

POTENTIOMETRIC MAP OF THE PALEOZOIC AQUIFER  
IN NORTHEASTERN MISSISSIPPI,  
OCTOBER AND NOVEMBER 1978

This potentiometric map of the Paleozoic aquifer is the first in a series of maps, prepared by the U.S. Geological Survey in cooperation with the Mississippi Board of Water Commissioners, delineating the potentiometric surfaces of the major aquifers in Mississippi. The map is based on water-level measurements made in 23 wells during October and November 1978 and on water-surface altitudes determined at several points on streams that receive discharge from the aquifer in or near the outcrop area. The altitudes of the water surfaces in the streams were determined from topographic maps and were not field checked.

The Paleozoic aquifer, as described in this report, includes all the freshwater-bearing beds in the Paleozoic rocks in northeastern Mississippi. Paleozoic rocks in the area consist mostly of beds of sandstone, shale, and limestone which dip about 30 feet per mile to the southwest. Most of the freshwater known to occur in Paleozoic rocks in Mississippi is in the upper 100 feet--commonly a weathered zone. This zone probably contains freshwater (less than 1,000 milligrams per liter of dissolved solids) as much as 60 miles from the outcrop area. (See index map and potentiometric map.) Well depths in the outcrop area in Tishomingo County commonly are less than 200 feet, but may be more than 1,000 feet. Well depths necessary to tap the upper weathered zone increase to the west, and at Corinth, the wells tapping this zone are about 500 feet deep. Permeability of the Paleozoic rocks varies widely and consequently well yields vary widely--from a few gallons per minute to more than 1,000 gallons per minute.

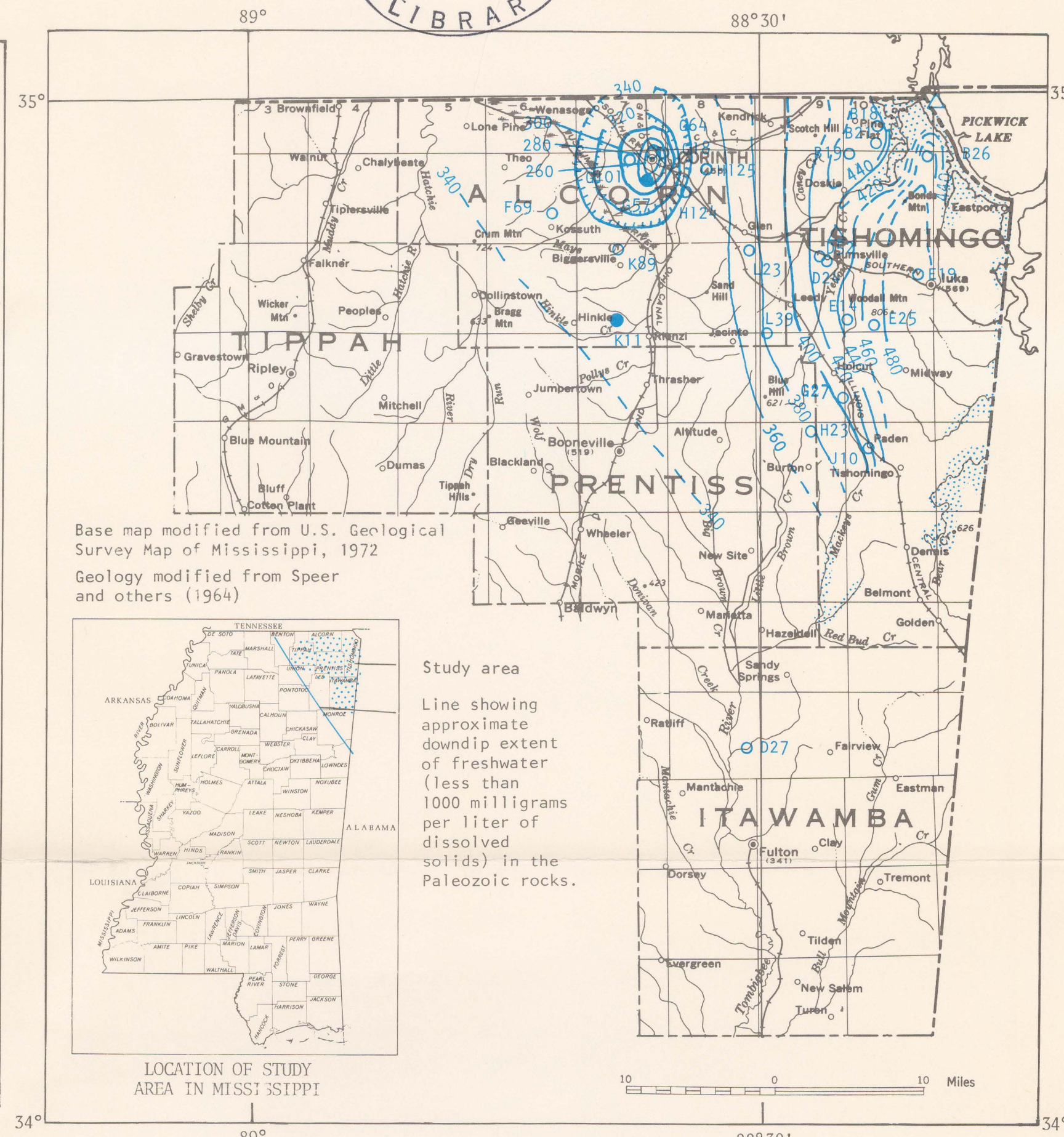
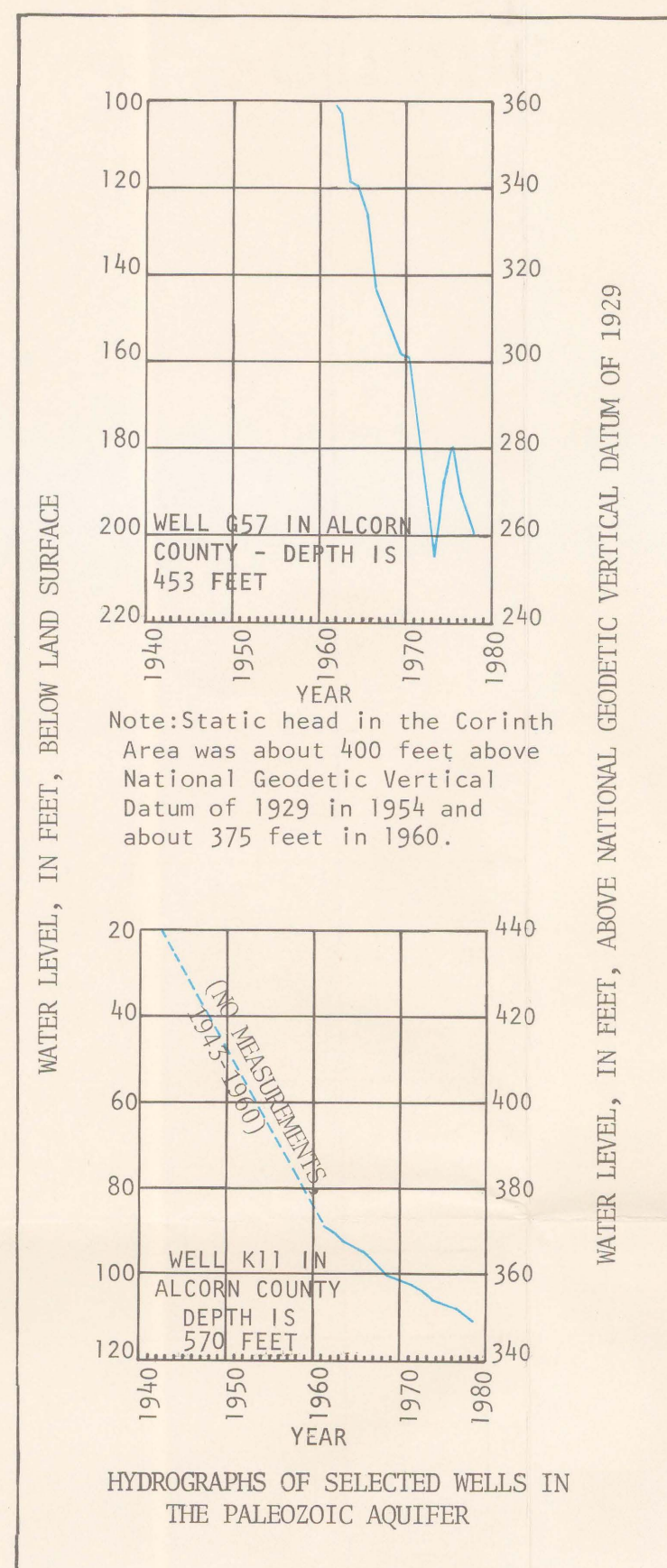
The potentiometric surface of the Paleozoic aquifer slopes generally to the west away from the area of outcrop and is strongly influenced by large ground-water withdrawals at Corinth. (See potentiometric map.) In the outcrop areas the potentiometric surface is strongly affected by recharge from precipitation, topography, and drainage of the aquifer by streams. In some downdip areas the Paleozoic aquifer is poorly separated from the overlying aquifer (Coker, Gordo, or Eutaw) and, therefore, the static head in the Paleozoic aquifer is about the same as that in the overlying aquifer. No great differences have been observed in static heads between the several water-bearing beds within the Paleozoic rocks.

Historically, water levels in or near the outcrop of the Paleozoic aquifer have shown little or no long-term changes. Heavy withdrawals in the Corinth area (Alcorn County) caused the water level to decline about 9 feet per year in well G57 during 1962-74. After new wells in other parts of the city were put into service in 1972 and 1973, the pumping pattern changed and the water level in well G57 temporarily recovered about 25 feet. The downward trend resumed in about 1976 (see hydrograph). Ten miles south of Corinth the water level in the Paleozoic aquifer has been declining about 1 foot per year since 1961. (See hydrograph of well K11 in Alcorn County.)

Additional information on the geohydrology of the Paleozoic aquifer may be found in the following reports:

SELECTED REFERENCES

- Boswell, E. H., 1963, Cretaceous aquifers of northeastern Mississippi: Mississippi Board Water Commissioners Bulletin 63-10, 202 p.
- Speer, P. R., Golden, H. G., and Patterson, J. F., 1964, Low-flow characteristics of streams in the Mississippi Embayment in Mississippi and Alabama: U.S. Geological Survey Professional Paper 448-I, 47 p.
- Wasson, B. E., Golden, H. G., and Gaydos, M. W., 1965, Available water for industry--Clay, Lowndes, Monroe, and Oktibbeha Counties, Mississippi: Mississippi Research and Development Center Bulletin, 60 p.
- Wasson, B. E., and Tharpe, E. J., 1975, Water for industrial development in Alcorn, Itawamba, Prentiss, and Tishomingo Counties, Mississippi: Mississippi Research and Development Center Bulletin, 39 p.
- Wasson, B. E., and Thomson, F. E., 1970, Water resources of Lee County, Mississippi: U.S. Geological Survey Water-Supply Paper 1899-B, 63 p.



AREA OF OUTCROP OF PALEOZOIC ROCKS (Paleozoic aquifer).



POTENTIOMETRIC CONTOUR--Shows altitude at which water level would have stood in tightly cased wells. Dashed where approximately located. Contour interval is 20 feet. Datum is National Geodetic Vertical Datum of 1929. Based on measurements of water-level altitudes in wells and water-surface altitudes of streams in and near outcrop area.



OBSERVATION WELL AND NUMBER--Wells are numbered alpha-numerically by county.



OBSERVATION WELL FOR WHICH HYDROGRAPH IS SHOWN.



POINT AT WHICH ALTITUDE OF WATER SURFACE IN STREAM WAS USED TO DEFINE THE POTENTIOMETRIC SURFACE OF AQUIFER.

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