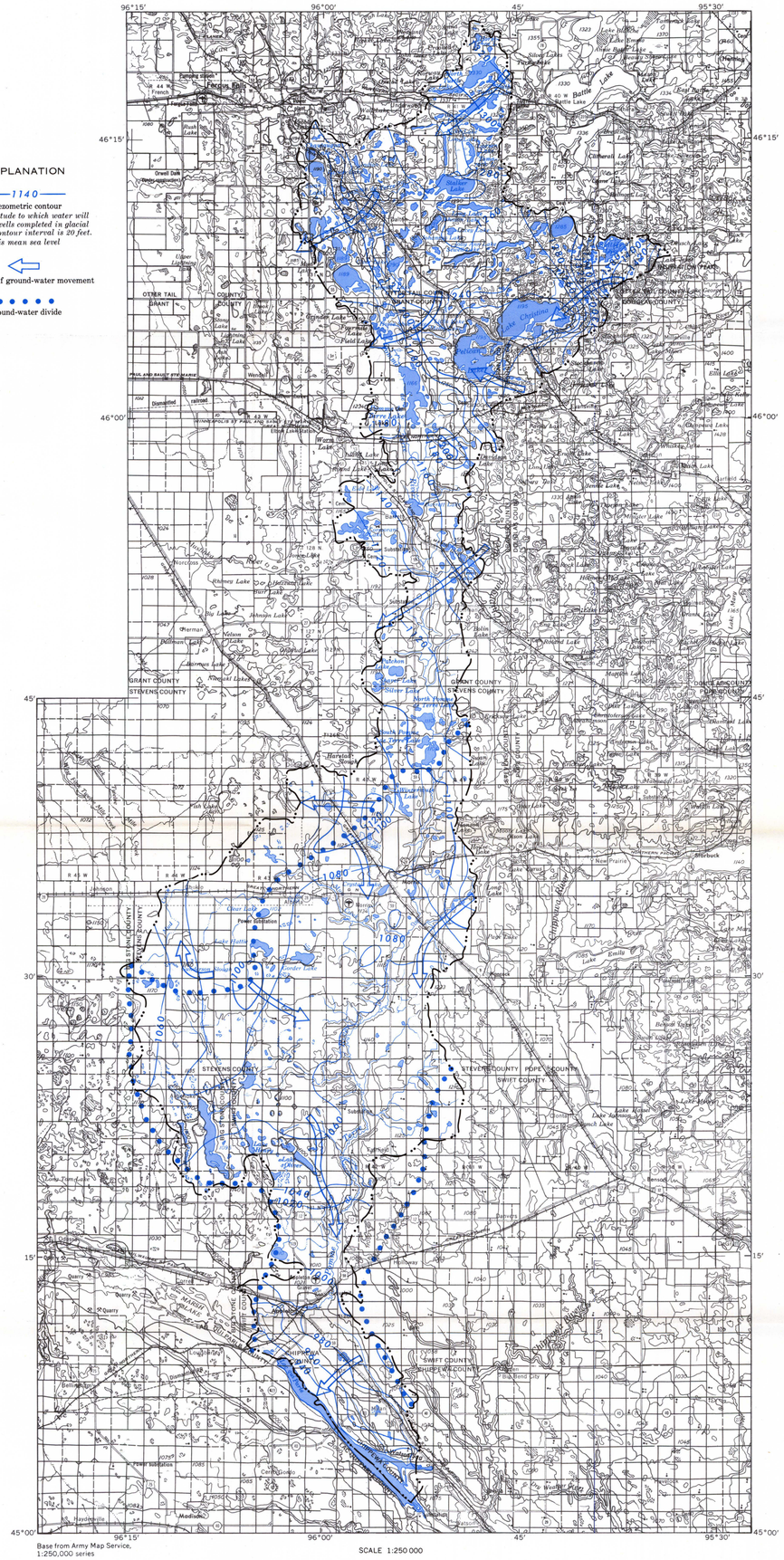
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE MINNESOTA DEPARTMENT OF CONSERVATION
DIVISION OF WATERS

HYDROLOGIC INVESTIGATIONS
ATLAS HA-220 (SHEET 2 OF 4)

GROUND WATER



THE PIEZOMETRIC MAP SHOWS THAT GROUND-WATER FLOW IS FROM NORTHEAST TO SOUTHWEST IN THE NORTHERN PART OF THE WATERSHED, AND GENERALLY SOUTH IN THE SOUTHERN PART.—*The two parts are separated by a ground-water divide which is coincident with an area of relatively thin glacial drift. The ground-water divide flanking the southern part approximates the surface-water divide. Ground water discharges into the Pomme de Terre River throughout its length*

EXPLANATION

AQUIFERS	Number of wells with reported yields	Average depth (feet)	Maximum yield (gallons per minute)	Average yield (gallons per minute)	Median yield (gallons per minute)	Number of wells with reported specific capacities	Maximum specific capacity[1]	Average specific capacity[1]	Median specific capacity[1]	Relative water-yielding capacity
GLACIAL DRIFT										
Area underlain by ice-contact sand and gravel, 20–250 feet thick. Outline based on topography and confirmed in some places by drill logs	23	124	1500	96	12	3	280	100	-	Good
Area probably underlain by ice-contact sand and gravel, thickness unknown. Outline based on topography and unconfirmed										
Area underlain by outwash sand and gravel, valley fill 20–100 feet thick. Outline based on topography and confirmed in some places by drill logs	14	60	700	184	14	6	28	18	19	Good
Area probably underlain by outwash sand and gravel; valley fill, thickness unknown. Outline based on topography and unconfirmed										
Area underlain by silty outwash sand and gravel, 20–90 feet thick. Outline based on topography and confirmed by drill logs	23	57	600	50	6	20	24	5	2	Fair
Area in which glacial drift contains thin sand and gravel lenses. These lenses may occur at any depth within the drift, but in one area there is a concentration of lenses between 1,030 and 1,050 feet of altitude. Pattern shows area where wells completed between 1,030 and 1,050 feet	238	133	400	24	6	65	22	3	1	Fair
BEDROCK										
Area between these boundaries is the approximate area underlain by Cretaceous rocks. These rocks are mostly shale but in places include thin beds of sandstone. Outline based on 18 wells in and near the watershed	2	192	75	39	-	1	.1	-	-	Poor
Precambrian crystalline rocks which underlie entire watershed	2	270	50	22	-	0	-	-	-	Poor

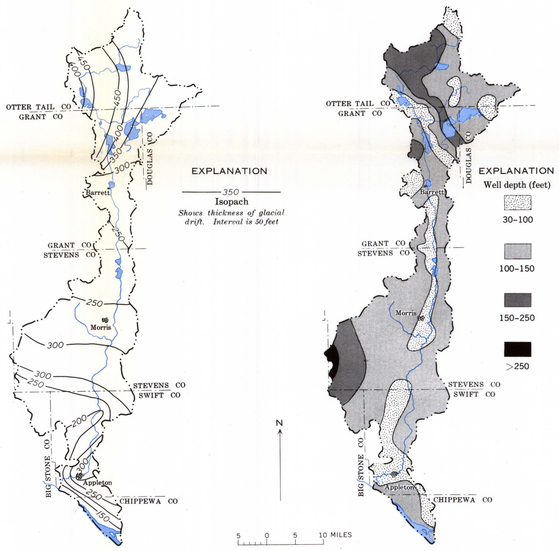
[1] Specific capacities have a maximum pumping period of 24 hours

Contact
Dashed where approximately located

Well location

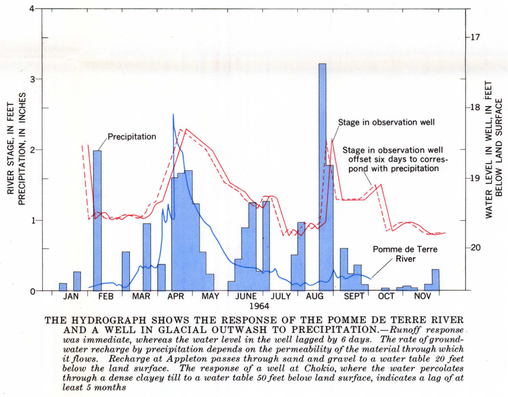
Test hole location

Note
The data presented on this map are based on records of 589 wells and testholes

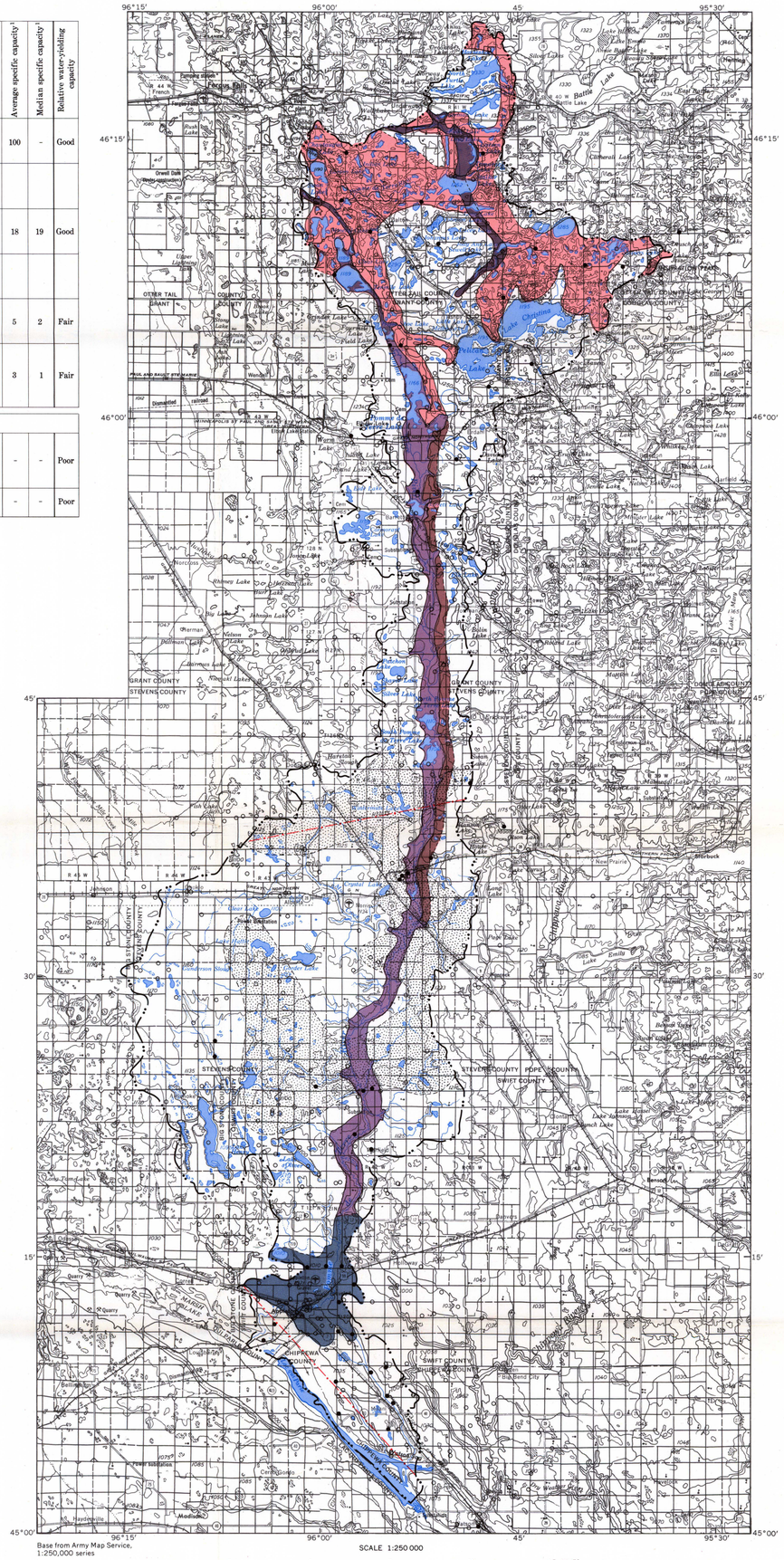


THICK GLACIAL DRIFT ENHANCES THE AVAILABILITY OF GROUND WATER.—*There is greater probability of a well producing more ground water where the drift is thickest because the well would probably penetrate more lenses of sand and gravel and the upper 20 to 80 feet of the drift is saturated*

DEPTH OF WELLS COMPLETED IN GLACIAL DRIFT IS DIVIDED INTO FOUR GROUPS.—*The shallow wells are generally in areas of outwash and ice-contact sand and gravel, and the deepest wells are in areas of thick drift*



THE HYDROGRAPH SHOWS THE RESPONSE OF THE POMME DE TERRE RIVER AND A WELL IN GLACIAL OUTWASH TO PRECIPITATION.—*Runoff response was immediate, whereas the water level in the well lagged by 6 days. The rate of ground-water recharge by precipitation depends on the permeability of the material through which it flows. Recharge at Appleton passes through sand and gravel to a water table 20 feet below the land surface. The response of a well at Chokio, where the water percolates through a dense clayey till to a water table 50 feet below land surface, indicates a lag of at least 5 months*



WATER CAN BE OBTAINED ALMOST ANYWHERE IN THE WATERSHED FROM A WELL COMPLETED IN GLACIAL DRIFT.
The Cretaceous and Precambrian rocks underlying the drift are poor aquifers and few wells are completed in them

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1966—W66120

WATER RESOURCES OF THE POMME DE TERRE RIVER WATERSHED, WEST-CENTRAL MINNESOTA

By
R. D. Cotter and L. E. Bidwell

1966