



HYDROGRAPHS OF SELECTED WELLS IN THE SPARTA AQUIFER SYSTEM
[See map for locations. Note that vertical scales vary. Data points (+) represent periodic water-level measurements, generally made with steel tape.]

- EXPLANATION**
- AREA OF OUTCROP OF SPARTA SAND-- Modified from Belt and others, 1945. North of Leake County, the Sparta Sand outcrop is mostly covered with a mantle of loess, which may be as much as 75 feet thick in the eastern edge of the Sparta outcrop and completely missing in areas in the eastern edge of the Sparta outcrop
 - AREA OF SUBCROP OF SPARTA SAND BENEATH THE MISSISSIPPI RIVER VALLEY ALLUVIUM-- Generalized after Dalsin (1978)
 - 160-- POTENTIOMETRIC CONTOUR-- Shows altitude at which water level would stand in tightly cased wells. Based on measurements of water-level altitudes in wells and on water-surface altitudes of streams in and near outcrop area. Dashed where approximately located. Contour interval is 20 feet. National Geodetic Vertical Datum of 1929 (NGVD of 1929)
 - OBSERVATION WELL AND NUMBER-- Upper number is well number, which is alpha-numerical by county. Lower number is altitude of water surface, in feet above NGVD of 1929
 - OBSERVATION WELL FOR WHICH HYDROGRAPH IS SHOWN
 - POINT AT WHICH ALTITUDE OF WATER SURFACE IN STREAM DURING THE FALL WAS USED TO DEFINE THE POTENTIOMETRIC SURFACE OF AQUIFER. Number is approximate altitude of water surface, in feet above NGVD of 1929
 - EAST EDGE OF MISSISSIPPI RIVER ALLUVIAL PLAIN-- That part of plain north of Vicksburg is known as the Yazoo basin and locally as the Delta

DISCUSSION

The U.S. Geological Survey, in cooperation with the Mississippi Department of Natural Resources, Bureau of Land and Water Resources, has prepared a series of maps of major aquifers in Mississippi to show the availability of ground water for municipal and industrial use and to show the effects of withdrawals on the aquifer. This map, the second in the series of water-level maps for the Sparta aquifer system, follows a map that delineated the potentiometric surface of the aquifer in 1950 (Jasson, 1950).

The Sparta Sand of Eocene age is composed of thick, irregularly bedded sand and clay. The aquifer outcrops in a narrow crescent-shaped band that stretches from north-central to east-central Mississippi. The formation is about 100 feet thick in Clarke County in east-central Mississippi and increases to as much as 1,000 feet thick in Warren County in west-central Mississippi (Newcome, 1976). The base of the Sparta dips about 20 to 50 feet per mile to the southwest. The interconnected sand beds that occur throughout the Sparta form the Sparta aquifer system.

Precipitation recharges the Sparta aquifer system in the outcrop area. The regional ground-water movement, westward and southward into the subsurface from the outcrop area, has been modified by centers of pumping at Jackson, Yazoo City, Clarksdale, and Cleveland.

As water moves down the dip from the outcrop, mineralization increases. The approximate dompic extent of freshwater (dissolved-solids concentrations less than 1,000 milligrams per liter) in the Sparta aquifer system is about 70 to 100 miles southwest of the outcrop area. The aquifer system contains freshwater in all or parts of 44 counties, where it is the source of ground water for large industrial and municipal wells and many domestic and stock wells.

This water-level map is based on water-level measurements made in 153 wells in the Sparta aquifer system in the fall of 1984. The contours show altitudes at which water levels would have stood in tightly cased, un pumped wells in the fall of 1984.

In and near the outcrop area, water levels in the Sparta aquifer system have been stable since 1950. In the northwest part of the area where wells are sparse and withdrawals are small, the water levels have declined about 1 to 2 feet per year. The largest declines have occurred in the Jackson area where the cone of depression has expanded and, in places, has deepened about 3 feet per year since 1980. Water levels in the southern part of the "delta" (the Mississippi alluvial plain) have continued to decline, resulting in a larger and deeper cone of depression than in 1980. Smaller centers of pumping in the northern part of the Delta at Clarksdale and Cleveland have lowered water levels about 2 feet per year since 1980. Where the Sparta aquifer system and the Mississippi River valley alluvial aquifer are in hydraulic connection, water levels have remained at about the same altitude in both aquifers.

SELECTED REFERENCES

Belt, W.E., and others, 1945, Geologic map of Mississippi: Mississippi Geological Society, 1 sheet.

Dalsin, G.J., 1978, The Mississippi River valley alluvial aquifer in Mississippi: U.S. Geological Survey Water-Resources Investigations 78-106, 1 sheet.

Newcome, Roy, Jr., 1976, The Sparta aquifer system in Mississippi: U.S. Geological Survey Water-Resources Investigations Report 76-7, map.

Jasson, B.E., 1950 (1951), Potentiometric map of the Sparta aquifer system in Mississippi, fall 1950: U.S. Geological Survey Water-Resources Investigations Open-File Report 81-1051, map.

ADDITIONAL INFORMATION
Data describing the individual wells used in this study may be obtained from the following:

Director Mississippi Department of Natural Resources Bureau of Land and Water Resources Post Office Box 10631 Jackson, Mississippi 39209 (601) 961-5200	District Chief U.S. Geological Survey Water Resources Division Suite 710, Federal Building Jackson, Mississippi 39269 (601) 965-4600
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POTENTIOMETRIC MAP OF THE SPARTA AQUIFER SYSTEM IN MISSISSIPPI, FALL 1984

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JACKSON, MISSISSIPPI