

POTENTIOMETRIC MAP OF THE MERIDIAN-UPPER WILCOX
AQUIFER IN MISSISSIPPI, FALL 1983

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 potentiometric maps for the major aquifers in Mississippi to show the effects of ground-water withdrawals. This map, the second in the series for the Meridian-upper Wilcox aquifer, updates a map that delineated the potentiometric surface of the aquifer in 1979 (Wasson, 1980a).

The Meridian-upper Wilcox aquifer consists of the Meridian Sand member of the Tallahatta Formation and the uppermost sand beds of the Wilcox Group. Thickness of the aquifer ranges from 50 to 500 feet. The dip of the base of the aquifer ranges from 20 to 50 feet per mile to the southwest. The aquifer generally overlies in central and eastern Mississippi by the relatively impermeable strata in the Tallahatta Formation and is underlain by clay in the upper part of the Wilcox Group. Northwestward the overlying strata becomes sandy.

Precipitation recharges the Meridian-upper Wilcox in the outcrop area, which extends from Benton County in the north to Clarke County in the south. The regional ground-water movement is westward and southward from the outcrop area, but it has been modified by centers of pumping in Scott County and in northwestern Mississippi (see potentiometric map).

The potentiometric map is based on water-level measurements made in about 170 wells in the Meridian-upper Wilcox aquifer in October 1983, and on the approximate altitudes of water surfaces in some major streams. The contours show altitudes at which water levels would have stood in tightly cased unpumped wells.

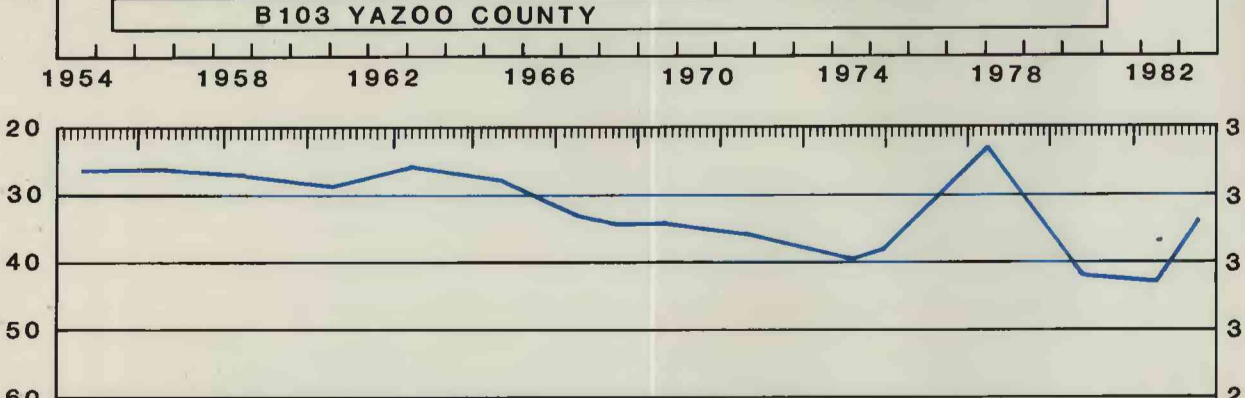
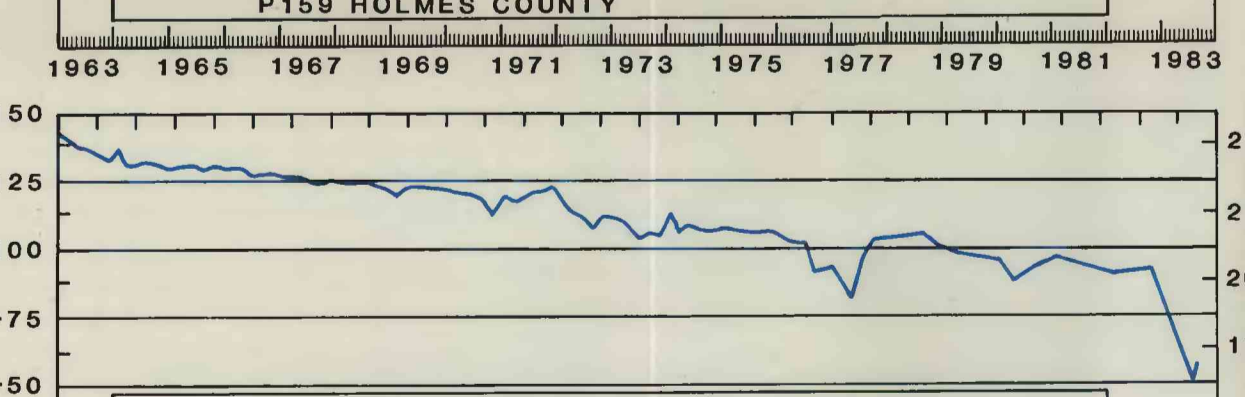
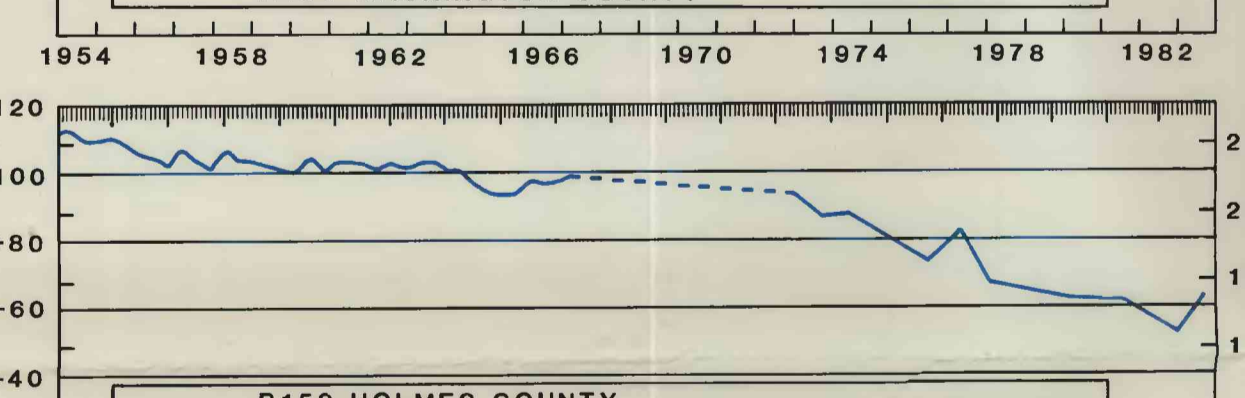
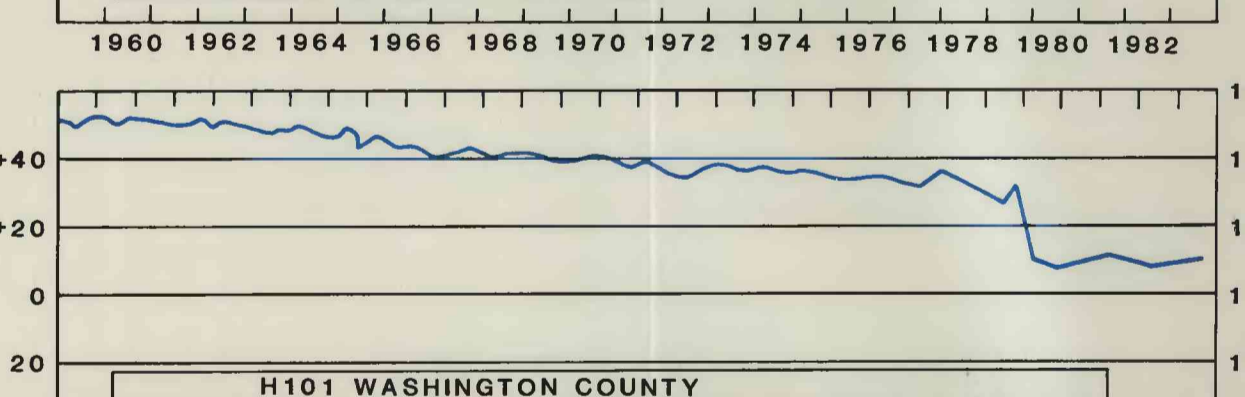
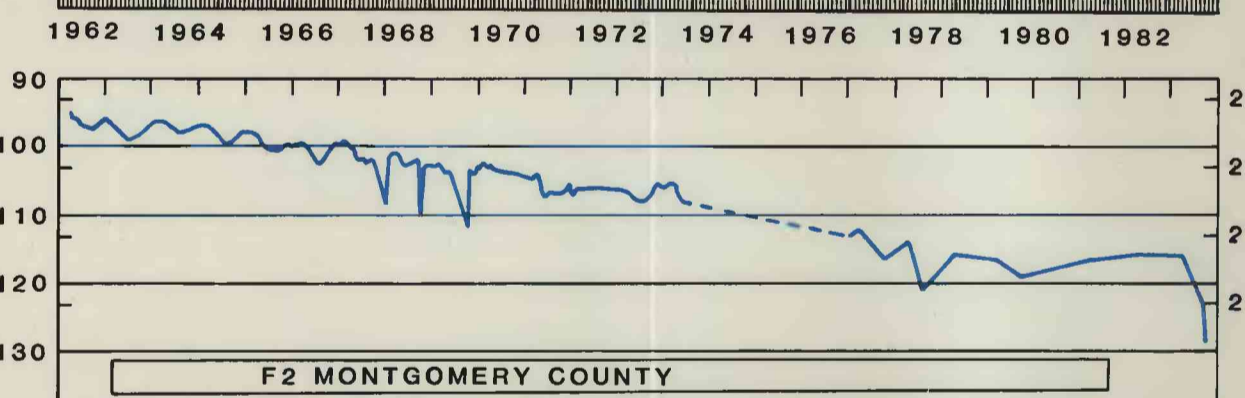
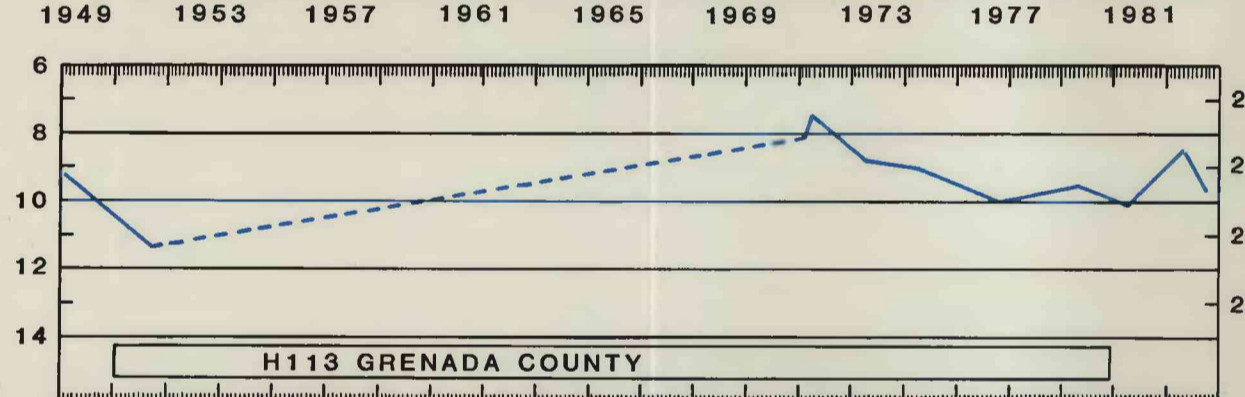
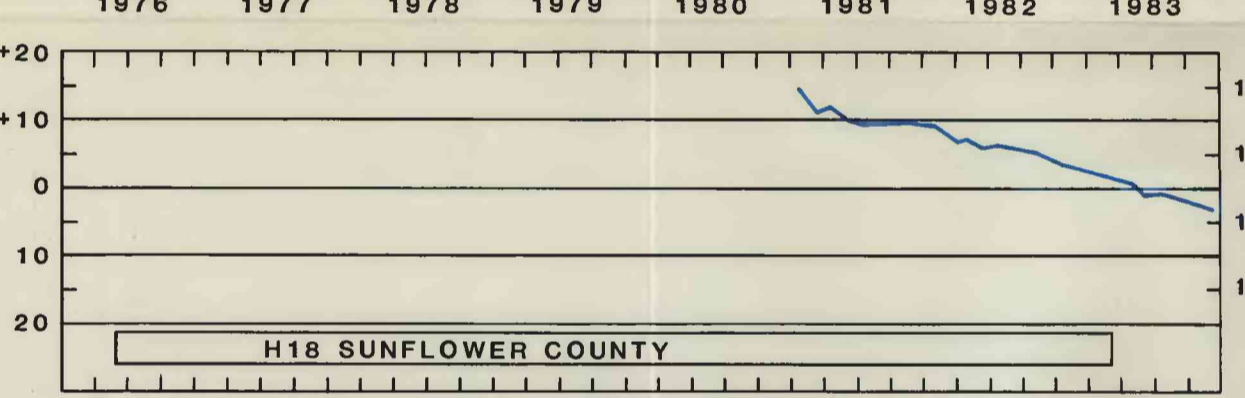
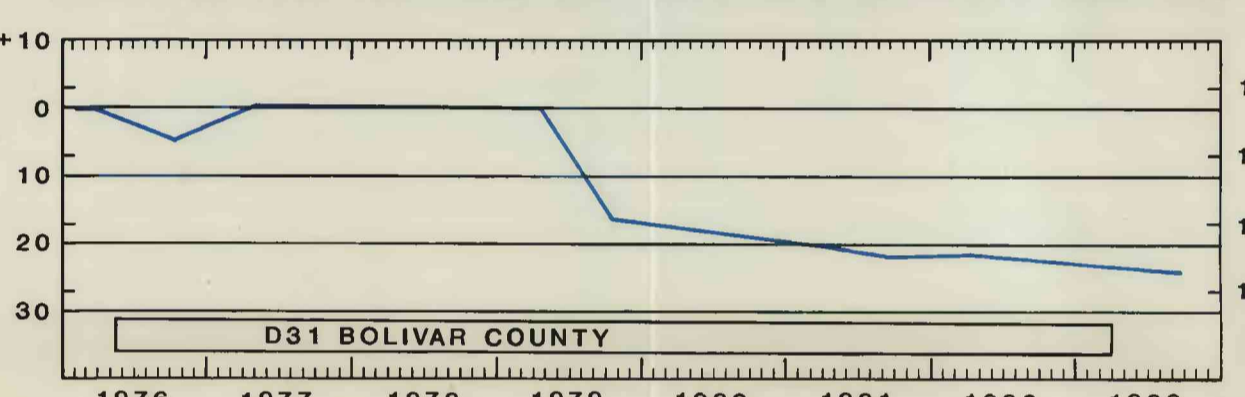
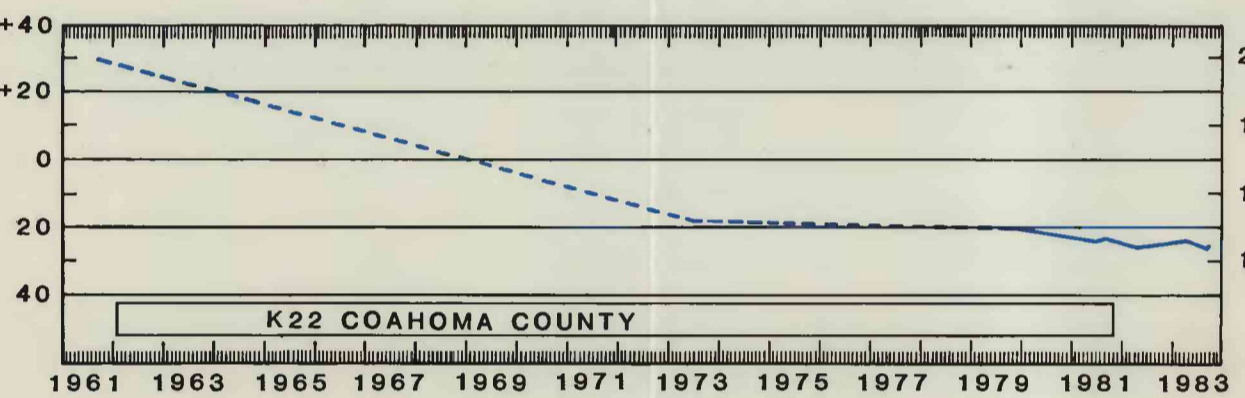
The approximate down-dip extent of freshwater in the Meridian-upper Wilcox aquifer, about 30 to 80 miles west and southwest from the outcrop area, marks a boundary of this map. The aquifer, which contains freshwater (less than 1,000 milligrams per liter of dissolved solids) in an area of about 18,000 square miles in Mississippi, is the source of ground water for most of the large-capacity industrial and municipal wells and many domestic wells in this area.

Except in or near the outcrop area where water levels have continued to be stable, water-level declines in the Meridian-upper Wilcox aquifer have averaged about 2 feet per year since 1979 (see hydrographs). Down-dip from the outcrop in areas where wells are sparse and withdrawals are small, water levels have declined about 1 to 2 feet per year. The greatest local declines, about 4 feet per year, have occurred in northwestern Mississippi and in the Scott County area.

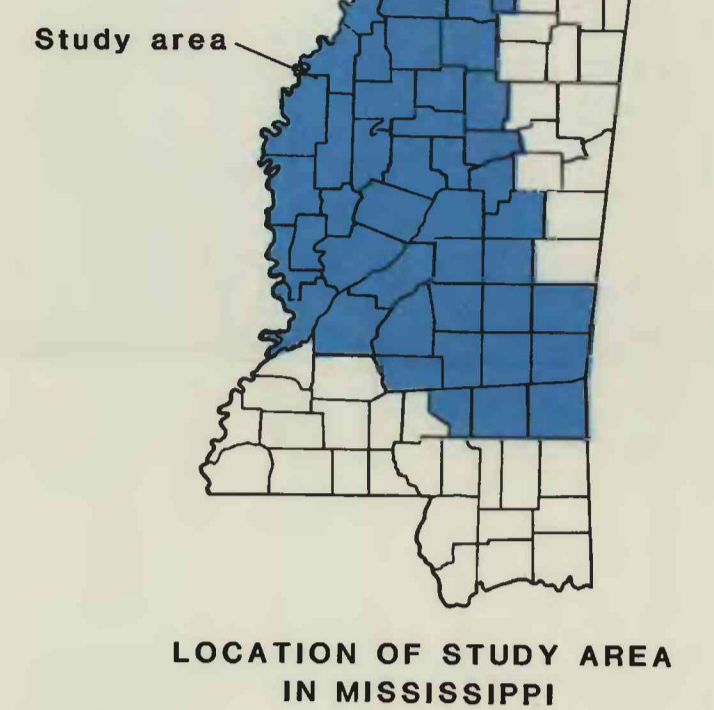
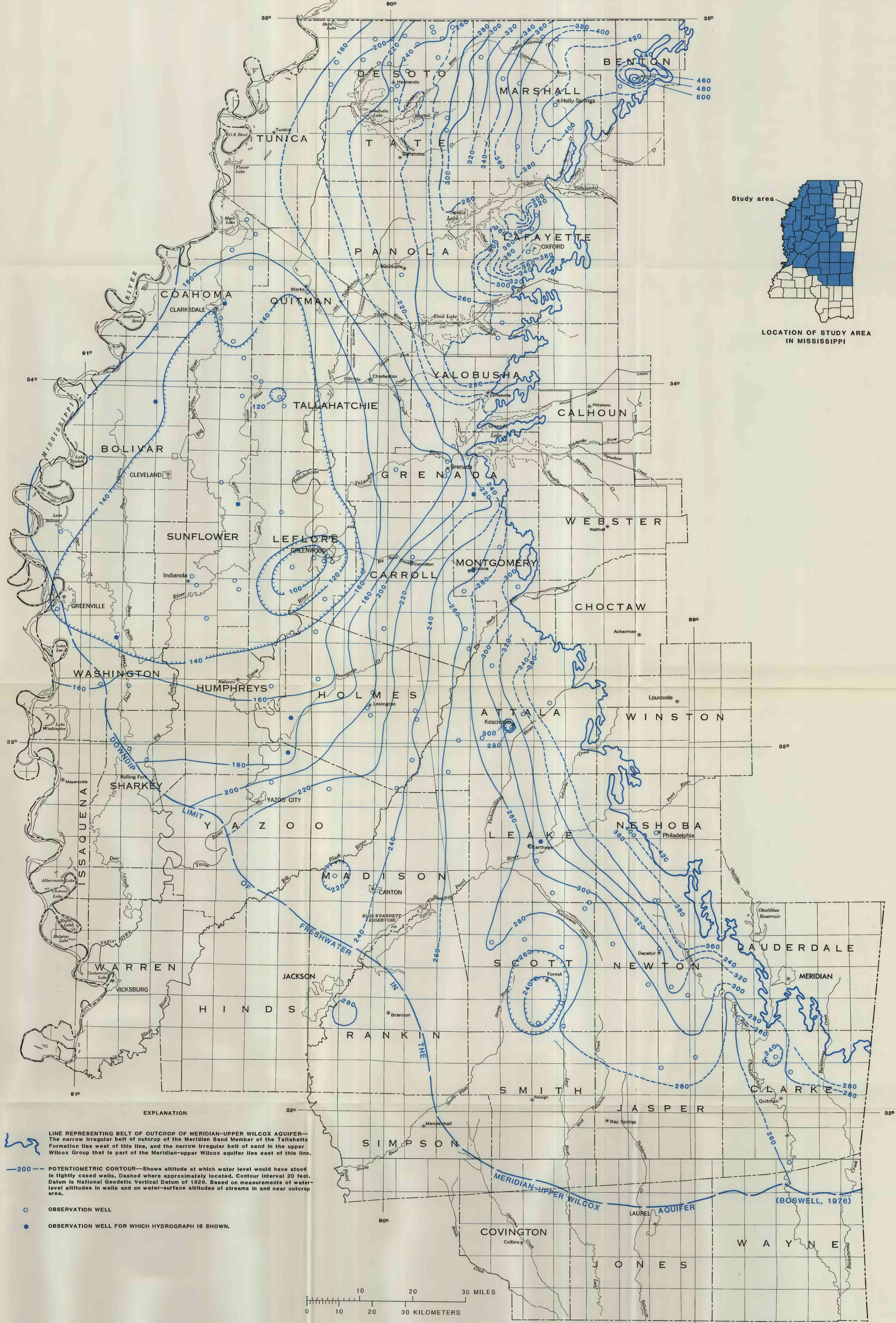
The cone of depression in northwestern Mississippi, which resulted from long-term heavy pumping, was expanded areally and has deepened about 3 feet per year since 1979. A new cone of depression in Scott County has resulted from heavy pumping for industrial and municipal use since 1979.

SELECTED REFERENCES

- Boswell, E. H., 1976, The Meridian-upper Wilcox aquifer in Mississippi: Jackson, Mississippi: U.S. Geological Survey, Water-Resources Investigations 76-79, map, 3 sheets.
- Wasson, B. E., 1980a, Potentiometric map of the Meridian-upper Wilcox aquifer in Mississippi, fall 1979: U.S. Geological Survey Water Resources Investigations Report 80-590, map, 1 sheet.
- 1980b, Sources for water supplies in Mississippi: Mississippi Research and Development Center, 112 p.



HYDROGRAPHS OF WATER LEVELS IN MERIDIAN-UPPER WILCOX AQUIFER



EXPLANATION

— LINE REPRESENTING BELT OF OUTCROP OF MERIDIAN-UPPER WILCOX AQUIFER—The narrow irregular belt of outcrop of the Meridian Sand Member of the Tallahatta Formation lies west of this line, and the narrow irregular belt of sand in the upper Wilcox Group that is part of the Meridian-upper Wilcox aquifer lies east of this line.

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

○ OBSERVATION WELL

● OBSERVATION WELL FOR WHICH HYDROGRAPH IS SHOWN.

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Base map modified from U.S. Geological Survey State base map, 1972