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# GROUND WATER IN THE REPUBLICAN RIVER BASIN IN NEBRASKA

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## PART I NUCKOLLS, WEBSTER, FRANKLIN AND HARLAN COUNTIES

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Prepared by the Conservation and Survey Division of the  
University of Nebraska, the United States Geological Survey  
and the Bureau of Irrigation, Water Power and Drainage  
of the Nebraska Department of Roads and Irrigation

NEBRASKA WATER RESOURCES SURVEY  
WATER SUPPLY PAPER 1

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bottom land and terrace region, shown by means of shaded patterns on the county map, and (3) a geologic profile section in each county based on the test-drilling information. The description of materials drilled in the test holes is in driller's terminology and does not constitute, necessarily, an exact geologic description.

Interested parties can make use of these data advantageously in the following manner: The probable nature and thickness of materials underlying a specific piece of land can be approximated by studying the shaded areas on the map and by examining the logs of nearby test holes drilled in similar topographic positions, keeping in mind differences in surface elevation. If the land is situated in the upland outside of the valley, logs of nearby upland test holes can be used as a guide, provided that allowances are made for differences in surface elevation and variations in texture and slope of the water-bearing material.

The maps may be used in the following manner: If the land in question is located in an area shown on the map as underlain by a relatively thin, water-filled formation, the chances of obtaining high-capacity wells are less than in areas shown as underlain by a relatively thick water-filled formation. Thus, locations on the farm may be selected that are more favorable from a water-production standpoint.

The contours on the top of the relatively impervious Cretaceous bedrock theoretically connect points of equal elevation on the top of this buried surface and thus outline buried channels where the elevations are comparatively low and buried ridges where the elevations are comparatively high. As a general rule the thickest and coarsest sands and gravels occur near the middle of the buried channels.

All ground-water information shown on the maps is based on data obtained from test drilling and is therefore more accurate for land adjacent to closely-spaced test holes and less accurate for areas where the test holes are situated farther apart.

The thicknesses of saturated water-bearing material shown on the county Ground-Water Maps have been computed from water levels measured in the test holes on the dates specified in the written logs. It is known that the water table fluctuates upward and downward depending upon the amounts of ground-water recharge and discharge. This seasonal fluctuation is usually less than a foot and rarely more than three to four feet. Therefore the thicknesses shown are probably accurate within a few feet at any time of the year.

The information included in this report is not designed to eliminate the necessity of drilling test holes prior to the installation of irrigation or other high-capacity wells, but it should be a guide toward the evaluation of possibilities. Many factors other than the thickness of the water-saturated material greatly affect the yields of the wells and the perennial supplies of ground water in any locality, including: (1) permeability of the water-bearing formation, (2) design and construction of the well and pumping equipment, (3) ease of recharge of the water-bearing formation from precipitation or from surface flow, and (4) amount, distribution and nature of precipitation and of surface flow.

If additional technical assistance and guidance is required the Conservation and Survey Division of the University of Nebraska is equipped to answer inquiries on specific problems providing location by legal description is accurately supplied.