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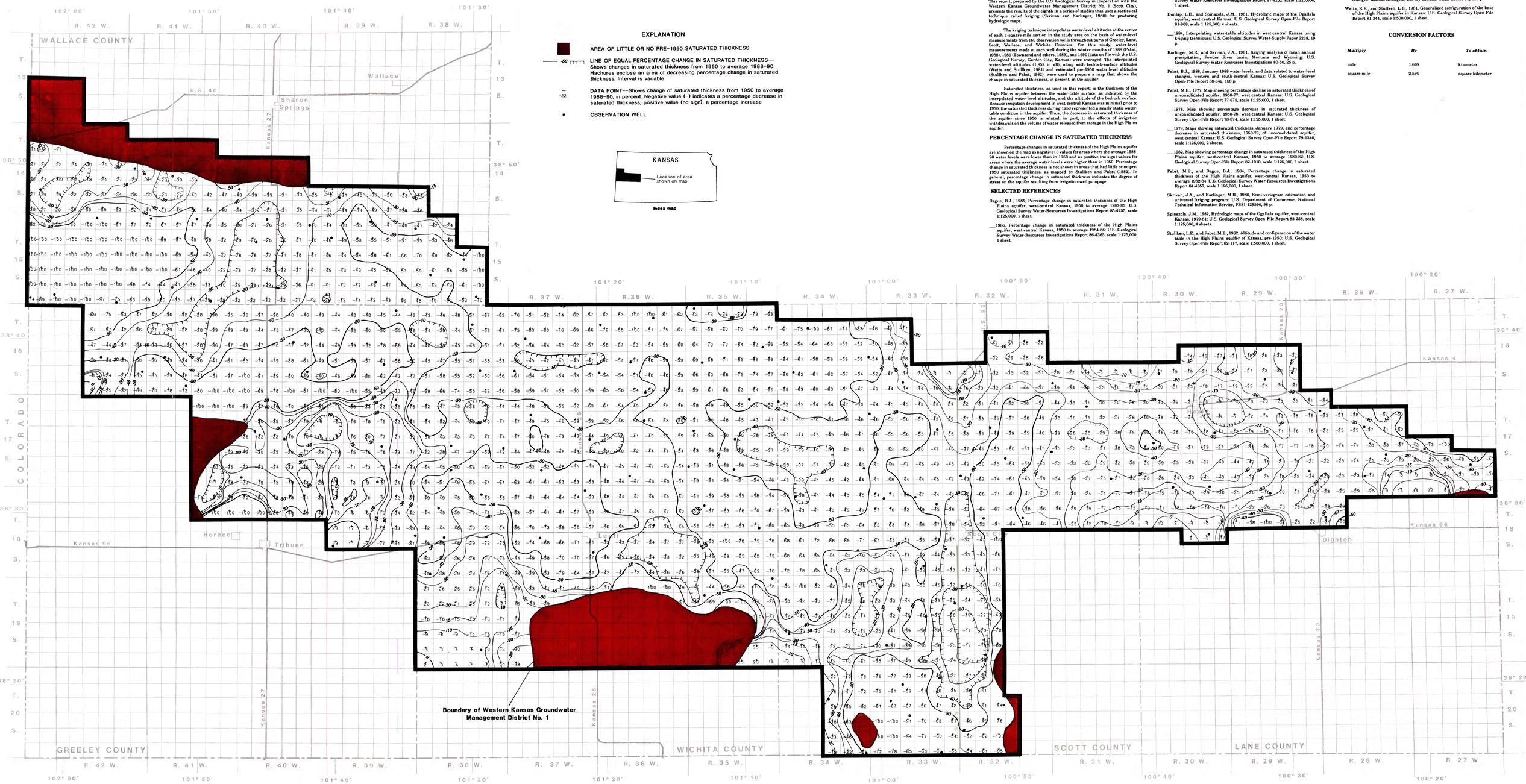
WESTERN KANSAS GROUNDWATER MANAGEMENT DISTRICT NO. 1

WATER-RESOURCES INVESTIGATIONS
REPORT 91-4008



Base from digital plot of Lambert conformal conic projection, U.S. Geological Survey, 1:500,000, 1984

SCALE 1:125,000
0 2 4 6 MILES
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PERCENTAGE CHANGE IN SATURATED THICKNESS OF THE HIGH PLAINS AQUIFER, WEST CENTRAL KANSAS, 1950 TO AVERAGE 1988-90

By

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INTRODUCTION

Ongoing studies in west-central Kansas provide up-to-date information that is useful in the management of ground water for irrigation. This report, prepared by the U.S. Geological Survey in cooperation with the Western Kansas Groundwater Management District No. 1 (Scott City), presents the results of the eighth in a series of studies that uses a statistical technique called kriging (Skrivan and Karlinger, 1980) for producing hydrologic maps.

The kriging technique interpolates water-level altitudes at the center of each 1-square-mile section in the study area on the basis of water-level measurements from 160 observation wells throughout parts of Greeley, Lane, Scott, Wallace, and Wichita Counties. For this study, water-level measurements made at each well during the winter months of 1988 (Pabst, 1988), 1989 (Townsend and others, 1989), and 1990 (data on file with the U.S. Geological Survey, Garden City, Kansas) were averaged. The interpolated water-level altitudes (1,859 in all), along with bedrock-surface altitudes (Watts and Stullken, 1981) and estimated pre-1950 water-level altitudes (Stullken and Pabst, 1982), were used to prepare a map that shows the change in saturated thickness, in percent, in the aquifer.

Saturated thickness, as used in this report, is the thickness of the High Plains aquifer between the water-table surface, as indicated by the interpolated water-level altitudes, and the altitude of the bedrock surface. Because irrigation development in west-central Kansas was minimal prior to 1950, the saturated thickness during 1950 represented a nearly static water-table condition in the aquifer. Thus, the decrease in saturated thickness of the aquifer since 1950 is related, in part, to the effects of irrigation withdrawals on the volume of water released from storage in the High Plains aquifer.

PERCENTAGE CHANGE IN SATURATED THICKNESS

Percentage changes in saturated thickness of the High Plains aquifer are shown on the map as negative (-) values for areas where the average 1988-90 water levels were lower than in 1950 and as positive (no sign) values for areas where the average water levels were higher than in 1950. Percentage change in saturated thickness is not shown in areas that had little or no pre-1950 saturated thickness, as mapped by Stullken and Pabst (1982). In general, percentage change in saturated thickness indicates the degree of stress on the aquifer resulting from irrigation-well pumpage.

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CONVERSION FACTORS

Multiply	*By*	*To obtain*
mile	1.609	kilometer
square mile	2.590	square kilometer