

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 in hydrologic continuity 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 eroded 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 long-term development of the aquifer and to develop a capability for predicting 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, consisting of Harper, Ellis, Woodward, Dewey, and Roger Mills Counties (sheet 1), and for the Panhandle area, consisting of Cimarron, Texas, and Beaver Counties (sheet 2). Water levels were measured in January, February, and March 1980 by the Oklahoma Water Resources Board.

The water table generally slopes from west to east at an average rate of about 14 feet per mile. The altitude of the water table ranges from about 4,650 feet in Cimarron County to about 2,000 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 lies below the streambed. A downstream flexure of the contour indicates a losing reach of the stream.

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

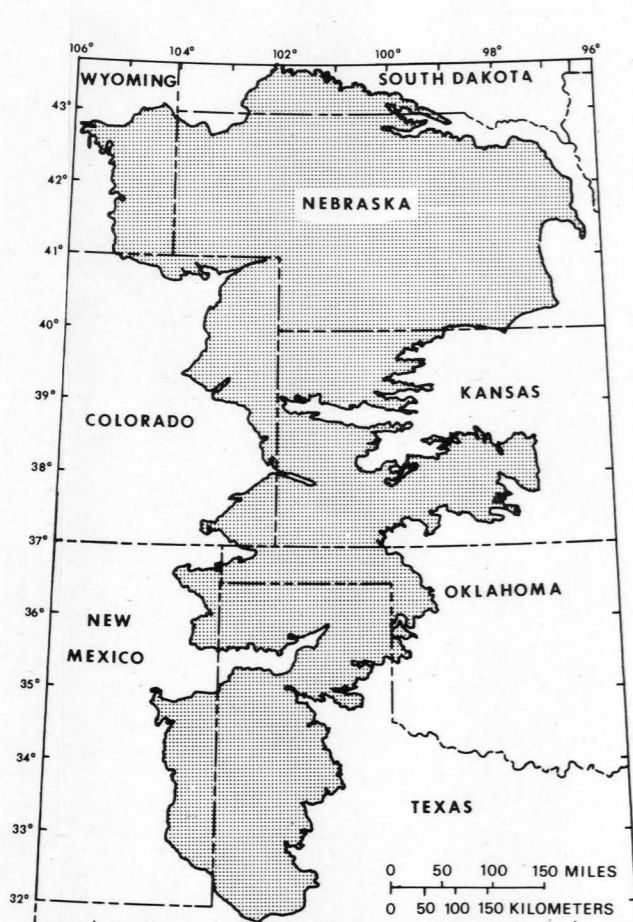
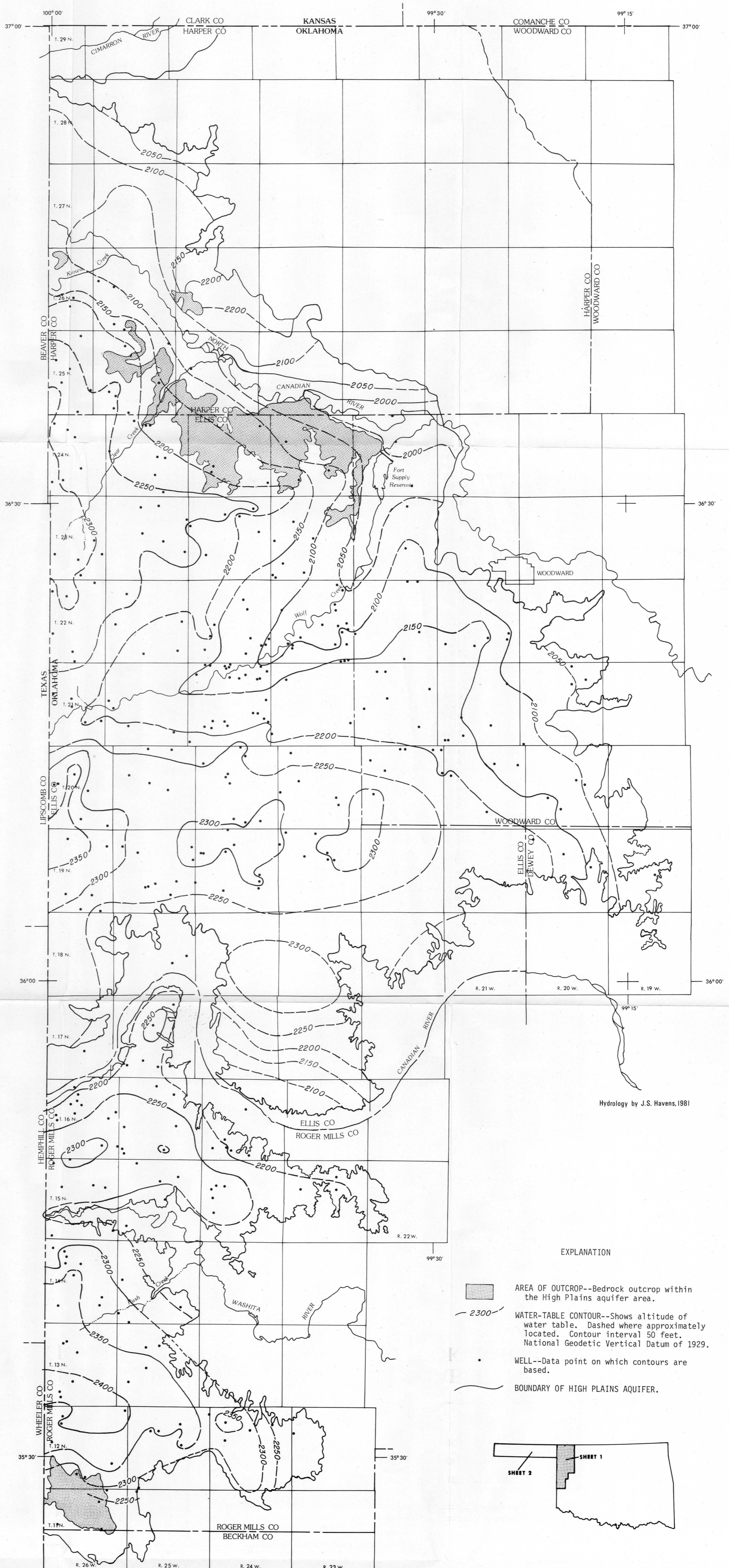
CONVERSION TABLE

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 |

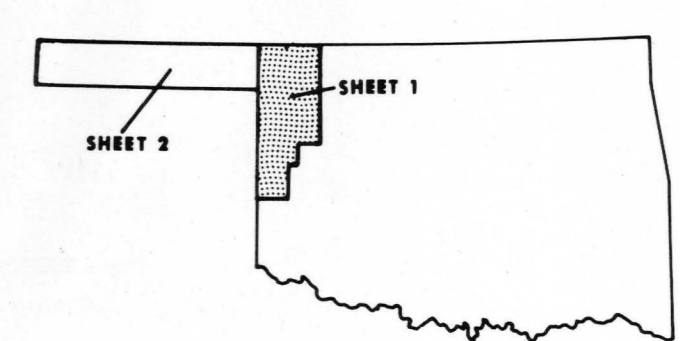
SELECTED REFERENCES

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- 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.
- 1982b, Altitude and configuration of the predevelopment water table in the High Plains regional aquifer, northwestern Oklahoma: U.S. Geological Survey Water-Resources Investigations 82-275, scale 1:250,000, 2 sheets.
- Mills, W. B., and Spiser, D. E., 1980, Selected water-level records for Oklahoma, 1979-80: U.S. Geological Survey Open-File Report 80-975, 55 p.
- Pabst, M. E., and Stulken, L. E., 1981, Altitude and configuration of the water table in the High Plains aquifer in Kansas, 1980: U.S. Geological Survey Water-Resources Investigations 81-1004, scale 1:250,000, 3 sheets.
- 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.



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

- 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 25 30 MILES
0 5 10 15 20 25 30 KILOMETERS

MAP SHOWING ALTITUDE AND CONFIGURATION OF THE 1980 WATER TABLE
IN THE HIGH PLAINS REGIONAL AQUIFER IN HARPER, ELLIS,
WOODWARD, DEWEY, AND ROGER MILLS COUNTIES, OKLAHOMA

**ALTITUDE AND CONFIGURATION OF THE 1980 WATER TABLE
IN THE HIGH PLAINS REGIONAL AQUIFER, NORTHWESTERN OKLAHOMA**
By
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