

GENERAL DESCRIPTION

The High Plains aquifer in Oklahoma is part of a regional aquifer system extending from South Dakota on the north through Wyoming, Colorado, Nebraska, Kansas, and Oklahoma to Texas and New Mexico on the south (index map). The principal aquifer, the Ogallala Formation of Tertiary age, is hydraulically connected with other unconsolidated deposits, principally of Quaternary age. Alluvium and terrace deposits hydraulically connected with the Ogallala are included in the High Plains aquifer in Oklahoma. Parts of the underlying bedrock also are hydraulically connected with the Ogallala. The High Plains aquifer in Oklahoma has been removed by erosion on the west exposing underlying rocks of Cretaceous age and on the east exposing rocks of Permian age.

During 1978, the U.S. Geological Survey began a 5-year study of the High Plains regional aquifer system to provide hydrologic information for evaluation of the effects of its long-term development and to develop and evaluate computer models for simulation of aquifer response to alternative changes in ground-water management (Weeks, 1978). This report is one of a series presenting hydrologic information on the High Plains aquifer in Oklahoma.

The altitude and configuration of the water table are shown for the eastern area (sheet 1) and for the Panhandle area (sheet 2). In the eastern area, consisting of Harper, Ellis, Woodward, Dewey, and Roger Mills Counties, water levels measured from the 1950's to the 1970's represent predevelopment conditions and were obtained from published and unpublished data in the files of the U.S. Geological Survey. In the Panhandle, predevelopment contours were based on measurements made from 1937 to 1940. Some water levels in Beaver County were measured as late as 1959 in areas where significant development had not occurred previously.

The water table generally sloped from west to east at an average rate of about 14 feet per mile. The altitude of the water table ranged from about 4,650 feet in Cimarron County to about 1,950 feet in Woodward County. Ground-water moves perpendicular to the water-table contours from higher to lower altitudes. Where contours cross stream valleys, an upstream flexure of the contour indicates a gaining reach of the stream; ground water is discharging to the stream. Contours crossing a stream valley without flexure generally indicate that the water table is below the streambed.

The water table in some areas of bedrock high was in hydraulic connection with the adjacent High Plains aquifer and the water table continued across the bedrock areas without interruption.

CONVERSION TABLE

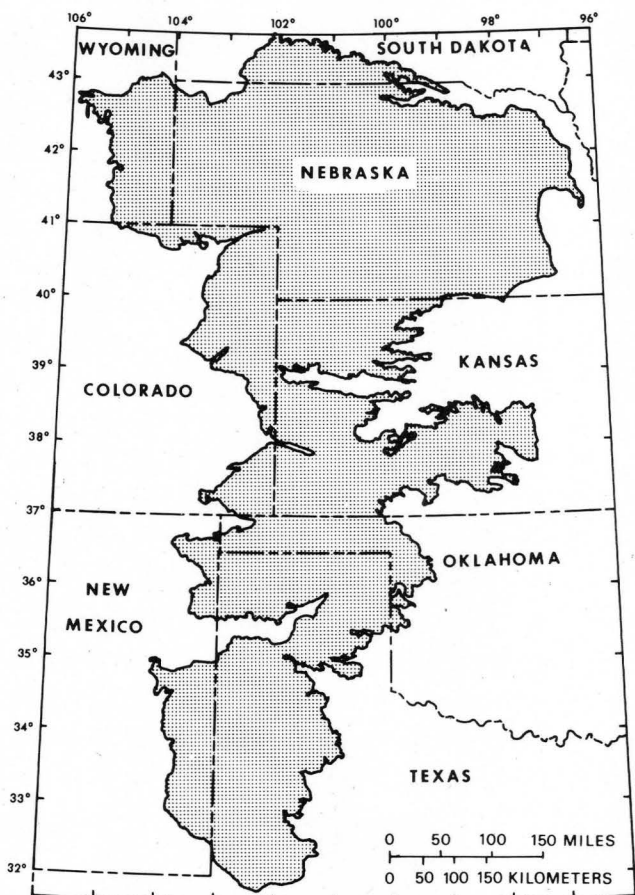
CONVERSION TABLE

The inch-pound units of measurements given in this report are listed with equivalent International System (SI) of Units using the following conversion factors:

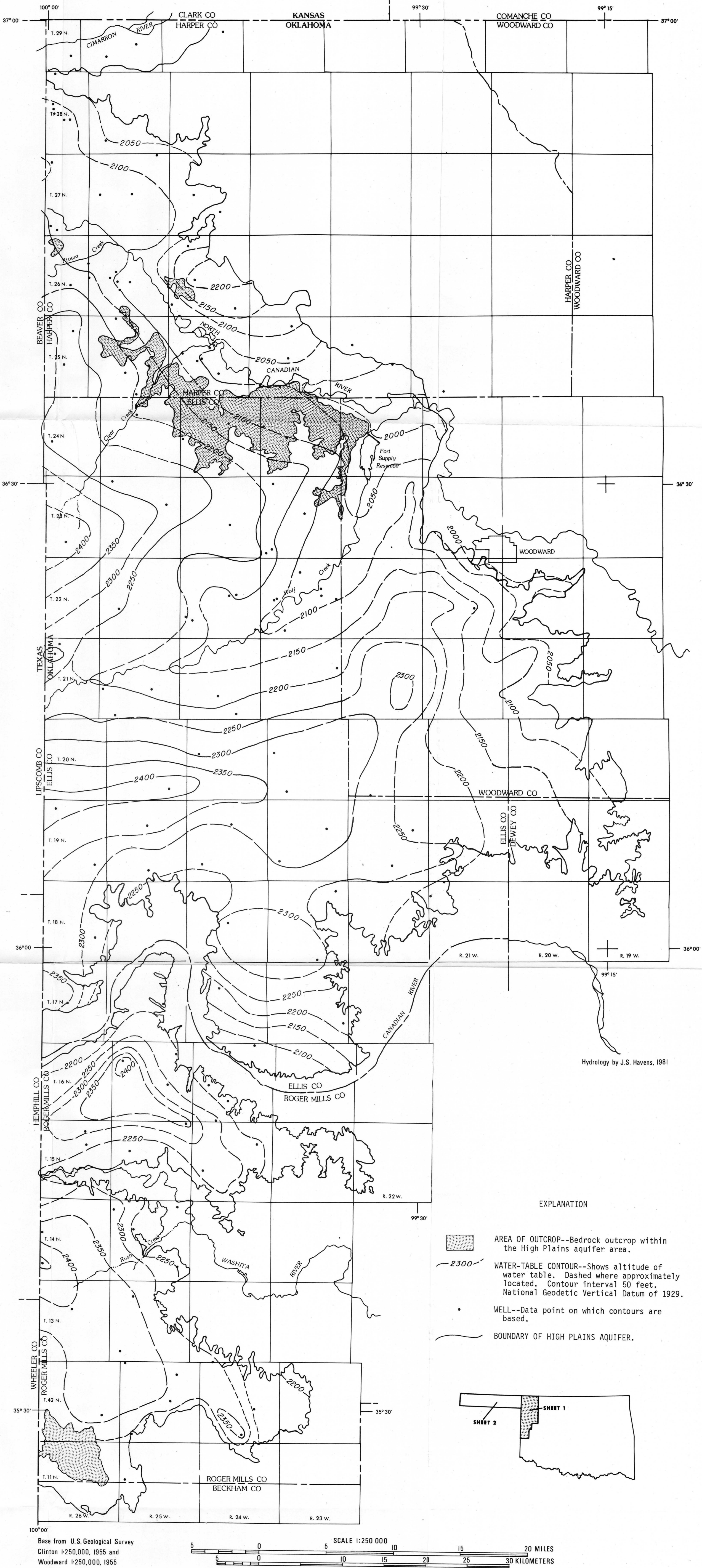
Inch-pound unit	Multiply by	SI (metric) unit
foot	0.3048	meter
mile	1.609	kilometer
foot per mile	0.1894	meter per kilometer

SELECTED REFERENCES

- Goemaat, R. L., 1977, Ground-water levels in observation wells in Oklahoma, 1950-75: U.S. Geological Survey Open-File Report 77-73, 94 p.
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- Hart, D. L., Jr., Hoffman, G. L., and Goemaat, R. L., 1975, Geohydrology of the Oklahoma Panhandle, Beaver, Cimarron, and Texas Counties: U.S. Geological Survey Water-Resources Investigations 25-75, 62 p.
- Havens, John S., 1982a, Generalized altitude and configuration of the base of the High Plains regional aquifer, northwestern Oklahoma: U.S. Geological Survey Water-Resources Investigations 81-1117, scale 1:250,000, 2 sheets.
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- Marine, I. W., and Schoff, S. L., 1962, Ground-water resources of Beaver County, Oklahoma: Oklahoma Geological Survey Bulletin 97, 74 p.
- Pabst, M. E., and Stulken, L. E., 1982, Altitude and configuration of the water table in the High Plains aquifer of Kansas, pre-1950: U.S. Geological Survey Water-Resources Investigations 82-117, scale 1:250,000, 3 sheets.
- Schoff, S. L., 1939, Geology and ground-water resources of Texas County, Oklahoma: Oklahoma Geological Survey Bulletin 59, 248 p.
- 1943, Geology and ground-water resources of Cimarron County, Oklahoma, with a section on Mesozoic stratigraphy by J. W. Stovall: Oklahoma Geological Survey Bulletin 64, 317 p.
- Weeks, J. B., 1978, Plan of study for the High Plains regional aquifer systems analysis in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Water-Resources Investigations 78-70, 28 p.
- Wood, P. R., and Stacy, B. L., 1965, Geology and ground-water resources of Woodward County, Oklahoma: Oklahoma Water Resources Board Bulletin 21, 114 p.



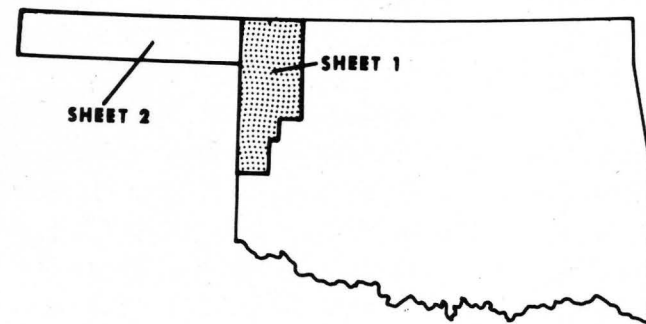
Index map showing location of the High Plains aquifer (shaded)



Hydrology by J.S. Havens, 1981

EXPLANATION

- AREA OF OUTCROP--Bedrock outcrop within the High Plains aquifer area.
- WATER-TABLE CONTOUR--Shows altitude of water table. Dashed where approximately located. Contour interval 50 feet. National Geodetic Vertical Datum of 1929.
- WELL--Data point on which contours are based.
- BOUNDARY OF HIGH PLAINS AQUIFER.



Base from U.S. Geological Survey
Clinton 1:250,000, 1955 and
Woodward 1:250,000, 1955

SCALE 1:250 000
0 5 10 15 20 MILES
0 5 10 15 20 25 30 KILOMETERS

MAP SHOWING ALTITUDE AND CONFIGURATION OF THE PREDEVELOPMENT WATER TABLE
IN THE HIGH PLAINS REGIONAL AQUIFER IN ELLIS, WOODWARD, DEWEY, AND ROGER
MILLS COUNTIES, OKLAHOMA

ALTITUDE AND CONFIGURATION OF THE PREDEVELOPMENT WATER TABLE
IN THE HIGH PLAINS REGIONAL AQUIFER, NORTHWESTERN OKLAHOMA

By
John S. Havens
1982