

**INTRODUCTION**

The Floridan aquifer system covers nearly 100,000 square miles in the southeastern United States throughout Florida and in parts of Georgia, South Carolina, and Alabama, and is one of the most productive aquifers in the world (Miller, 1990). This sequence of carbonate rocks is hydraulically connected and is over 300 feet thick in south Florida and thins toward the north. Typically, this sequence is subdivided into the Upper Floridan aquifer, the middle confining unit, and the Lower Floridan aquifer. The majority of freshwater is contained in the Upper Floridan aquifer and is used for water supply (Miller, 1986). The Lower Floridan aquifer contains fresh to brackish water in northeastern Florida and Georgia, while in south Florida it is saline. The potentiometric surface of the Upper Floridan aquifer in May–June 2010 shown on this map was constructed as part of the U.S. Geological Survey Floridan Aquifer System Groundwater Availability Study (U.S. Geological Survey database, 2011). Previous synoptic measurements and regional potentiometric maps of the Upper Floridan aquifer were prepared for May 1980 (Johnston and others, 1981) and May 1985 (Bush and others, 1986) as part of the Floridan Regional Aquifer System Analysis.

**POTENTIOMETRIC SURFACE**

The potentiometric surface is an imaginary surface connecting points of equal altitude to which water will rise in tightly cased wells that tap a confined aquifer system (Lohman, 1979). The surface in this map is defined by potentiometric contours, which are lines of constant altitude on the potentiometric surface. Potentiometric contours are based on water-level measurements collected at 1,753 wells during May 2–June 23, 2010 (Kinnaman, 2011). These measurement collections included 1,266 wells in Florida, 428 in Georgia, 45 in South Carolina, and 14 in Alabama. Some contours are inferred from previous potentiometric-surface maps with larger well networks. Potentiometric contours were not extended south of Charlotte, Glades, and Martin Counties in Florida. Brackish to saline water present within the Upper Floridan aquifer in this area affects the water density and water levels; therefore, only locations of measured artesian pressure are indicated on the map.

The potentiometric surface of the carbonate Upper Floridan aquifer can fluctuate over time in response to rainfall, and more locally in response to groundwater withdrawals. Potentiometric-surface highs generally correspond to, but are not limited to, topographic highs where the aquifer is recharged. Groundwater discharge is reflected by depressions in the potentiometric surface such as near springs, large wells, reaches of streams or rivers that are hydraulically connected, or along the coast. Groundwater in the Upper Floridan aquifer generally flows from potentiometric highs to potentiometric lows in a direction perpendicular to the contours.

**ACKNOWLEDGMENTS**

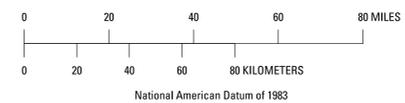
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**REFERENCES CITED**

Bush, P.W., Barr, G.L., Clarke, J.S., and Johnston, R.H., 1986, Potentiometric surface of the Upper Floridan aquifer in Florida and in parts of Georgia, South Carolina, and Alabama, May 1985: U.S. Geological Survey Water-Resources Investigations Report 86-4316, 1 sheet.  
 Johnston, R.H., Healy, H.G., and Hayes, I.R., 1981, Potentiometric surface of the Upper Floridan aquifer in Florida and in parts of Georgia, South Carolina, and Alabama, May 1980: U.S. Geological Survey Open-File Report 81-486, 1 sheet.  
 Kinnaman, S.L., 2011, Synoptic water-level measurements of the Upper Floridan aquifer in Florida and in parts of Georgia, South Carolina, and Alabama, May–June 2010: U.S. Geological Survey Data Series Report 639.  
 Lohman, S.W., 1979, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 72 p.  
 Miller, J.A., 1986, Hydrogeologic framework of the Floridan Aquifer System in Florida and in parts of Georgia, Alabama, and South Carolina: U.S. Geological Survey Professional Paper 1403-B, 91 p.  
 Miller, J.A., 1990, Ground Water Atlas of the United States: Segment 6, Alabama, Florida, Georgia, South Carolina: U.S. Geological Survey Hydrologic Atlas 730-G, 28 p.  
 U.S. Geological Survey, 2011, Floridan Aquifer System Groundwater Availability Study: U.S. Geological Survey database, accessed September 6, 2011, at <http://fl.water.usgs.gov/FAWAM/>.

**EXPLANATION**

- 50 — Potentiometric contour — Shows altitude at which water level would have stood in tightly cased wells. Hachures indicate depressions. Contour interval 10 feet. Vertical datum is National Geodetic Vertical Datum of 1929. Dashed where inferred.
- Surveyed well with known open-hole interval — Measuring-point datum is referenced to benchmark datum
- ⊙ Surveyed well with known open-hole interval — Measuring-point datum is referenced to benchmark datum. Brackish to saline water, not contoured



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