## GROUND-WATER LEVELS

The maps and hydrographs in this section of the report provide an overview of ground-water levels in major aquifers in Georgia during 2001. In addition, the hydrographs provide a visual summary of ground-water conditions for the past 5 years (1997–2001) compared to the period of record. Discussion about each aquifer is subdivided into areas where wells would likely have similar water-level fluctuations and trends. The map on the facing page gives the location of wells that were continuously monitored during the 2001 calendar year, including 13 wells that are monitored in real time.

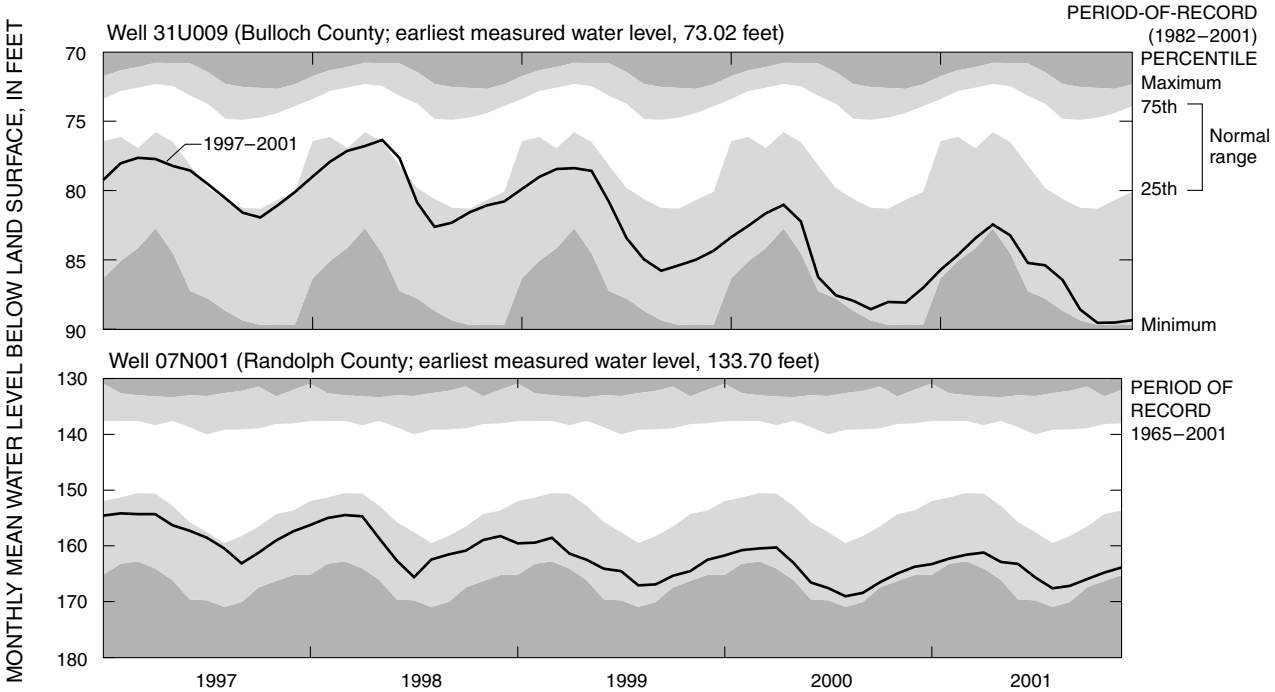
Changes in ground-water levels measured in wells are caused by changes in aquifer storage. The many factors that affect ground-water storage are described by Taylor and Alley (2001) and are briefly discussed here. When recharge to an aquifer exceeds discharge, ground-water levels rise and when discharge exceeds recharge, ground-water levels decline. Recharge varies in response to precipitation and surface-water infiltration into an aquifer. Discharge occurs as natural flow from an aquifer to streams and springs, as evapotranspiration, and as withdrawal from wells. Hydraulic responses and controls on ground-water levels in major aquifers in Georgia are summarized in the table on the previous two pages.

Water levels in aquifers in Georgia typically follow a cyclic pattern of seasonal fluctuation, with rising water levels during winter and spring due to greater recharge from precipitation, and declining water levels during summer and fall due to less recharge, greater evapotranspiration, and pumping. The magnitude of fluctuations can vary greatly from season to season and from year to year in response to varying climatic conditions. This cyclic pattern can be seen on the 5-year hydrograph of well 31U009 in Bulloch County (below).

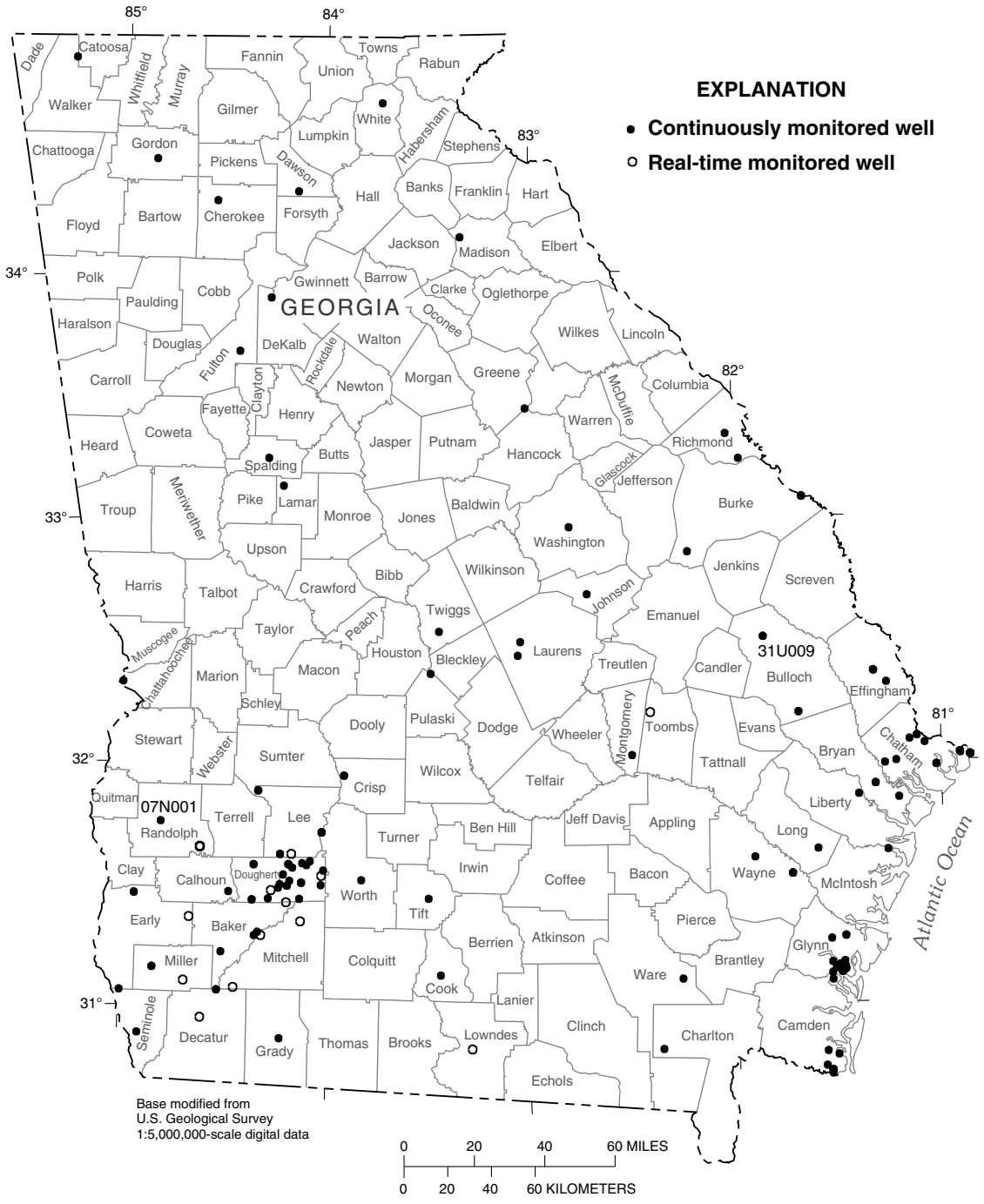
Ground-water pumping is the most significant human activity that affects the amount of ground water in storage and the rate of discharge from an aquifer (Taylor and Alley, 2001). As ground-water storage is depleted within the radius of influence of pumping, water levels in the aquifer decline, forming a cone of depression around the well. In areas having a high density of pumped wells, multiple cones of depression can form and produce water-level declines over a large area. These declines may alter ground-water-flow directions, reduce flow to streams, capture water from a stream or adjacent aquifer, or alter ground-water quality. The effects of sustained pumping can be seen on a hydrograph of well 07N001 in Randolph County (below).

### *Reference Cited*

Taylor, C.J., and Alley, W.M., 2001, Ground-water-level monitoring and the importance of long-term water-level data: U.S. Geological Survey Circular 1217, 68 p.




*Example hydrographs showing monthly mean water levels in wells 31U009 and 07N001 for the period 1997–2001 and summary statistics for the period of record for these wells.*




*Ground-water-level monitoring wells used to collect long-term water-level data in Georgia during 2001.*