



This potentiometric-surface map shows generalized contours of water-level elevations of the Evangeline aquifer in southwestern Louisiana and aquifers in stratigraphically equivalent deposits of southeastern Louisiana. The map was prepared as part of the Gulf Coast Regional Aquifer-System Analysis study (Crabb, 1984). Water levels differ vertically within the Evangeline and equivalent aquifers. This is especially evident where one sand within the aquifer is heavily pumped and hydraulically separated from other sands by confining beds. This map does not account for localized distortion of the regional flow pattern near pumping centers. In southwestern Louisiana, the sand beds of the upper part of the Evangeline aquifer contain significant amounts of freshwater; whereas, the lower sand beds contain brackish or saline water. For this map, wells screened in the upper sand beds were used to describe the potentiometric surface because these sand beds are the most extensively pumped.

The Evangeline aquifer of southwestern Louisiana was named and described by Jones and others (1954, p. 128) as being equivalent to the Foley Formation of Pliocene age. Whitfield (1975, pp. 5-7) included the Blounts Creek Member of Fisk (1940) of the Fleming Formation (Miocene age) in the Evangeline aquifer. Historically, the Evangeline aquifer in southwestern Louisiana has been treated as a single unit, and individual sand beds within the aquifer have not been given local names.

Rollo (1960, pp. 38-39) correlated the beds of the Evangeline aquifer with stratigraphically equivalent beds east of the Mississippi River in Louisiana and determined the beds east of the river to be of Pliocene age. East of the Mississippi River, individual sand beds have commonly been given local aquifer names, and no single name has been used for the entire section equivalent to the Evangeline aquifer. Table 1 gives the aquifer names most commonly used in southeastern Louisiana for beds equivalent to the Evangeline aquifer.

The Evangeline aquifer of southwestern Louisiana and equivalent beds of southeastern Louisiana are overlain by Pleistocene deposits and Holocene alluvium. The Pleistocene deposits form the Chicot aquifer in southwestern Louisiana and the Gonzales-New Orleans and equivalent aquifers in southeastern Louisiana. The Miocene beds at the base of the Evangeline aquifer are exposed locally in stream valleys of southwestern Louisiana (Whitfield, 1975, p. 7). Pliocene beds of the Evangeline aquifer pinch out beneath the Chicot aquifer, and no exposures are known. The Evangeline and equivalent aquifers increase in thickness from zero at the northern edge of the outcrop-subcrop belt to more than 2,000 feet along the southern limit of freshwater.

The Evangeline and equivalent aquifers are recharged by rainfall on the upland alluvial terraces of Holocene age of south-central Louisiana, southeastern Louisiana, and southwestern Mississippi (Rollo, 1960, p. 39). Recharge occurs primarily through the terrace deposits at elevations of 250 to 350 feet. Most of the water entering the terrace deposits is discharged to streams in the same area. Water that is not discharged locally to streams moves down into the Evangeline and equivalent aquifers, and then moves downgradient toward lower elevations in the coastal plain and along the Mississippi River where the water discharges upward through overlying younger sediments. Artesian conditions prevail in the Evangeline and equivalent aquifers, except in recharge areas where water-table conditions occur.

The regional-flow direction in the Evangeline and equivalent aquifers is primarily southward. Gradients are generally 6 to 8 feet per mile in unstressed locations and range up to 12 feet per mile in and near pumping centers such as Baton Rouge. The lowest gradients are found across the Atchafalaya basin in south-central Louisiana.

Ground water is pumped for municipal, industrial, and domestic use in much of the region where the Evangeline and equivalent aquifers contain freshwater. The aquifers are heavily pumped in and near Baton Rouge, north of Eunice, and near Ville Platte. Areally definable cones of depression result from these pumpages. Heavy pumping from the Chicot aquifer in southwestern Louisiana affects water levels locally in the underlying Evangeline aquifer. Water-level elevations in the Evangeline aquifer generally follow the same pattern of decline as levels in the Chicot aquifer. This is exemplified by the large region of generally low water levels centered in southern Evangeline and northern Acadia Parishes where relatively little water is pumped from the Evangeline aquifer, but where the Chicot aquifer is heavily pumped. Water levels in wells in the Chicot and Evangeline aquifers in that area are not significantly different. Because there is not enough pumping from the Evangeline aquifer to cause these low water levels, the Chicot and the Evangeline aquifers in this vicinity must be relatively well connected hydraulically.

Table 1.—Aquifers of southeastern Louisiana equivalent to the Evangeline aquifer of southwestern Louisiana

Southeastern Louisiana	State Range area (Perjan, 1961)	Southeastern Louisiana (Wynn and Poyard, 1978)	Thibote Coque Parish (Hiner and others, 1968)
Evangeline aquifer	"800-foot" sand "1,000-foot" sand "1,200-foot" sand "1,500-foot" sand "1,700-foot" sand	Lower Pontchartrain aquifer Big Branch aquifer Kenswood aquifer Rita aquifer Ovington aquifer Siddell aquifer	Lower zone 1     Upper zone 2

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GENERALIZED POTENTIOMETRIC SURFACE OF THE EVANGELINE AND EQUIVALENT AQUIFERS IN LOUISIANA, 1980

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