monitoring wells.
- Maintained continuous-recording streamgages at the outflow of both the upper Alcovy River and the Redland–Pew Creek River Basins to establish baseline information on baseflow, runoff, and other hydrologic properties.
- Maintained and obtained streamflow readings at four additional staff-gage monitoring sites.

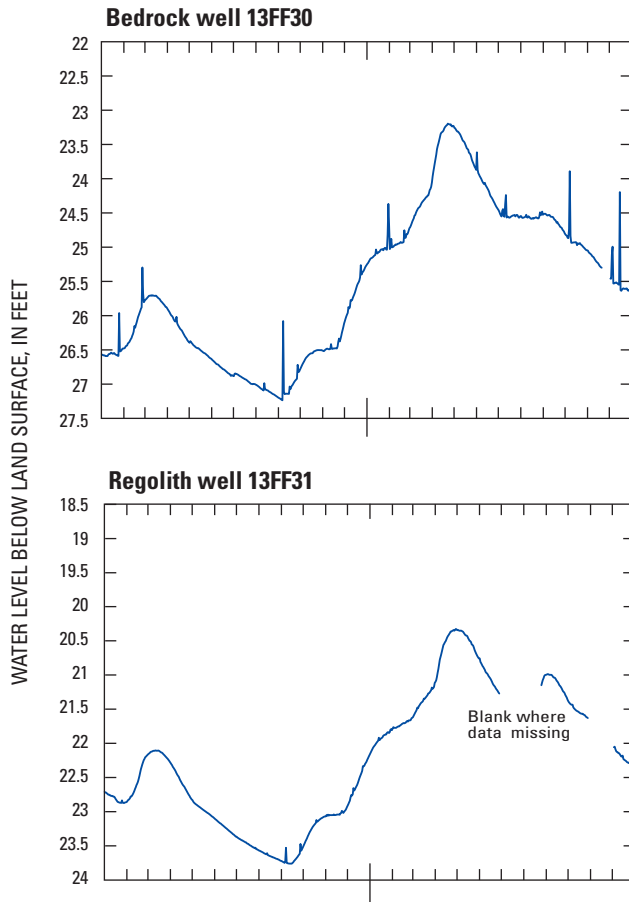


- Obtained seepage measurements during the fall 2004 low-flow period to quantify the ground-water contribution to streamflow in areas being monitored.
- Maintained a project Web site that may be accessed at <http://ga.water.usgs.gov/projects/lawrencevillegw/>.

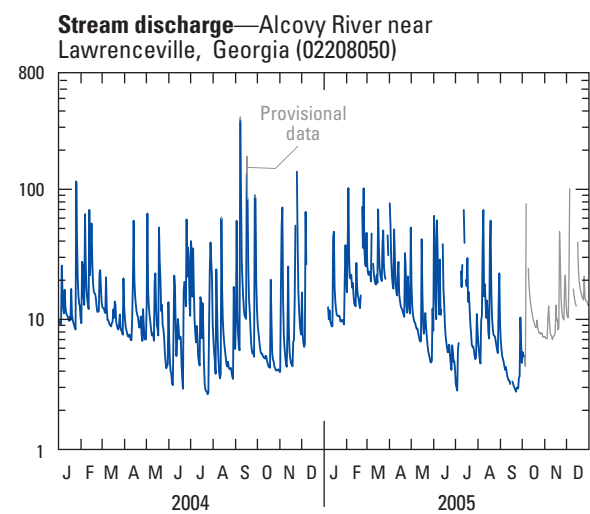
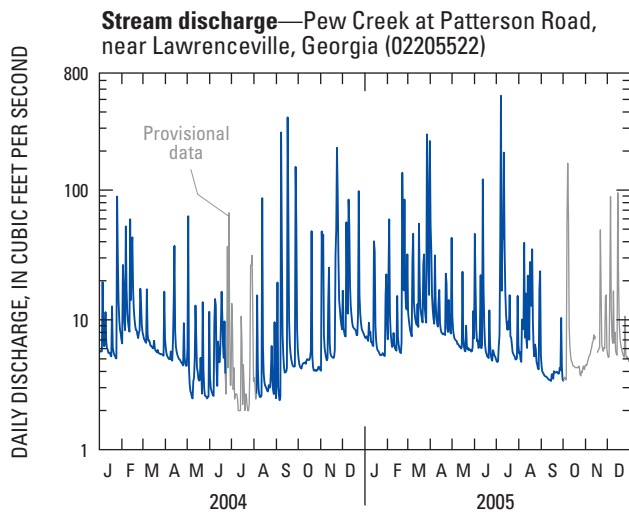
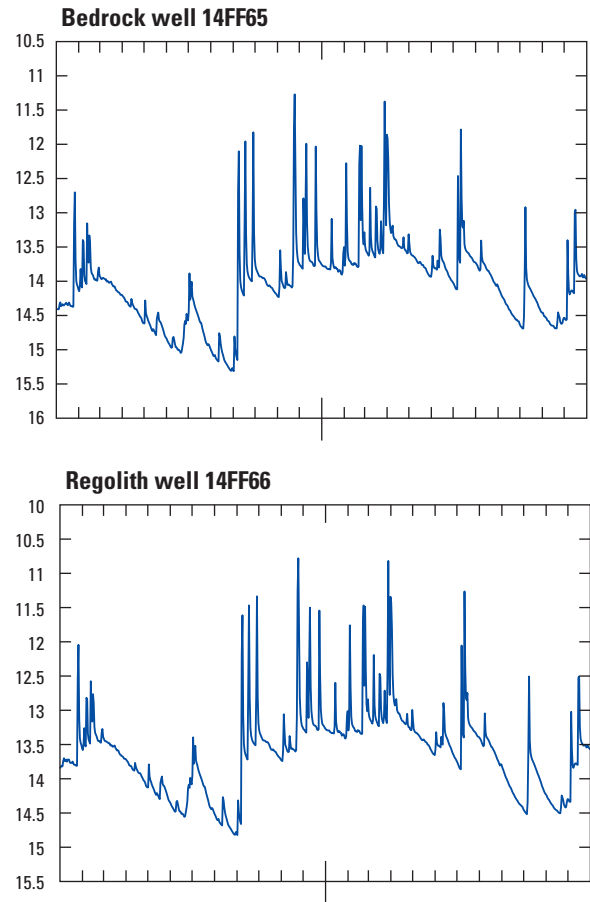


Location of the Lawrenceville study area in the Piedmont physiographic province of Georgia.

A. Pew Creek Basin



B. Alcovy Creek Basin



Bedrock and regolith water-level hydrographs in the (A) Pew Creek Basin, and (B) Alcovy River Basin showing different responses to peak stream discharge. Water-level hydrographs in Pew Creek Basin show little relation to surface-water discharge, whereas the hydrographs in the Alcovy River Basin show a strong relation. Ground water and stream interaction is one of the components being investigated in this study.