



GENERAL DESCRIPTION

The High Plains aquifer in Kansas is part of a regional aquifer system that extends into Colorado, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. The aquifer in Kansas, which underlies an area of 31,000 square miles in the western and south-central part, is a hydraulically connected assemblage of unconsolidated water-bearing deposits of alluvial origin. In western Kansas, the aquifer consists of the Ogallala Formation of late tertiary age overlain by deposits of Quaternary age. In south-central Kansas, the aquifer consists principally of unconsolidated deposits of Quaternary age. The High Plains aquifer is delimited on the east by outcrops of Permian or Cretaceous rocks and by unsaturated deposits of Quaternary age.

The U.S. Geological Survey began a 5-year study of the High Plains regional aquifer during 1978 to provide: (1) hydrologic information for evaluating the effects of continued ground-water development and (2) computer models for predicting aquifer response to changes in ground-water development. This report is one of a series that presents hydrologic information on the aquifer in Kansas.

The generalized altitude and configuration of the base of the High Plains aquifer in Kansas are shown. Data used in preparing the map include altitudes from published reports (see "Selected References"), depth-to-bedrock data from records of the Kansas Department of Health and Environment, and altitudes of the base of the Ogallala Formation at the outcrop.

The surface depicted on the map represents an unconformable contact between the unconsolidated deposits of Tertiary and Quaternary age and the underlying consolidated rocks of Permian, Cretaceous, and Jurassic age. This surface is a composite of several post-Cretaceous erosion surfaces (Merritt and Frye, 1954), which have been modified and affected by structural features and collapse structures. Dissolution of underlying Permian evaporites by ground water has been a significant factor in the development of subsidence and faulting of the bedrock surface in southwestern Kansas (Gutentag and others, 1980) and subsidence in south-central Kansas (Williams and Lohman, 1949).

The regional gradient of the base of the aquifer is approximately 10 feet per mile, but the local gradient exceeds 100 feet per mile in the vicinity of the Bear Creek fault (Hamilton and Kearny Counties), the Crows Creek-Fowler fault (Meade County), and other buried erosional features and collapse structures.

Three levels of contour reliability were recognized based on the density of data used in preparing the base-of-aquifer map. Contours identified as type 1 are considered to be well-controlled by data and accurately represent the altitude at the base of the aquifer within ± 25 feet (one-half contour interval). Type-1 contours generally coincide with areas in which ground water has been developed extensively for irrigation use. Contours identified

as type 2 are based on data-point density of one per township or less, and the accuracy is somewhat reduced. Contours identified as type 3 are based on a small amount of data and are considered to be speculative. Type-3 contours generally occur in "fringe areas" near the edge of the aquifer where there is little saturated thickness and limited potential for ground-water development.

CONVERSION TABLE

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

Inch-pound unit	Multiply by	SI unit
foot	0.3048	meter
mile	1.609	kilometer
square mile	2.590	square kilometer
foot per mile	0.1894	meter per kilometer

The National Geodetic Vertical Datum of 1929 (NGVD) is a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada. NGVD of 1929 refers to sea level in this report.

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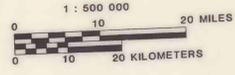
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EXPLANATION

- AREA OF BEDROCK OUTCROP WITHIN AQUIFER BOUNDARY
- BASE OF AQUIFER CONTOUR—Shows altitude of base of aquifer. Solid where accurately located (type 1); long dash where approximately located (type 2); and short dash where location is speculative (type 3). Contour interval 50 feet. National Geodetic Vertical Datum of 1929
- BOUNDARY OF HIGH PLAINS AQUIFER
- FAULT—U, upthrown side; D, downthrown side



Geology by K. R. Watts, 1970, modified in part from Bayne and Ward (1974), Fader and Stullken (1978), Frye and Leonard (1949), Gutentag and Stullken (1976), Gutentag, Lohmeyer, and Slagle (1980), Holston (1965), Latta (1950), McClain and others (1975), McLaughlin (1949), Pearl and others (1972), Prescott (1955), Slagle and Weakly (1976), Waite (1942), and Williams and Lohman (1949)

GENERALIZED CONFIGURATION OF THE BASE OF THE HIGH PLAINS AQUIFER IN KANSAS

By  
K.R. Watts and L.E. Stullken  
1981

Base from U.S. Geological Survey State base map, 1963