

Upper Floridan Aquifer

The Upper Floridan aquifer underlies most of the Coastal Plain of Georgia, southern South Carolina, extreme southeastern Alabama, and all of Florida (Miller, 1986). The aquifer is one of the most productive in the United States, and a major source of water in the region. During 1995, approximately 700 million gallons per day (Mgal/d) was withdrawn from the Upper and Lower Floridan aquifers in Georgia, primarily for industrial and irrigation uses (Fanning, 1997).

The Upper Floridan aquifer predominately consists of Eocene to Oligocene limestone, dolomite, and calcareous sand. The aquifer is thinnest along its northern limit (map, facing page) and thickens to the southeast, where the maximum thickness is about 1,700 feet (ft) in Ware County (Miller, 1986). The aquifer is confined throughout most of its extent, except where it crops out or is near land surface along the northern limit, and in areas of karst topography in parts of southwestern and south-central Georgia.

The Coastal Plain of Georgia has been informally divided into four hydrologic areas for discussion of water levels (map, facing page)—the southwestern, south-central, east-central, and coastal areas. This subdivision is a modification of that used by Peck and others (1999) and is similar to that used by Clarke (1987).

Southwestern area

All or parts of 16 counties constitute the southwestern area. In this area, the Upper Floridan aquifer ranges in thickness from about 50 ft in the northwest to about 475 ft in the southeast (Hicks and others, 1987). The aquifer is overlain by sandy clay residuum that is hydraulically connected to streams. With the introduction of center pivot irrigation systems around 1975, the Upper Floridan aquifer has been widely used as the primary water source for irrigation in southwestern Georgia (Hicks and others, 1987). According to Torak and McDowell (1996), about 162 million gallons per day (Mgal/d) of water was withdrawn from the Upper Floridan aquifer in the southwestern area during 1990, 70 percent of which was used for irrigation.

Within the southwestern area, lies the city of Albany–Dougherty County area. In this area, most of the water withdrawn from the Upper Floridan aquifer is for public supply. About 20 Mgal/d was withdrawn during 1995. Irrigation withdrawal was about half that amount (11 Mgal/d; Fanning, 1997).

South-central area

Six counties constitute the south-central area. In this area, the Upper Floridan aquifer ranges in thickness from about 300 to 700 ft (Miller, 1986). Lowndes County is a karst region, having abundant sinkholes and sinkhole lakes that have formed where the aquifer crops out and the overlying confining unit has been removed by erosion (Krause, 1979). Direct recharge from rivers to the Upper Floridan aquifer occurs through these sinkholes at a rate of about 70 Mgal/d (Krause, 1979). In the south-central area, ground-water use totaled about 91 Mgal/d in 1995 with the majority of the withdrawal used for irrigation (Fanning, 1997).

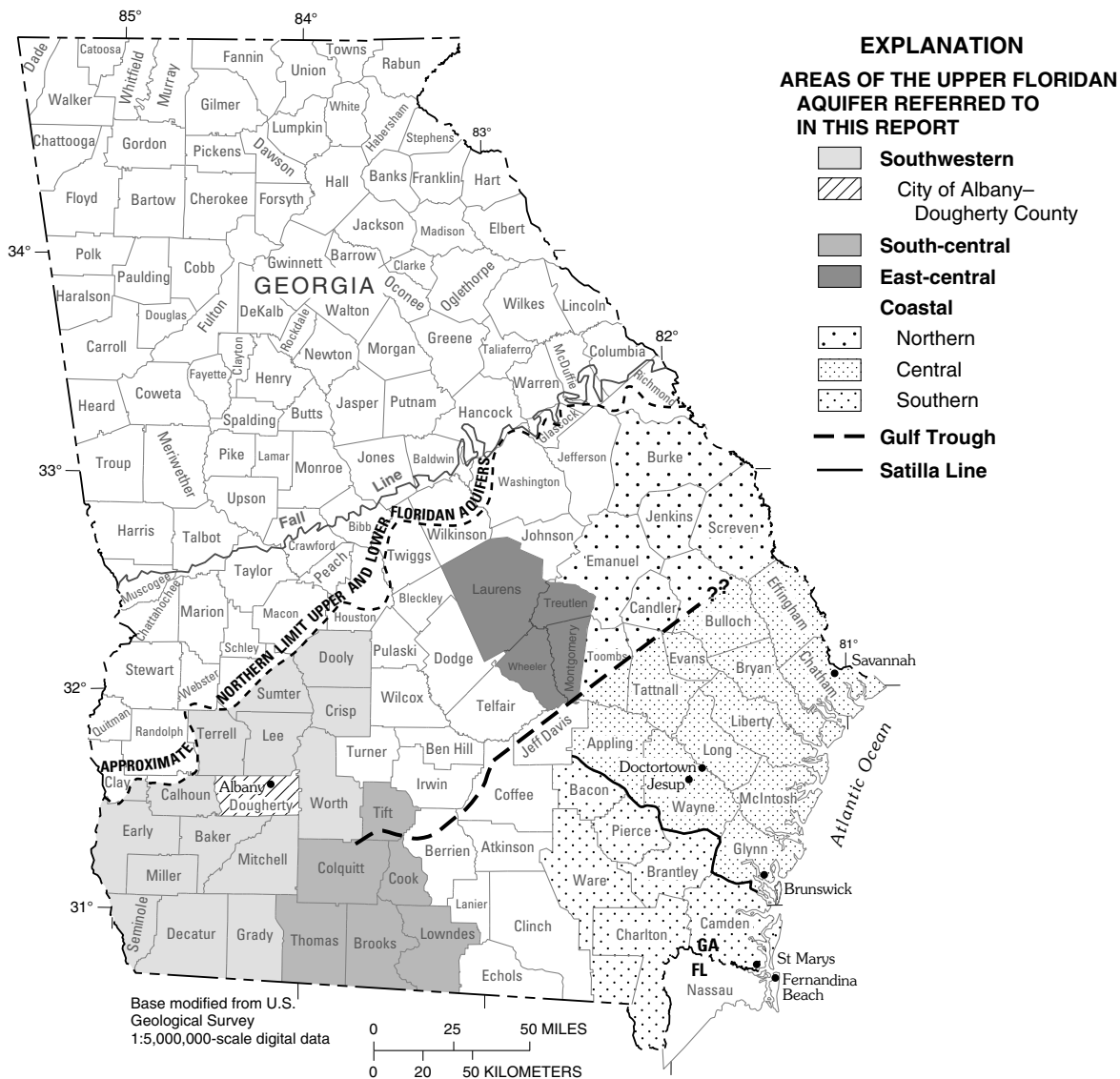
East-central area

Four counties constitute the east-central area. In this area, the Upper Floridan aquifer can be as thick as about 650 ft in the southeast to absent in the north. In this area, withdrawal totaled about 14 Mgal/d in 1995 and was used predominantly for irrigation (Fanning, 1997).

Coastal area

The Georgia Environmental Protection Division (GaEPD) defines the coastal area of Georgia to include the 6 coastal counties and adjacent 18 counties, an area of about 12,240 square miles. In this area, the Upper Floridan aquifer may be absent in the north (Burke County) to about 1,700 ft thick in the south (Ware County) (Miller, 1986). Excluding withdrawals for thermoelectric power generation, nearly 70 percent of all withdrawals in the area are from ground water (Fanning, 1999), primarily for industrial purposes. During 1997, about 347 Mgal/d was withdrawn from the Upper Floridan aquifer in the coastal area (Fanning, 1999).

The coastal area has been subdivided by GaEPD into three subareas—the northern, central, and southern—to facilitate implementation of the State's water-management policies. The central subarea includes the largest concentration of pumpage in the coastal area—the Savannah, Brunswick, and Jesup pumping centers. The northern subarea is northwest of the Gulf Trough (Herrick and Vorhis, 1963), a prominent geologic feature that is characterized by a zone of low permeability in the Upper Floridan aquifer that inhibits flow between the central and northern subareas. In this area, pumping from the aquifer is primarily agricultural, with no large pumping centers. The southern subarea is separated from the central subarea by the Satilla line, a postulated hydrologic boundary (W.H. McLemore, Georgia Environmental Protection Division, Geologic Survey Branch, oral commun. with John S. Clarke, Jan. 6, 2000). In this area, the largest pumping center is at St Marys, Georgia–Fernandina Beach, Florida.



Areas of the Upper Floridan aquifer referred to in this report.

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