REVISED HYDROGEOLOGIC FRAMEWORK FOR THE FLORIDAN AQUIFER SYSTEM IN THE NORTHERN COASTAL AREAS OF GEORGIA AND PARTS OF SOUTH CAROLINA

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Abstract. The hydrogeologic framework for the Floridan aquifer system was revised for eight northern coastal counties in Georgia and five coastal counties in South Carolina (Fig. 1) as part of a regional assessment of water resources by the U.S. Geological Survey (USGS) Groundwater Resources Program. In this study, selected well logs were compiled and analyzed to determine the vertical and horizontal continuity of permeable zones that make up the aquifer system, and define more precisely the thickness of confining beds that separate individual aquifer zones. The results of the analysis indicate that permeable zones in the Floridan aquifer system can be divided into (1) an upper group of extremely transmissive zones that correlate to the Ocala Limestone in Georgia and the Parkers Ferry Formation in South Carolina, and (2) a lower group of zones of relatively lower transmissivity that correlates to the middle part of the Avon Park formation in Georgia and updip clastic equivalent units of South Carolina (Fig. 2). This new subdivision simplifies the hydrogeologic framework originally developed by the USGS in the 1980s and helps to improve the understanding of the physical geometry of the system for future modeling efforts. Revisions to the framework in the Savannah-Hilton Head area are particularly important where permeable beds control the movement of saltwater contamination. The revised framework will enable waterresource managers in Georgia and South Carolina to assess groundwater resources in a more uniform manner and help with the implementation of sound decisions when managing water resources in the aquifer system.

REFERENCE

Williams, L.J., and Gill, H.E., 2010, Revised hydrogeologic framework of the Floridan aquifer system in the northern coastal area of Georgia and adjacent parts of South Carolina: U.S. Geological Survey Scientific Investigations Report 2010–5158, 103 p., 3 plates.

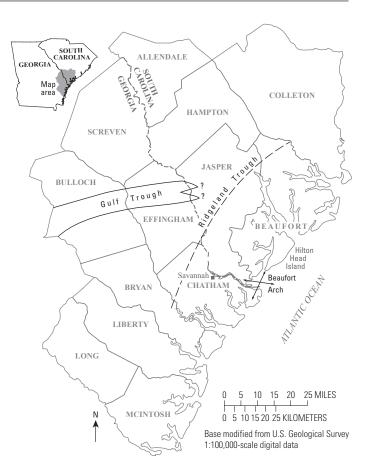


Figure 1. Study area in eight northern coastal counties of Georgia and five southern coastal counties of South Carolina. (Structural features: Gulf Trough from Applied Coastal Research Laboratory, 2002; Beaufort Arch from Clarke and others, 1990; modified from Williams and Gill, 2010).

Hydrogeologic unit	Thickness (feet)	Formation			Lithology	Geophysical log response	Permeable
		Unit	Georgia	South Carolina	Lithology	Gamma Resistivity	zone
Surficial aquifer	0–100	Post Miocene	Undiffer- entiated	Undiffer- entiated	Quartz sand	A MMM	Surficial
Upper confining unit Upper Brunswick Lower Brunswick	0-300	Miocene	Hawthorn Formation Tiger Leap	Undiffer- entiated	Clay <u>Phosphatic sand</u> Clay <u>Phosphatic sand</u> Limestone	Marker 'A' Marker 'B'	Local
Upper Floridan aquifer	0-400	Oligo- cene	Formation Suwannee Limestone	Cooper Fm. Dayton Limestone	Sandy/clayey Limestone and marl	Marker 'C'	
		Upper Eocene	Ocala Limestone	Parkers Ferry Formation Harleyville Fm.	Limestone (calcarenite)	Marker 'D' SN-LN	1 2
Middle confining unit	100–350				Glauconitic limestone (calcilutite and calcarenite)	And And Annound	3
Lower Floridan aquifer	150–400	Middle Eocene	Avon Park Formation	Santee Limestone	Glauconitic limestone (calcarenite)	the second secon	4 4 5
				Warley Hill Marl Congaree Fm.	Cherty limestone (calcilutite)	of system	
Lower confining unit	Varies	Lower Eocene/ Paleocene	Oldsmar Fm. Cedar Keys Fm.	Black Mingo Group	Clastic and carbonate rocks (varies by formation)	(Logs show typical response. Logs shown here are from well 360392, Hunter Army Airfield, Chatham County, Georgia.)	

Hydraulic unit





Permeable zone—Number refers to similar water-bearing zones previously defined by McCollum and Counts (1964). Upper two local zones correlate to upper and lower Brunswick aquifers. Local zone shown in Oligocene is a water-bearing zone identified in the Tiger Leap Formation in Chatham County, Georgia.

Type of Log

LN = long normal resistivity SN = short normal resistivity LA = lateral resistivity

Figure 2. Hydrogeologic units and confining beds of the Floridan aquifer system showing representative log response and location of permeable zones and mapping horizons (modified from Williams and Gill, 2010; Fm., formation)