This map (fig. 1) shows the generalized potentiometric surface or water table in the shallow aquifers in southern Mississippi. The mapped area encompasses about 18,000 mi^2 (square miles) and includes the recharge areas of the principal aquifers in the southern part of the State (fig. 1).

The potentiometric-surface map was prepared as part of the Gulf Coast Regional Aquifer-System Analysis. The potentiometric-surface map is based on about 200 water-level measurements made in the fall of 1982, supplemented by about 100 measurements made between 1960 and 1982. The measurements made prior to 1982 are considered to be representative of water levels in 1982 because water levels in the shallow aquifer have undergone no significant long-term changes. All water levels used are for wells less than 250 feet deep that reflect water-table (unconfined) or near water-table conditions. Altitudes of water surfaces in streams were used to establish the water-table altitude in large river valleys.

The configuration of the potentiometric surface generally reflects topography. Insets to the potentiometric map show in detail moderate-to-steep gradients in potentiometric surfaces in an area of moderate relief in Lincoln County and gentle gradients in an area of little relief in Harrison County.

The shallow unconfined aquifers recharge the Miocene aquifer system (Newcome, 1975) and the Oligocene aquifer system (Gandl, 1979). Aquifers in the Citronelle Formation (Boswell, 1979) are part of the shallow aquifers. The Miocene aquifer system of Newcome (1975), which underlies most of the area, includes water-bearing sand units in the Catahoula Sandstone, in the Hattiesburg and Pascagoula Formations of Miocene age, and in the Graham Ferry Formation of Pliocene age (table 1). The Citronelle Formation was deposited as a continuous southward-dipping blanket of sand, gravel, and clay over the more steeply dipping Miocene and older Pliocene strata. It now occurs as a highly dissected and discontinuous ridge-forming unit (Boswell, 1979). In many areas only isolated remnants of the formation have been identified and identification of the formation in the subsurface of Harrison County is questionable (Brown and others, 1944, p. 55 and pl. 1, 7, 10, and 12).

As used on this map, the shallow aquifers consist of the uppermost sand beds of the older units (fig. 1) and, where present, the Citronelle Formation. The Catahoula Sandstone, the principal aquifer in the northern part of the area, is overlain by extensive deposits of the Citronelle only in Copiah County. Southward, the Citronelle overlies the Hattiesburg, Pascagoula, and Graham Ferry Formations. The Mississippi River alluvial aquifer underlies the Mississippi River flood plain in the west. Quaternary alluvial and terrace deposits include water-table aquifers in the coastal area and in major stream valleys. The relative positions of the geologic units are shown in the generalized geologic section in figure 2.

Precipitation, which infiltrates through permeable surface beds, is the primary source of recharge to the water table in most of the study area. Water infiltrating in areas of high land-surface altitudes produces higher water-table altitudes than would be found in areas of little relief and lower land-surface altitudes. Ground-water flow moves laterally and vertically from the high areas. Lateral flow moves toward valleys and is discharged by seeps and springs and the vertical flow moves downward into underlying strata. The discharged ground water is the source of dry-weather flow in small streams in the area. The water that moves downward recharges the deeper semi-confined and confined regional aquifers.

The water-table in the Mississippi River alluvial aquifer and the water table in the larger river valleys in the area are controlled principally by the stage of the river incising the valley. The water table is highest in the winter and spring during periods of high streamflow and lowest in late summer and fall during periods of low streamflow. The water table in the alluvial valleys generally is within less than 25 feet of the land surface.

Regional seasonal water-level fluctuations in the shallow aquifers are small and average only about 3 feet. Water levels in the unpumped shallow aquifers generally are highest in the spring and lowest in the fall, reflecting changes in seasonal precipitation and evapotranspiration (fig. 3, Jackson County well Q424).

Water-level declines due to withdrawals in the shallow aquifers are not areally extensive and the aquifers recover to near unstressed conditions on cessation of pumping. Where pumping is sustained and the transmissive capacity of the aquifer is not exceeded, a state of near equilibrium is attained (fig. 3, Claiborne County well L5). Well T101 in Wilkinson County (fig. 3) is in the recharge area of and about 40 miles north of heavily pumped aquifers at Baton Rouge, La. The water level in this well has remained in a near steady-state condition since 1942. This indicates that the effects of withdrawals are not measurable in the recharge area. General water-level declines that characterize the deeper confined aquifers are not occurring regionally in the shallow water-table aquifers.

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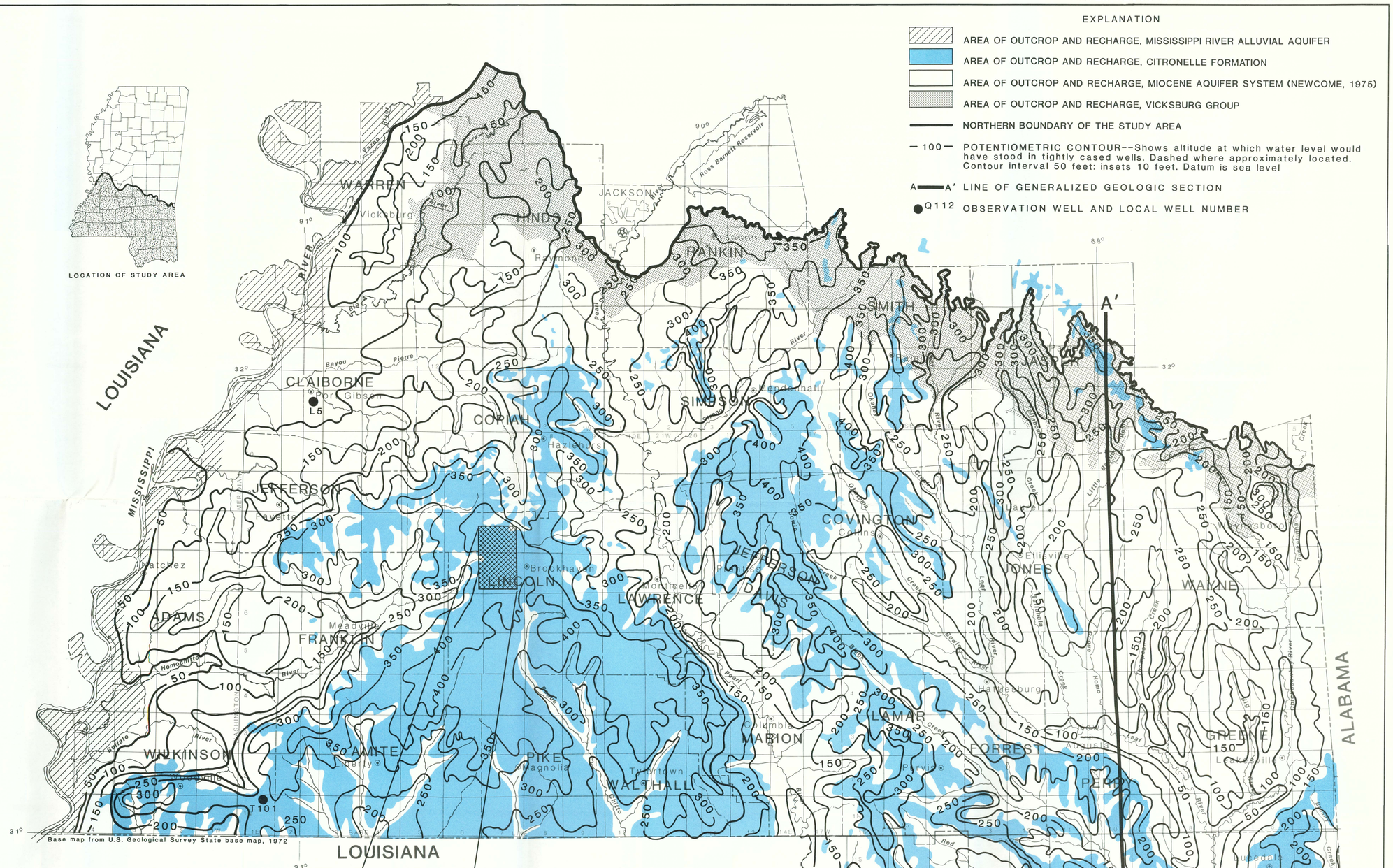

Figure 2.--Generalized geologic section A-A′ showing relations of geologic units in southern Mississippi.

Figure 3.--Hydrographs of selected wells in the shallow aquifers in southern Mississippi.

Figure 1.--Generalized potentiometric surface of shallow aquifers.

Table 1.--Geologic units in southern Mississippi

ERATHEM	SYSTEM	SERIES	GROUP	GEOLOGIC UNIT
CENZOIC	Quaternary	Holocene and Pleistocene		Alluvium and terrace deposits
	Tertiary	Pliocene		Citronelle Formation Graham Ferry Formation
		Miocene		Pascagoula Formation Hattiesburg Formation Catahoula Sandstone
				? —— ? —— ? —— ?
		Oligocene		Paynes Hammock Formation Chickasawhay Limestone
			Vicksburg	Buckatunna Formation Byram Formation Glendon Formation Marianna Formation Mint Spring Formation
				Forest Hill / Red Bluff Formation / Formation
		Eocene	Jackson	Yazoo Formation Moodys Branch Formation

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