

STATE OF SOUTH DAKOTA  
Nils Boe, Governor

SOUTH DAKOTA STATE GEOLOGICAL SURVEY  
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Water Information Circular 3

GLACIAL DRIFT AQUIFERS IN  
SANBORN COUNTY, SOUTH DAKOTA

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## INTRODUCTION

The purpose of this report is to acquaint the reader with the general location, quality, and amount of water in Sanborn County that is present in sand and gravel layers, called glacial drift aquifers. The map is not intended to be used in predicting exact conditions at any given point, but rather to give a general view of the ground-water conditions in the county. The information in this report when used with proper test drilling and test pumping may be useful for persons or groups who plan to use ground water for the house, livestock, irrigation, or municipal supplies. This circular is a supplement to a more detailed published report of the South Dakota Geological Survey (Geology and ground-water supplies in Sanborn County, South Dakota; S. Dak. Geol. Survey Bull. 17, 182 p., 1965). Copies of the above bulletin may be obtained from the South Dakota Geological Survey at Vermillion.

The map was drawn from information collected by the South Dakota Geological Survey and the United States Geological Survey during the summers of 1959-62, as part of the detailed geology and ground-water study of Sanborn County (see reference to Bulletin 17, above). Pumping tests were made at five places in the county shown by the points marked with "P" on the map. The purpose of these tests was to determine the amount of water available. Water from the pumping tests was analyzed to determine its quality. The information from the pumping tests is summarized in the table.

## THE AQUIFERS

The aquifers in Sanborn County are made up of sand and gravel that was washed into the county by water flowing from two melting glaciers which covered the area about 30,000 and 12,000 years ago. Sand and gravel deposited by meltwater from the older glacier is buried by glacial clay deposits. The sand and gravel derived from the last glacier is not buried, but lies at the surface near Woonsocket and west of Cuthbert along Morris Creek. The aquifers are mainly sand, but gravel layers are also present. Where the aquifers are at the surface, the water level may be from a few feet to 10 or 15 feet below the land surface. Water flows from wells completed in the buried aquifers in the east-central part of the county. Aquifers beneath the James Valley bottom land are mainly fine sand and silt, are thin, and probably would not produce enough water for irrigation wells. Sand point wells probably can be developed in most places on the bottom land in the James Valley.

The map shows the location of aquifers in the county. The blank areas on the map may be underlain by aquifers, but they are less than ten feet thick. Under ideal conditions, 8 to 10 feet of gravel is sufficient for an irrigation well, but the basic assumption used in preparing the map was that the greater the aquifer thickness, the better chance to develop a well, other factors being equal. Wells in the county range from 12 to 165 feet deep in the glacial drift aquifers. Water yields from 200 to 1,000 gallons

per minute and possibly as much as 1,500 gallons per minute can be obtained.

Water from the glacial drift aquifers is hard and normally contains moderately high amounts of dissolved solids. Generally, the water can be used for irrigation if soil and land-surface conditions are favorable. Water from the glacial drift aquifers has been used successfully for irrigation in the county.

Before an irrigation system is built, it is advisable to drill a test well to determine the thickness of the aquifer at the selected location. Samples of the aquifer material can be analyzed to determine grain size. This information will help the driller select the correct mesh and length of screen to be used in the irrigation well. The test well should be pumped for at least 72 hours to determine the water yield, and a sample of water should be collected for chemical analysis, to determine if it is suitable for the desired use. Analyses of the soil and subsoil, and examination of the surface contours are also important in determining the suitability of the land for irrigation, and in selecting the correct irrigation system.

Persons wishing additional information about the geology and hydrology of Sanborn County may contact the South Dakota Geological Survey in Vermillion, or the United States Geological Survey in Huron.

Table of pump test data.

Map Number	Well	Water-yielding Material	Thickness (feet)	Depth to Top of Aquifer (feet)	Total Depth (feet)	Diameter of Casing (inches)	Pumping Rate (gal. per min.)	Draw-down <sup>1/</sup> (feet)
P-1	Walter Brosnan NE $\frac{1}{4}$ sec. 17, T. 108 N., R. 61 W.	Clean, well-sorted, medium to fine sand	42	71	127	16	485	19
P-2	U. S. Geological Survey test well; NW $\frac{1}{4}$ sec. 29, T. 108 N., R. 59 W.	Well-sorted layers of fine gravel to medium sand	42	62	104	14	302	17
P-3	John Warren SE $\frac{1}{4}$ sec. 1, T. 107 N., R. 62 W.	Poorly-sorted gravel to silt	45	40	85	14	215	50
P-4	U. S. Geological Survey test well; SW $\frac{1}{4}$ sec. 7, T. 107 N., R. 58 W.	Well-sorted layers of fine gravel to coarse sand	53	45	117	14	796	18
P-5	Robert Threadgold SE $\frac{1}{4}$ sec. 13, T. 106 N., R. 59 W.	Coarse gravel to coarse sand	9	91	100	18	613	10

<sup>1/</sup> Drawdown calculated for the well pumping 500 gallons per minute for 10 days.

Map of Sanborn County,  
showing the location of  
**SHALLOW GROUND-WATER AQUIFERS  
WITH IRRIGATION POSSIBILITIES**

**EXPLANATION**

*This area is underlain by aquifers more than 25 feet thick; wells completed in this area may yield as much as 1,000 gallons per minute; water is generally good for irrigation use; pumping tests run on wells in this area.*



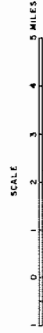
*This area is underlain by aquifers from 10 to 25 feet thick; wells completed in this area may yield from 500 to 1,000 gallons per minute; water is generally good for irrigation use; one pumping test run in this area.*



*This area may contain aquifers less than 10 feet thick; moderate to high yield wells may be developed in this area, but much of the area probably has no aquifer; no pumping tests run in this area.*



P-1 • Location of pump test well.



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