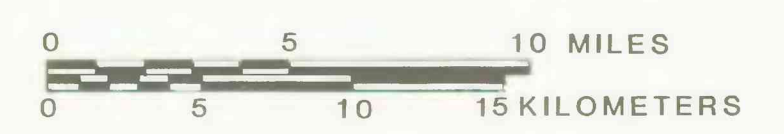


Geology modified from Pearl and others (1972)  
and from Watts and Stullken (1981)

**EXPLANATION**

— 2300 — **BASE-OF-AQUIFER CONTOUR**— Shows altitude of aquifer base. Dashed where approximately located. Contour interval 50 feet. National Geodetic Vertical Datum of 1929

— — — **BOUNDARY OF REPUBLICAN RIVER BASIN**



Base from U.S. Geological Survey  
1:250,000 quadrangles; Beloit, 1955-70;  
Goodland, 1954

**MAP SHOWING ALTITUDE AND CONFIGURATION OF BASE OF PRINCIPAL AQUIFERS, WESTERN PART OF REPUBLICAN RIVER BASIN**

**GEOHYDROLOGY OF PRINCIPAL AQUIFERS IN THE REPUBLICAN RIVER BASIN, KANSAS**

BY  
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**INTRODUCTION**

This report summarizes information from a reconnaissance study of the geohydrology of the principal aquifers in the Republican River basin in Kansas. The study was made, in cooperation with the U.S. Bureau of Reclamation, to provide information for use in a water-management study of the basin.

**GEOHYDROLOGY**

The principal aquifers in the study area occur in unconsolidated deposits of the Ogallala Formation, the Grand Island Formation, and the Quaternary alluvium. The unconsolidated materials consist chiefly of alluvial sediments that have been deposited on eroded surfaces of consolidated Permian and Cretaceous rocks. Sand and gravel aquifers within the deposits provide a major source of water for most uses in a large part of the Republican River basin in Kansas.

**Physical Description**

The Ogallala Formation of the Miocene age was deposited by streams throughout most of western and central Kansas. Layers of arkosic sand and gravel, interbedded with silt and clay, filled valleys in the bedrock and overtopped ridges. Alluvial deposits are thickest in the western part of the basin, may be as much as 320 feet in some buried valleys

(Pearl and others, 1972), and generally are thinnest to the east. The surface of the deposits forms a gentle eastward-sloping plane. The base of the aquifer in the Ogallala Formation is formed by the northeast-trending ridges and valleys of the bedrock surface, as shown on sheet 1. Altitudes on the base of the aquifer range from 3,700 feet in southwest Sherman County to about 2,000 feet in the Prairie Dog Creek valley in northwest Phillips County, an average slope of 12 to 13 feet per mile. A closed depression, as shown on the map, probably indicates dissolution and collapse of the underlying bedrock.

The Grand Island Formation of Pleistocene age was deposited in an ancestral channel of the Republican River that previously crossed through northeastern Jewell County and northwestern Republic County (Fisher, 1948; Fisher and Leonard, 1955), as shown on sheet 2. The western extent of the channel deposits in Jewell County is not known. Layers of coarse sand and medium-to-coarse gravel interbedded with silty clay, derived mostly from the Ogallala formation, partly refilled the channel. Thicknesses of the deposits are as much as 120 feet. In the present valley of the Republican River, erosion has removed part or all of the Grand Island Formation. The base of the aquifer in the formation, where it occurs, is formed by the bedrock surface underlying the ancestral channel, as shown on sheet 2.

Alluvial sediments of Pleistocene and Holocene age (collectively termed Quaternary alluvium) were deposited in most

of the major stream valleys in the basin. In the western part, stream channels had been eroded into or through the Ogallala Formation. These channels were partly refilled with interbedded gravel, sand, silt, and clay that were derived principally from the Ogallala. Thicknesses of the deposits may be as much as 85 feet (Pearl and others, 1972). In some areas, the base of the aquifer in the Quaternary alluvium overlies and functions as a single unit with the aquifer in the Ogallala Formation. In other areas, such as the downstream parts of valleys along the South Fork Republican River and Beaver, Sappa, and Prairie Dog Creeks, the base of the aquifer is formed by the surface of the bedrock underlying the channel, as shown on sheet 1.

In the eastern part of the basin, Quaternary alluvium was deposited in channels that had been eroded into bedrock by the Republican River and its major tributaries. These deposits consist of silty clay interbedded with layers of coarse sand and medium-to-coarse gravel derived partly from the limestone and sandstone layers in the bedrock. Thicknesses of the alluvium in the valley of the Republican River are as much as 130 feet (Bayne and Walters, 1959). The base of the aquifer in the Quaternary alluvium is formed by the surface of the underlying bedrock, as shown on sheet 2. Altitudes on the base of the aquifer range from about 1,450 feet in northwest Republic County to about 1,050 feet near the downstream end of Milford Reservoir near Junction City, an average slope of about 5 feet per mile.