

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

MAPS SHOWING SATURATED THICKNESS, JANUARY 1979,  
AND PERCENTAGE DECREASE IN SATURATED THICKNESS, 1950-79,  
OF UNCONSOLIDATED AQUIFER, WEST-CENTRAL KANSAS

By M. E. Pabst

---

U.S. GEOLOGICAL SURVEY

OPEN-FILE REPORT 79-1340

Prepared in cooperation with the  
Western Kansas Groundwater Management District No. 1

Garden City, Kansas

December 1979

FINB

MAPS SHOWING SATURATED THICKNESS, JANUARY 1979,  
AND PERCENTAGE DECREASE IN SATURATED THICKNESS, 1950-79,  
OF UNCONSOLIDATED AQUIFER, WEST-CENTRAL KANSAS

---

M. E. Pabst

---

Maps showing the saturated thickness in 1979 and the percentage decrease in saturated thickness from 1950 to 1979 are intended to illustrate existing conditions in the unconsolidated aquifer and the continuing decrease of ground water in storage. This report is the second in an annual series of publications prepared by the U.S. Geological Survey in cooperation with the Western Kansas Groundwater Management District No. 1.

The principal aquifer in west-central Kansas consists mostly of saturated sand and gravel of Miocene age (Ogallala Formation) and Pleistocene age (undifferentiated deposits). The main body of this ground-water reservoir is designated as the unconsolidated aquifer.

About 1,860 square miles of the area, as shown within the aquifer boundary, are underlain by sufficient saturated material to supply ground water for irrigation. Saturated thickness ranges from less than 50 feet to about 270 feet. In the remainder of the area, except for isolated areas, the saturated material is thin and yields little or no water to wells.

The map showing saturated thickness of deposits in the unconsolidated aquifer (pl. 1) was contoured by superimposing maps showing the altitude and configuration of the underlying bedrock surface and the potentiometric (water-level) surface in the unconsolidated aquifer in January 1979.

Thickness of saturated deposits in the unconsolidated aquifer within the area of the Western Kansas Groundwater Management District has decreased as a result of ground-water withdrawals by wells, principally for irrigation. From 1950 to 1979, the decrease in saturated thickness was negligible in some areas and as much as 80 feet in other areas. The greatest decreases generally coincided with areas where irrigation wells were concentrated.

The significance of water-level declines in relation to ground-water storage is best illustrated by the percentage decrease of saturated thickness. For example, a water-level decline of 25 feet in an area where the saturated thickness was 200 feet would result in a decrease of 12 percent and would have little effect on well yields. A similar water-level decline of 25 feet in an area where saturated thickness was 50 feet would result in a decrease of 50 percent and probably would cause a significant reduction in well yields. Percentage decreases in saturated thickness of the unconsolidated aquifer from 1950 to 1979 in west-central Kansas range from about 0 to 80 percent.

The map showing percentage decreases in saturated thickness (pl. 2) was constructed from data given in previous reports (see Selected References) and unpublished maps of the water table in 1950 and 1979, the altitude and configuration of the bedrock surface, the saturated thickness of the unconsolidated aquifer in 1979, and the water-level decline from 1950 to 1979. Selected data points are used as control where bedrock altitudes are known and both 1950 and 1979 water-table data are available.

#### SELECTED REFERENCES

- Gutentag, E. D., and Stullken, L. E., 1976, Ground-water resources of Lane and Scott Counties, western Kansas: Kansas Geological Survey Irrigation Series No. 1, 37 p.
- McClain, T. J., Jenkins, E. D., Keene, K. M., and Pabst, M. E., 1975, Water resources of Gove, Logan, and Wallace Counties, west-central Kansas: U.S. Geological Survey Hydrologic Investigations Atlas HA-521.
- Pabst, M. E., 1978, Map showing percentage decrease in saturated thickness of unconsolidated aquifer, 1950-78, in west-central Kansas: U.S. Geological Survey Open-File Report 78-874, 1 pl.
- \_\_\_\_\_, 1979, January 1979 water levels, and data related to water-level changes since 1940 or 1950, western Kansas: U.S. Geological Survey Open-File Report 79-925, 213 p.
- Slagle, S. E., and Weakly, E. C., 1976, Ground-water resources of Greeley and Wichita Counties, western Kansas: Kansas Geological Survey Irrigation Series No. 2, 21 p.