

Hydrology - USGS/SCWRC Report 9

The Ground-Water Resources of Beaufort, Colleton, Hampton, and Jasper Counties, South Carolina

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ABSTRACT

In 1976, Beaufort, Colleton, Hampton, and Jasper Counties used an estimated 7.6 billion gallons of ground water, with about 6.2 billion gallons coming from the principal artesian aquifer. Southwest of the study area the city of Savannah, Georgia and nearby industries pump 75 Mgal/d (million gallons per day) from the principal artesian aquifer. As a result of these withdrawals, water level declines of 20 to about 100 feet have occurred.

With the exception of the Savannah River, the surface water in Beaufort and Jasper Counties is generally too salty for human consumption. In Hampton and Colleton Counties fresh surface water is available but it is not used to any significant extent. The Beaufort-Jasper Water Authority supplies about 5 Mgal/d of treated Savannah River water to the military installations in Beaufort, the residents of the Beaufort-Port Royal area, and some of the residents of Ladies Island.

Sedimentary rocks, ranging in age from Late Cretaceous to Holocene and ranging in thickness from about 2,500 feet in the northern part to about 3,500 feet in the southern part of the study area, store and supply all the ground water used in the area.

Rocks of Tertiary age, consisting of the Black Mingo Formation, Santee Limestone, Cooper Marl, and Hawthorn Formation, are the chief sources of ground-water supplies in the study area. The Black Mingo aquifer is a source of 50 to 250 gal/min (gallons per minute) of good quality water in Colleton and Hampton Counties, but is not used in Beaufort or Jasper Counties.

The Santee Limestone and lower part of the Cooper Marl form the principal artesian aquifer and furnish most of the ground water used in the area.

The principal artesian aquifer is divided into (1) an upper permeable zone, which furnishes about 75 percent of the water pumped from this aquifer in Hampton County and nearly all of the water pumped from this aquifer in Beaufort and Jasper Counties; (2) a middle zone of relatively low permeability, which yields small amounts of water to wells in Hampton and Colleton Counties; and (3) a lower permeable zone, which provides most of the water pumped from this aquifer in Colleton County.

The average transmissivity of the upper permeable zone ranges from about 10,000 ft²/d (square feet per day) to about 50,000 ft²/d. The transmissivity of the lower permeable zone ranges from about 500 ft²/d to about 5,000 ft²/d. The transmissivity of both zones decreases to

the north and east. Yields of wells open to the principal artesian aquifer range from about 50 gal/min to about 2,500 gal/min. Except where saltwater contamination occurs, water from the principal artesian aquifer is usually of good quality. Saltwater contamination of the principal artesian aquifer is usually of good quality and occurs from two sources: (1) sea water entering the aquifer through breaks or in areas of relatively high permeability in the overlying confining bed and (2) connate salty water present in underlying formations and in the lower two zones of the aquifer moving upward into the upper permeability zone.

Water containing more than 1,500 mg/L (milligrams per liter) of chloride is present throughout the aquifer at Parris Island, Fripp Island, Edisto Beach, and probably other small sea islands southeast of Beaufort. Salty water is present in the middle and lower permeable zones of the principal artesian aquifer in Beaufort County, in southern Colleton County, and maybe in southern Jasper County.

Water containing about 50 mg/L of chloride is present in the upper permeable zone of the principal artesian aquifer at Hilton Head Island. Salty water is moving laterally toward Hilton Head Island from the northeast and east and vertically upward from the middle and lower permeable zones. Estimates of the rate of saltwater movement towards Hilton Head Island range from 140 to 360 ft/yr (feet per year).

The upper and lower sections of the Hawthorn Formation act as confining beds. The middle section of the Hawthorn is a fairly persistent, sandy, dolomitic limestone (Hawthorn aquifer) and is a source of 50 to 200 gal/min of fairly good quality water in western Beaufort County and in Jasper County.

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