



HW4

# Water Resources Data Minnesota Water Year 1983

## Volume 2. Upper Mississippi and Missouri River Basins



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MN-83-2  
Prepared in cooperation with the Minnesota Department of  
Natural Resources, Division of Waters; the Minnesota  
Department of Transportation; and with other State,  
municipal, and Federal agencies

# CALENDAR FOR WATER YEAR 1983

1982

## OCTOBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

## NOVEMBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

## DECEMBER

S	M	T	W	T	F	S
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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1983

## JANUARY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

## FEBRUARY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
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27	28					

## MARCH

S	M	T	W	T	F	S
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## APRIL

S	M	T	W	T	F	S
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## MAY

S	M	T	W	T	F	S
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

## JUNE

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
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19	20	21	22	23	24	25
26	27	28	29	30		

## JULY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

## AUGUST

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

## SEPTEMBER

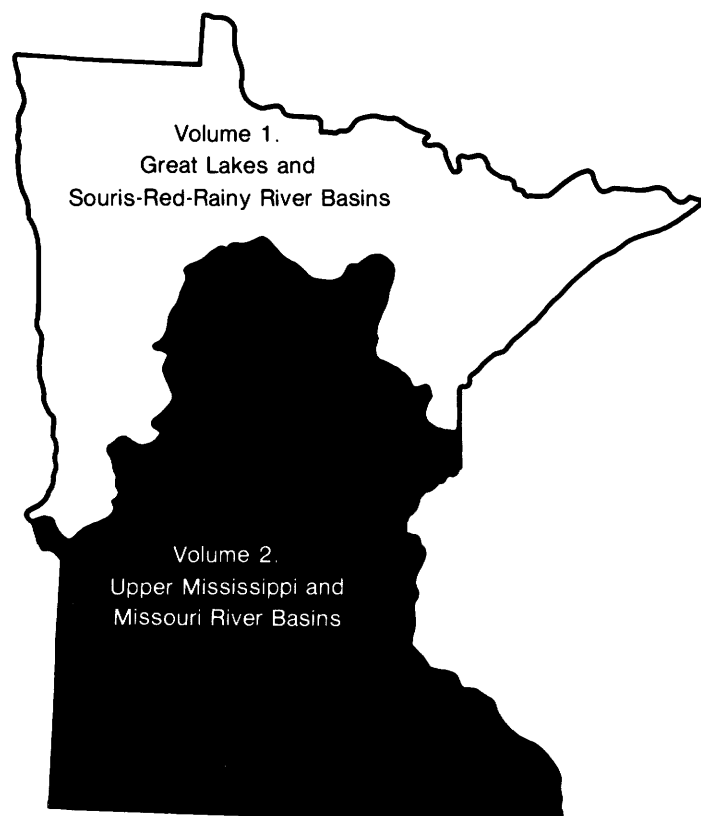
S	M	T	W	T	F	S
				1	2	3
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18	19	20	21	22	23	24
25	26	27	28	29	30	



# Water Resources Data Minnesota Water Year 1983

## Volume 2. Upper Mississippi and Missouri River Basins

by Kurt T. Gunard, Joseph H. Hess, James L. Zirbel, and Charles E. Cornelius



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Prepared in cooperation with the Minnesota Department of  
Natural Resources, Division of Waters; the Minnesota  
Department of Transportation; and with other State,  
municipal, and Federal agencies

**UNITED STATES DEPARTMENT OF THE INTERIOR**

**WILLIAM P. CLARK, Secretary**

**GEOLOGICAL SURVEY**

**Dallas L. Peck, Director**

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## PREFACE

This volume of the annual hydrologic data report of Minnesota is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface- and ground-water data-collection networks in each State, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and water quality provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources. Hydrologic data for Minnesota are contained in two volumes:

- Volume 1. Great Lakes and Souris-Red-Rainy River Basins
- Volume 2. Upper Mississippi and Missouri River Basins

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following individuals contributed significantly to the preparation of this report:

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Well 035N26W15DBB01.....	400	
Well 035N27W29DBB02.....	401	
Well 035N29W28ABC01.....	401	
<u>STEARNS</u>		
Well 122N28W07ABA02.....	402	
Well 123N32W33AAD02.....	402	
Well 124N28W21CDA01.....	403	
Well 125N33W03CDA02.....	403	
Well 126N30W17ABC02.....	404	
<u>STEELE</u>		
Well 106N20W30BAD01.....	404	
Well 107N20W16ABD01.....	404	
<u>SWIFT</u>		
Well 120N43W02DDD01.....	405	
Well 121N39W06BDB01.....	405	
Well 122N42W21BBB01.....	405	
<u>TODD</u>		
Well 128N33W17CCB01.....	406	
Well 130N33W16BBA01.....	406	
Well 132N33W26DCC01.....	407	
Well 133N32W14CCC01.....	407	
Well 133N35W07CCC01.....	408	
<u>WABASHA</u>		
Well 111N12W04BBD01.....	409	
<u>WADENA</u>		
Well 134N34W19ADD01.....	410	
Well 135N33W14ADD01.....	410	
Well 137N33W29DAA01.....	411	
Well 137N34W07DDD01.....	411	
<u>WASHINGTON</u>		
Well 027N20W02BCC01.....	412	
Well 027N20W02BCC02.....	412	
Well 027N20W02BCC03.....	412	
Well 027N21W28BCC01.....	413	
Well 028N20W11CAA01.....	413	
Well 028N20W34ADA01.....	414	
Well 029N21W06CAD01.....	414	
Well 029N21W10CCC01.....	415	
Well 029N21W13CAB01.....	415	
Well 030N20W03CAD01.....	415	
Well 030N20W03CAD03.....	416	
Well 031N21W28ABD01.....	416	
Well 032N20W30BCD01.....	416	
<u>WATONWAN</u>		
Well 106N32W01ddb01.....	417	
Well 107N31W14DAC01.....	417	
Well 107N31W35CAC01.....	418	
<u>WRIGHT</u>		
Well 118N27W03CAC01.....	418	
Well 118N27W03CAC03.....	419	
Well 119N26W24BAB02.....	419	
Well 119N26W35DDA01.....	420	
Well 121N25W15BBA02.....	420	
<u>YELLOW MEDICINE</u>		
Well 114N40W16BAC01.....	421	
Well 114N45W04DCD01.....	421	

377  
33 = 151



## WATER RESOURCES DATA FOR MINNESOTA, 1983

### INTRODUCTION

Water resources data for the 1983 water year for Minnesota consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. This volume contains discharge records for 72 gaging stations; stage and contents for 11 lakes and reservoirs; water quality for 34 stream stations, 16 partial-record stations, 3 lake stations, and 107 wells; and water levels for 238 observation wells. Also included are 107 high-flow partial-record stations. Additional water data were collected at various sites, not involved in the systematic data collection program, and are published as miscellaneous measurements. These data, together with the data in Volume 1, represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Minnesota.

Records of discharge or stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers titled "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of water supply papers titled "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of water-supply papers titled "Ground-Water Levels in the United States." Water-supply papers may be consulted in the libraries of the principal cities in the United States or may be purchased from Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202.

For water years 1961 through 1974, streamflow data were released by the Geological Survey in annual reports on a State-boundary basis. Water-quality records for water years 1964 through 1974 were similarly released either in separate reports or in conjunction with streamflow records.

Beginning with the 1975 water year, water data for streamflow, water quality, and ground water are published as an official Survey report on a State-boundary basis. These official Survey reports carry an identification number consisting of the two letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report MN-83-2." Water-Data reports are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the district chief at the address given on the back of the title page or by telephone (612) 725-7841.

### COOPERATION

The U.S. Geological Survey and organizations of the State of Minnesota have had cooperative agreements for the systematic collection of streamflow records since 1909, for ground-water levels since 1948, and for water-quality records since 1952. Organizations that assisted in collecting data through cooperative agreement with the Survey are:

Minnesota Department of Natural Resources, Division of Waters, Lawrence D. Seymour, director.

Minnesota Department of Transportation, Richard P. Braun, commissioner.

Minnesota Pollution Control Agency, Thomas J. Kalitowski, executive director.

Metropolitan Waste Control Commission of the Twin Cities Area, Peter E. Meintsma, chairman.

Metropolitan Council of the Twin Cities Area, Sandra Gardebring, chairwoman.

Elm Creek Conservation Commission, Gerald E. Butcher, chairman.

Fond du Lac Reservation Business Commission, W. J. Houle, chairperson.

Red Lake Watershed District, Truman Sandland, president.

Middle River-Snake River Watershed District, Donald Rivard, chairman.

City of Eagan, Bea Blomquist, mayor.

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting records for 53 gaging stations and 19 water-quality stations published in this report.

Eleven gaging stations in the Hudson Bay and St. Lawrence River basins were maintained by funds appropriated to the United States Department of State. Eight of these, on waters adjacent to the international boundary, are maintained by the United States (or Canada) under agreement with Canada (or the United States), and the records are obtained and compiled in a manner equally acceptable in both countries. These stations are designated herein as "International gaging stations."

## WATER RESOURCES DATA FOR MINNESOTA, 1983

Some records for the Red River of the North, which borders the State on the west, were obtained at the request of other Federal agencies as a part of the program of the U.S. Department of the Interior for development of the Missouri River basin.

## HYDROLOGIC CONDITIONS

## PRECIPITATION AND STREAMFLOW

Normal annual precipitation in Minnesota ranges from 19 inches in the northwest to 32 inches in the southeast. The average annual runoff ranges from about 2 inches in the west to about 16 inches in the northeast. The 1983 water year began with rainfall considerably above normal statewide, becoming deficient during some months in winter, spring, and summer. Total annual rainfall was above normal to much above normal everywhere except in the west-central part of the State where rainfall was slightly below normal (fig. 1). Annual runoff in 1983 ranged from 0.04 inch in parts of the west-central area to about 21 inches in the northeast. Expressed as a percentage of average for the period of record, 1983 runoff ranged from 4 percent of average in parts of the west-central area to 440 percent of average in parts of the southwest where the annual runoff was almost 10 inches.

Records for stations in central and southern Minnesota indicate a considerable variation in annual runoff from near average to much above average. Runoff in Crow River at Rockford in east-central Minnesota was 9.84 inches, which is more than  $2\frac{1}{2}$  times the average annual runoff of 3.58 inches, and was the greatest in 58 years of record. In southeastern Minnesota, runoff in Root River near Houston was 16.48 inches--more than twice the average of 7.44 inches and the greatest in 61 years of record. Runoff to the Des Moines River at Jackson, in southwestern Minnesota, was 13.34 inches, which was more than 4 times the average of 3.29 inches and the greatest in 48 years of record. Chippewa River near Milan in west-central Minnesota recorded near-average runoff with 2.67 inches (average is 1.95 inches). Annual and monthly mean discharges for these stations are compared to median discharges for a 30-year base period in figure 2.

No peaks of record were exceeded during 1983 at any gaging stations on streams for which records are published in this volume.

The combined storage in the six Mississippi River Headwater Reservoirs (Winnibigoshish, Leech, Pokegama, Pine, Sandy, and Gull) was 1,420,805 acre-feet at the end of the 1983 water year--a decrease of 49,314 acre-feet from the corresponding data a year ago.

## WATER QUALITY

Dissolved-solids data from selected NASQAN stations and suspended-sediment-load data from selected daily sediment stations were used to indicate variations in water quality in the Upper Mississippi River basin. No stations in Minnesota monitor water quality in the Missouri River basin.

Dissolved-solids concentrations in the Mississippi River were higher than normal in April and August. Dissolved-solids concentrations were very low in February at Minnesota River near Jordan (fig. 3).

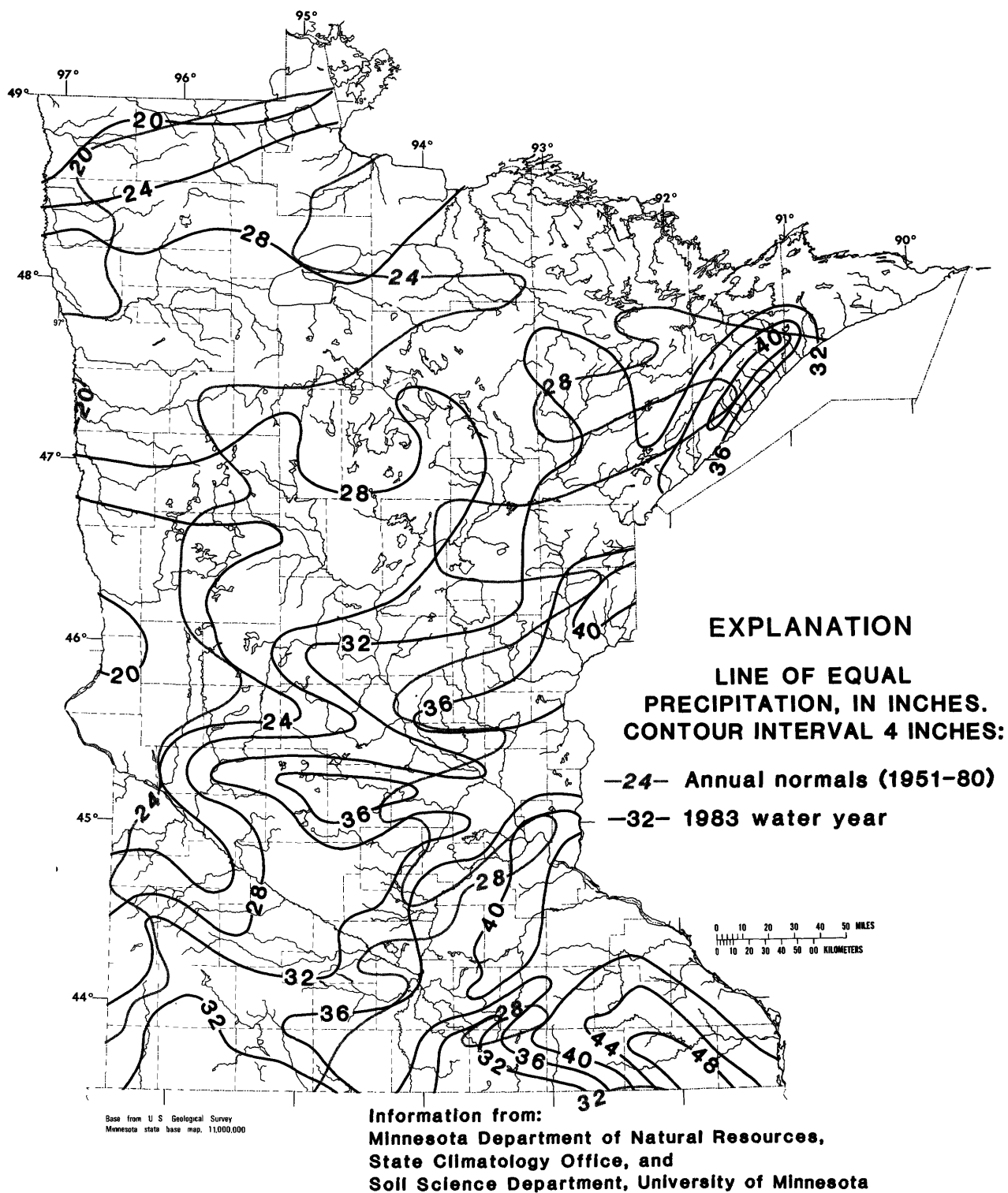
Suspended-sediment loads were high in March in central Minnesota, but low in parts of western Minnesota. Sediment yields were high in June at Mississippi River near Anoka. The annual sediment yield was lower than average at Whetstone River near Big Stone City, South Dakota, and at Yellow Bank River near Odessa. Annual yields were higher than average at Mississippi River near Anoka and at Minnesota River at Mankato (fig. 4).

Several samples of ground water collected throughout the Upper Mississippi River basin exceeded State primary drinking water standards of 10 mg/L for nitrite plus nitrate nitrogen (Minnesota Pollution Control Agency, 1978). Various other constituents exceeded secondary drinking water standards at some wells.

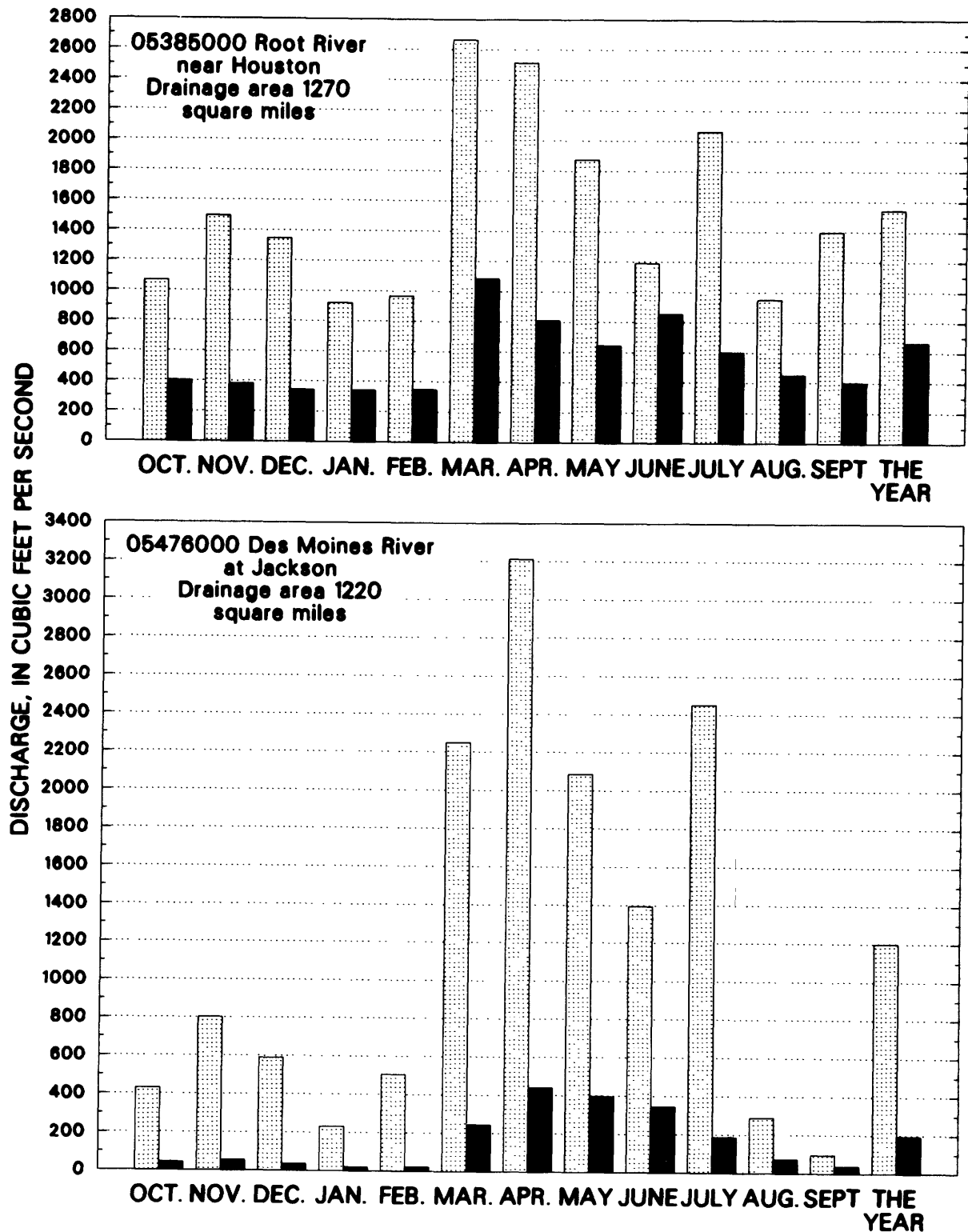
## GROUND-WATER LEVELS

Water levels in unconfined (water-table) aquifers were above normal in a large part of Minnesota during the 1983 water year. Water levels generally were normal early in the water year, but rose during the year as a result of above-normal precipitation. Heavy rains in the fall and early snow cover, which prevented the ground from freezing in many areas of the State, resulted in above-normal recharge and above-normal water levels during the winter in the southeastern half of the State. ~~Figure 5 shows how water levels relate seasonally to normal levels based on water-level fluctuations in 110 wells. Levels for the 1983 water year are compared to the long-term normal for each month and grouped by seasons.~~ During fall, water levels generally were near normal, except in west-central Minnesota where they were below normal, and in southwestern Minnesota and the northwestern corner of the State where they were above normal. During winter and spring, water levels in the southeastern half of the State generally were above normal, and numerous seasonal record-high levels were recorded. Water levels in west-central Minnesota continued below normal, and one seasonal record low was recorded. During summer, water levels in the southwest and in part of central Minnesota were nearly normal, but water levels in west-central Minnesota continued to be below normal in response to below-normal precipitation.

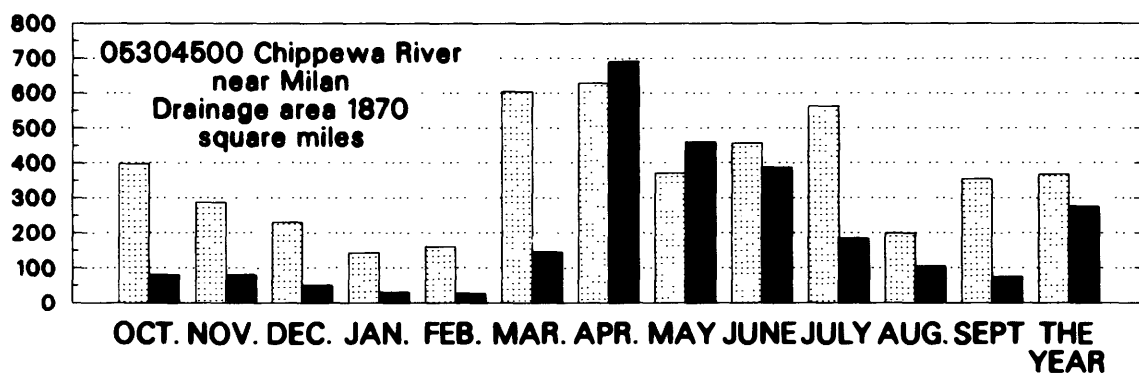
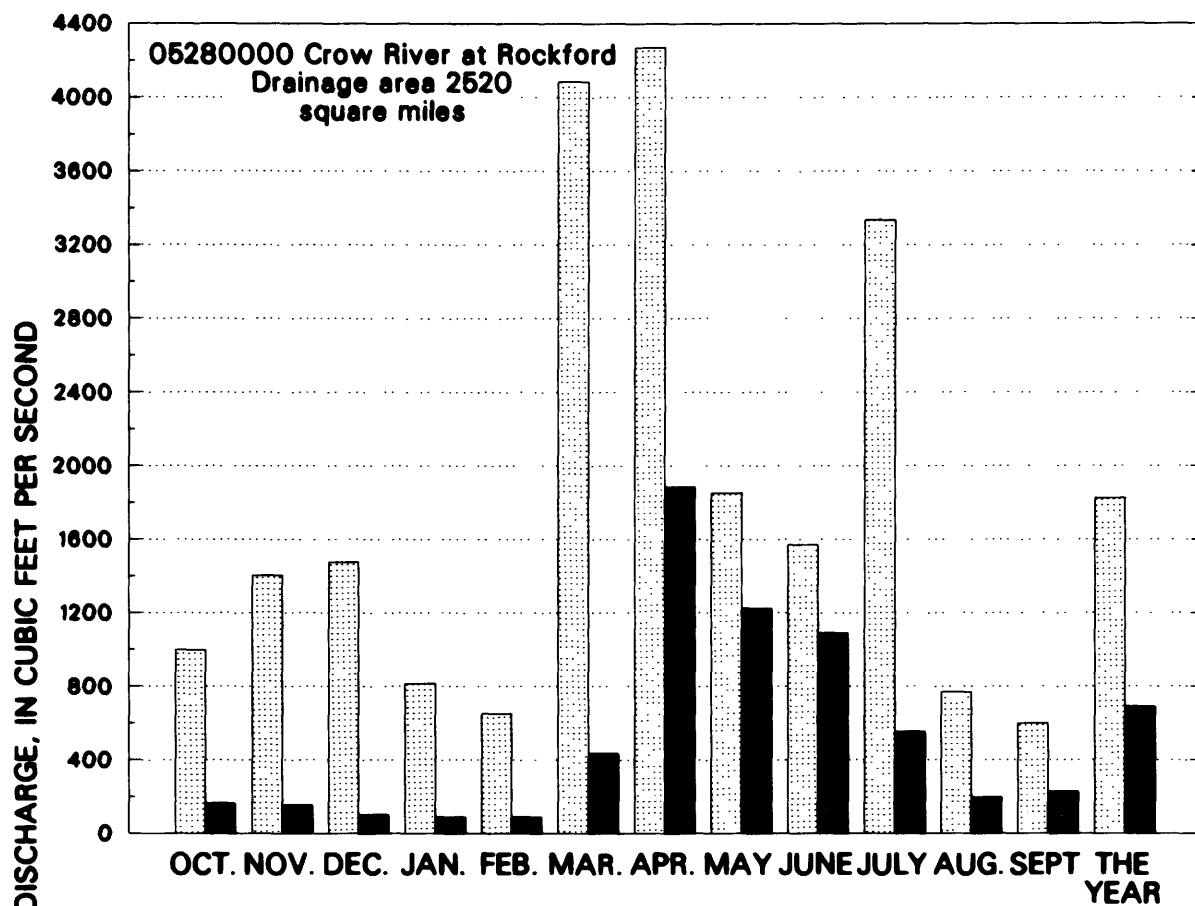
Water levels in confined drift and bedrock aquifers were normal or above in most of the State during all the 1983 water year. ~~The seasonally high water levels in confined aquifers (fig. 6)~~





**Figure 1.--Precipitation, in inches, during 1983 water year compared with normal annual precipitation for Minnesota**



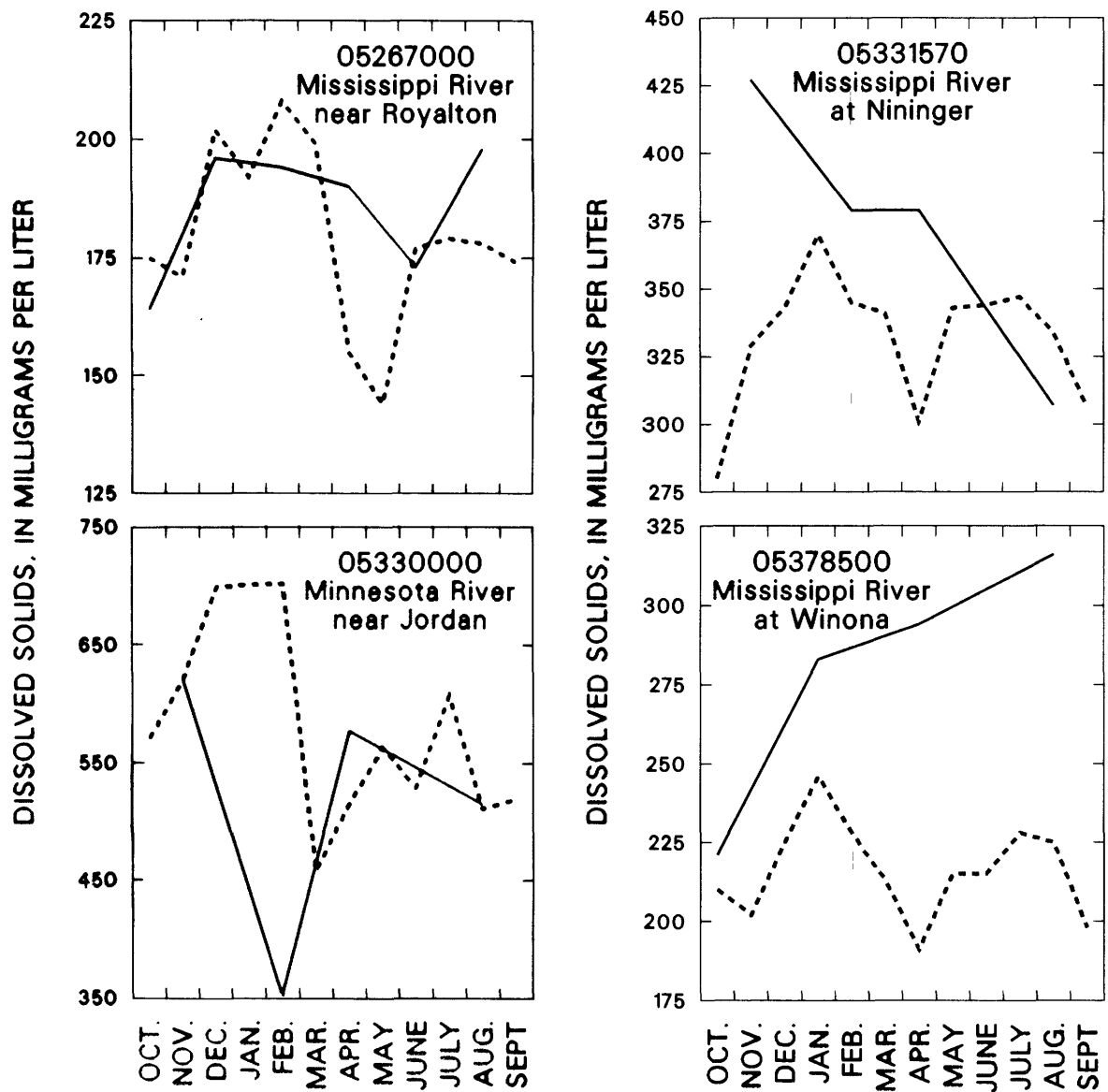
**Figure 2.--Comparison of discharges at four long-term representative gaging**



### EXPLANATION

-  Monthly and yearly mean discharges during 1983 water year
-  Median of monthly and yearly mean discharges for water years 1951-80

*stations for the 1983 water year with median discharges for a 30-year base period*

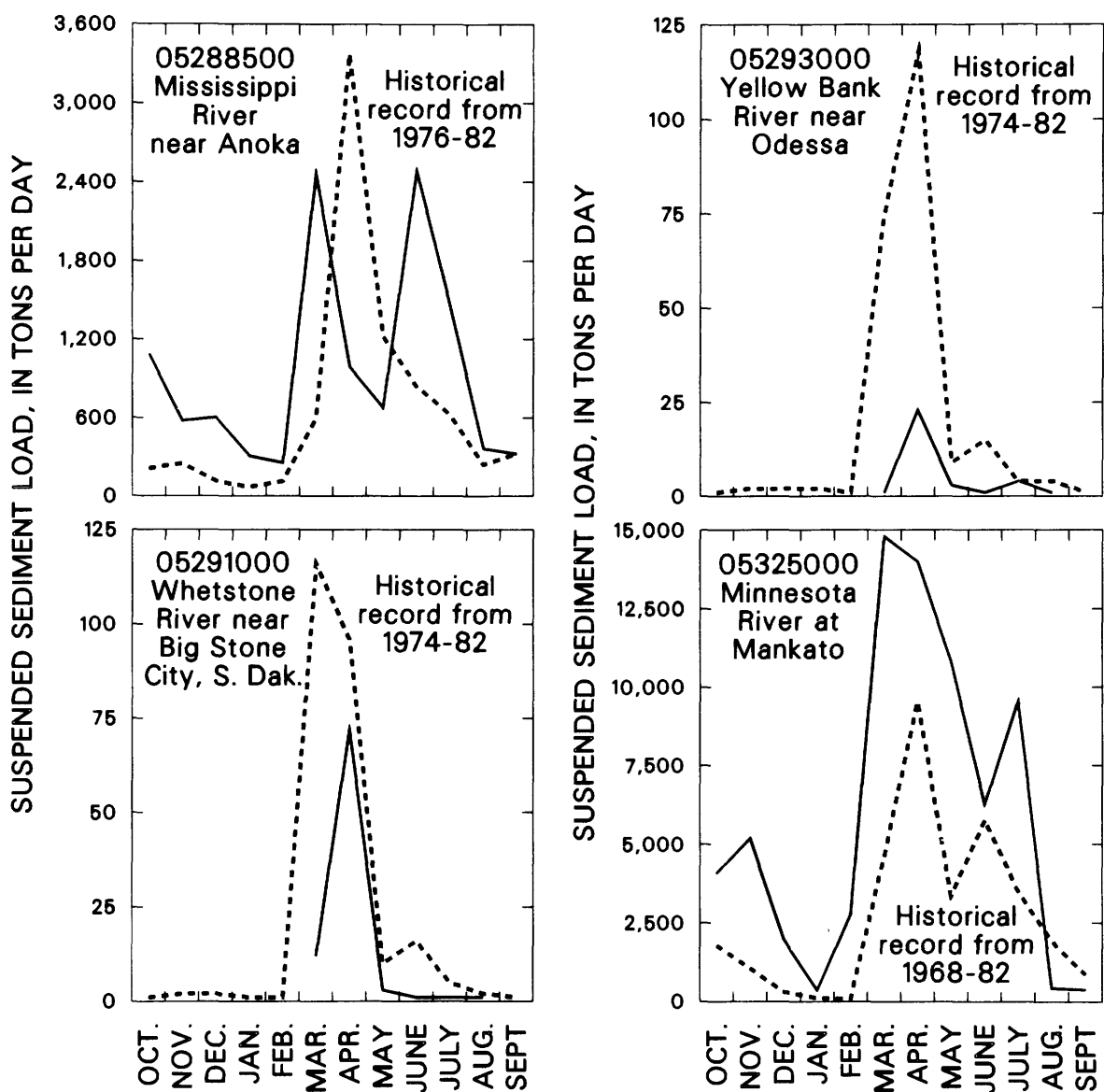


### EXPLANATION

- Mean monthly dissolved-solids concentration for period of record (minimum of five years)
- Monthly dissolved-solids concentration for 1983 water year

**Figure 3.--Comparison of dissolved-solids concentrations for 1983 water year with mean monthly values for the periods of record**



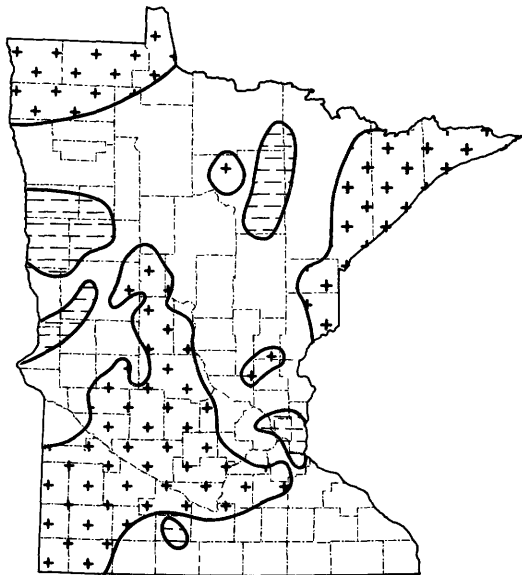


### EXPLANATION

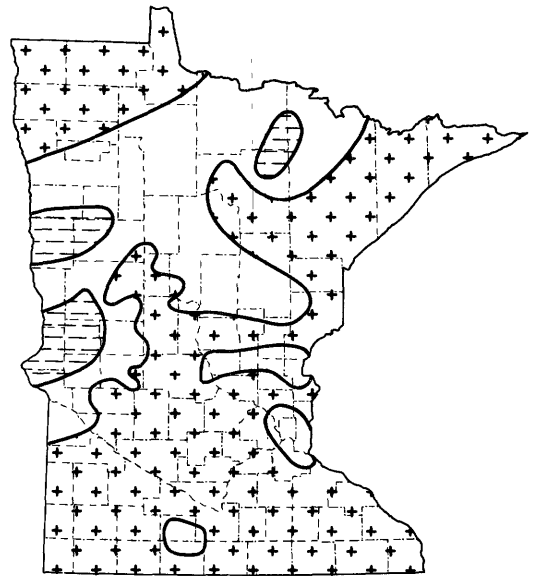
- Mean monthly suspended-sediment load for period of record
- Monthly suspended-sediment load for 1983 water year

**Figure 4.--Comparison of suspended-sediment loads for 1983 water year with mean monthly values for the period of record**

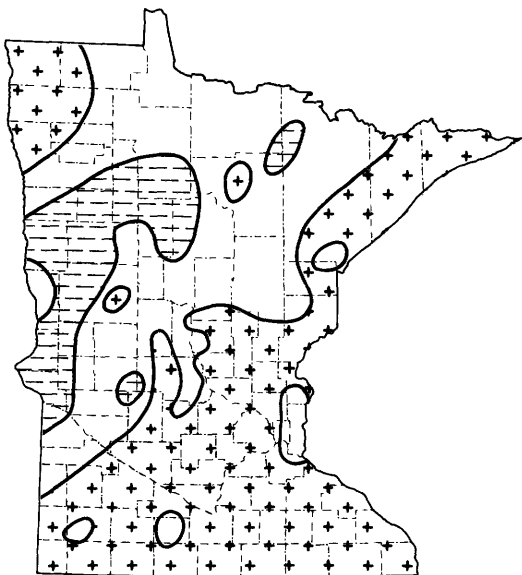
## 1983 WATER YEAR



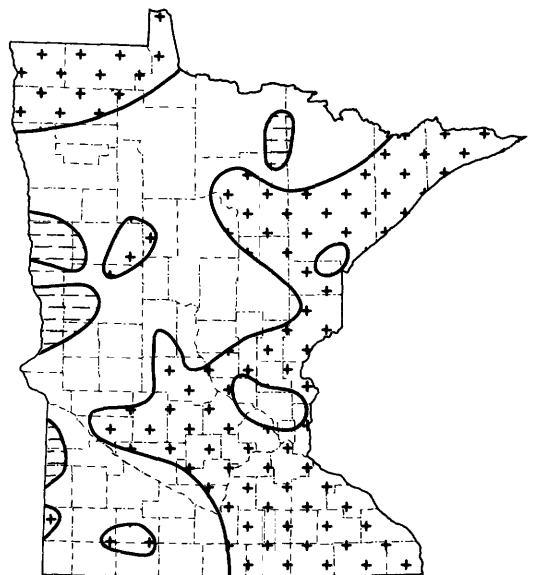
**FALL**  
(October-December)



**WINTER**  
(January-March)






**SPRING**  
(April-June)



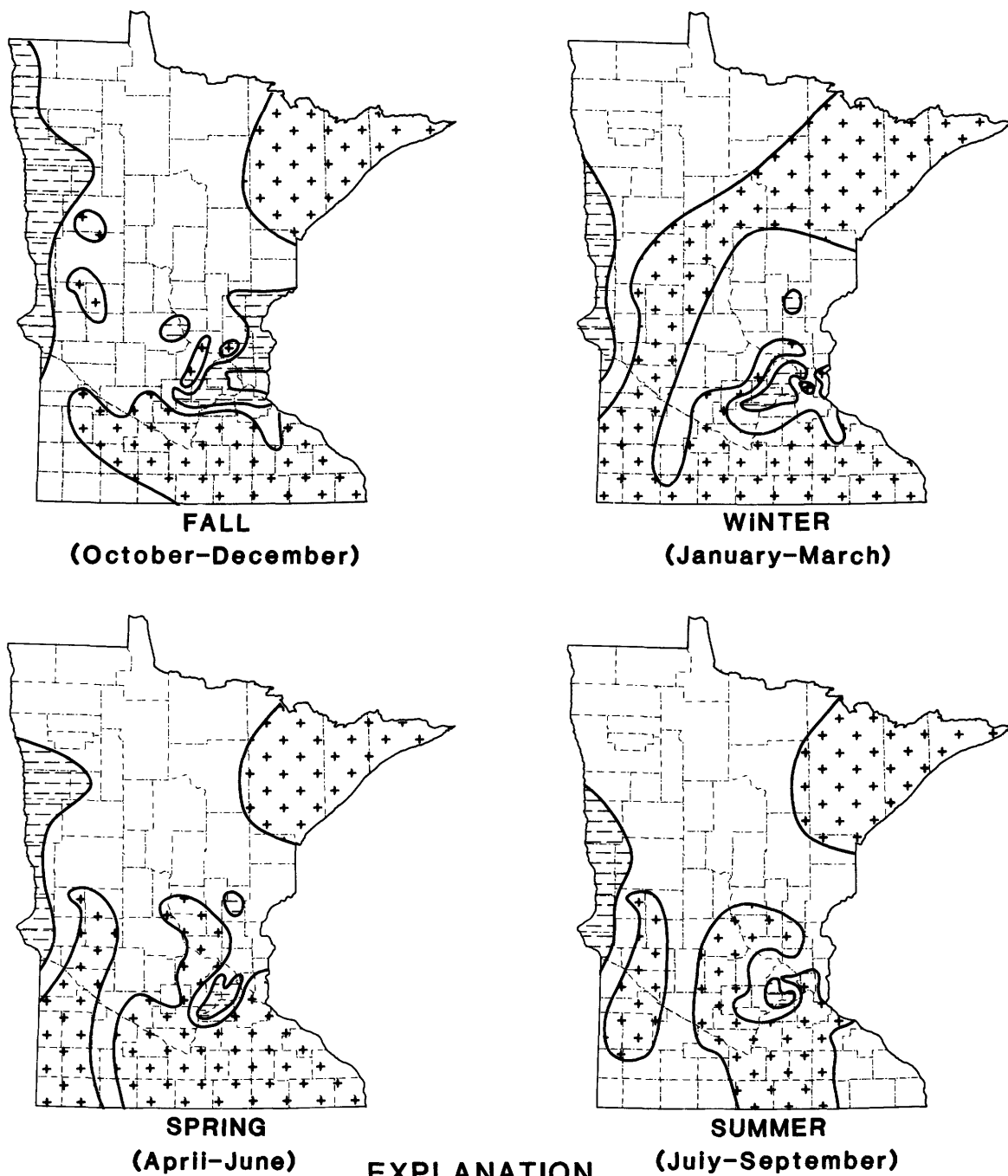
**SUMMER**  
(July-September)

## EXPLANATION

## WATER-TABLE LEVELS




-  **ABOVE NORMAL**--water levels are within the highest 25 percent of record for the season
-  **NORMAL**
-  **BELOW NORMAL**--water levels are within the lowest 25 percent of record for the season

**Figure 5.--Relationship of seasonal water-table levels to long-term mean levels**



### EXPLANATION

#### CONFINED-AQUIFER WATER LEVELS

-  **ABOVE NORMAL**--water levels are within the highest 25 percent of record for the season
-  **NORMAL**
-  **BELOW NORMAL**--water levels are within the lowest 25 percent of record for the season

**Figure 6.--Relationship of seasonal water levels in confined aquifers to long-term mean levels**

## WATER RESOURCES DATA FOR MINNESOTA, 1983

reflect the effect of considerably above-normal precipitation and ground-water recharge during fall. Numerous seasonal record-high-water levels were recorded in northeastern, central, south-central, and southeastern Minnesota. Confined levels in west-central Minnesota were consistently below normal, and new seasonal record low levels were recorded. Levels in the Mount Simon-Hinckley aquifer in the Twin Cities basin were consistently below normal because of increased pumpage from the aquifer. Figure 6 shows how confined water levels relate seasonally to normal levels based on water-level fluctuations in 84 wells.

## DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting inch-pound units to International System of units (SI) on the inside of back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Adenosine triphosphate (ATP) is the primary energy donor in cellular life process. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of ATP, therefore, provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as the organisms which produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C ± 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warmblooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms which produce blue colonies within 24 hours when incubated at 44.5°C ± 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria also found in the intestine of warmblooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C ± 1.0°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the unconsolidated material of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as the mass per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter (g/m<sup>3</sup>), and periphyton and benthic organisms in grams per square meter (g/m<sup>2</sup>).

## WATER RESOURCES DATA FOR MINNESOTA, 1983

Dry mass refers to the weight of residue present after drying in an oven at 60°C for zooplankton and 105°C for periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and the ash mass, and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash mass and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material: See Bed Material.

Cells/volume refers to the number of cells or any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, or about 646,000 gallons or 2,447 cubic meters.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water, and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common pigments in plants.

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Cubic foot per second (FT<sup>3</sup>/s, ft<sup>3</sup>/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to approximately 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment), that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Dissolved refers to the amount of substance present in true chemical solution. In practice, however, the term includes all forms of substance that will pass through a 0.45-micrometer membrane filter, and thus may include some very small (colloidal) suspended particles. Analyses are performed on filtered samples.

Diversity index is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = -\sum_{i=1}^s \frac{n_i}{n} \log_2 \frac{n_i}{n}$$

Where  $n_i$  is the number of individuals per taxon,  $n$  is the total number of individuals, and  $s$  is the total number of taxa in the sample of the community. Diversity index values range from zero, when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

## WATER RESOURCES DATA FOR MINNESOTA, 1983

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium carbonate ( $\text{CaCO}_3$ ).

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an 8-digit number.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Methylene blue active substance (MBAS) is a measure of apparent detergents. This determination depends on the formation of a blue color when methylene blue dye reacts with synthetic detergent compounds.

Micrograms per gram (UG/G, ug/g) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (gram) of sediment.

Micrograms per kilogram (MG/KG, mg/kg) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (kilogram) of sediment.

Micrograms per liter (UG/L, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represent the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L, and is based on the mass of sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

Organism is any living entity, such as an insect, phytoplankter, or zooplankter.

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meters ( $\text{m}^2$ ), acres, or hectares. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliters (mL) or liters (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

Parameter code numbers are unique five-digit code numbers assigned to each parameter placed into storage. These codes are assigned by the Environmental Protection Agency and are also used to identify data exchanged among agencies.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of suspended sediment or bed material determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in distilled water (chemically dispersed).

Particle-size classification used in this report agrees with recommendations made by the American Geophysical Union Subcommittee on Sediment Terminology.

## WATER RESOURCES DATA FOR MINNESOTA, 1983

The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay	0.00024 - 0.004	Sedimentation.
Silt	.004 - .062	Sedimentation.
Sand	.062 - 2.0	Sedimentation or sieve.
Gravel	2.0 - 64.0	Sieve.

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic material is removed and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, mass or volume.

Periphyton is the assemblage of microorganisms attached to and growing upon solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton is a useful indicator of water quality.

Pesticides are chemical compounds used to control undesirable plants and animals. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides. Insecticides and herbicides, which control insects and plants respectively, are the two categories reported.

Picocurie (PC, pCi) is one trillionth ( $1 \times 10^{-12}$ ) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields  $3.7 \times 10^{10}$  radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.

Phytoplankton is the plant part of the plankton. They are usually microscopic and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment, and are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells/mL of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algal mats or floating "moss" in lakes. Their concentrations are expressed as number of cells/mL of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column, and are often large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers.

Polychlorinated biphenyls (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [ $\text{mg C}/(\text{m}^2 \cdot \text{time})$  for periphyton and macrophytes and  $\text{mg C}/(\text{m}^3 \cdot \text{time})$  for phytoplankton] are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method, and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [ $\text{mg O}_2/(\text{m}^2 \cdot \text{time})$  for periphyton and macrophytes and  $\text{mg O}_2/(\text{m}^3 \cdot \text{time})$  for phytoplankton] are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

## WATER RESOURCES DATA FOR MINNESOTA, 1983

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of only readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Runoff in inches (IN, in) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight or volume, that passes a section in a given time. It is computed by multiplying discharge times mg/L times 0.0027.

Suspended-sediment load is quantity of suspended sediment passing a section in a specified period.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry weight or volume, that passes a section during a given time.

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Solute is any substance derived from the atmosphere, vegetation, soil, or rocks that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in micromhos per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in micromhos). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lived.

Natural substrates refers to any naturally occurring emerged or submersed solid surface, such as a rock or tree, upon which an organism lived.

Artificial substrate is a device which is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is taken. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection.

Surface area of a lake is that area outlined on the latest USGS topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is that part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.



## WATER RESOURCES DATA FOR MINNESOTA, 1983

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of the total concentration in a water-sediment mixture. The water-sediment mixture is associated with (or sorbed on) that material retained on a 0.45 micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, Hexagenia limbata is the following:

Kingdom.....Animal  
Phylum.....Arthropoda  
Class.....Insects  
Order.....Ephemeroptera  
Family.....Ephemeridae  
Genus.....Hexagenia  
Species.....Hexagenia limbata

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration in milligrams per liter by 0.00136.

Tons per day is the quantity of substance in solution or suspension that passes a stream section during a 24-hour day.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determines all of the constituent in the sample.)

Total in bottom material is the total amount of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total in bottom material."

Total load (tons) is the total quantity of any individual constituent, as measured by dry mass or volume, that is dissolved in a specific amount of water (discharge) during a given time. It is computed by multiplying the total discharge, times the mg/L of the constituent, times the factor 0.0027, times the number of days.

Total recoverable refers to the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination

## WATER RESOURCES DATA FOR MINNESOTA, 1983

represents something less than the "total" amount (that is, less than 95 percent) of the constituent percent in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

**Weighted average** is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharge. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

**WDR** is used as an abbreviation for "Water-Data Report" in reference to published reports beginning in 1975.

**WRD** is used as an abbreviation for "Water-Resources Data" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

**WSP** is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

## DOWNSTREAM ORDER AND STATION NUMBER

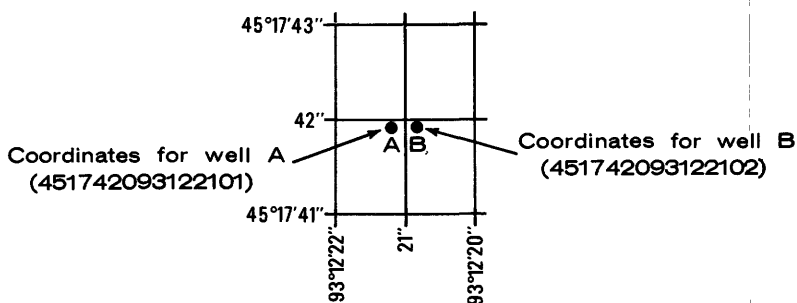
Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a main-stream station are listed before that station. A station on a tributary that enters between two main-stream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is situated with respect to the stream to which it is immediately tributary is indicated by an indentation in a list of stations in the front of the report. Each indentation represents one rank. This downstream order and system of indentation show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

As an added means of identification, each hydrologic station and partial-record station has been assigned a station number. These are in the same downstream order used in this report. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete 8-digit number for each station such as 05041000, which appears just to the left of the station name, includes the 2-digit part number "05" plus the 6-digit downstream order number "041000."

## NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES

The 8-digit downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are taken.

The well and miscellaneous site numbering system of the U.S. Geological Survey is based on the grid system of latitude and longitude. The system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, the next 7 digits denote degrees, minutes, and seconds of longitude, and the last 2 digits (assigned sequentially) identify the wells or other sites within a 1-second grid. See figure 7 below. Each well site is also identified by a local well number which consists of township, range, and section numbers, three letters designating 1/4, 1/4, 1/4 section location, and a two digit sequential number.



**Figure 7.--Example of system for numbering wells and miscellaneous sites**

## WATER RESOURCES DATA FOR MINNESOTA, 1983

## SPECIAL NETWORKS AND PROGRAMS

Hydrologic bench-mark station is one that provides hydrologic data for a basin in which the hydrologic regimen will likely be governed solely by natural conditions. Data collected at a bench-mark station may be used to separate effects of natural from manmade changes in other basins which have been developed and in which the physiography, climate, and geology are similar to those in the undeveloped bench-mark basin.

National stream-quality accounting network (NASQAN) is a data collection network designed by the U.S. Geological Survey to meet many of the information demands of agencies or groups involved in national or regional water-quality planning and management. Both accounting and broad-scale monitoring objectives have been incorporated into the network design. Areal configuration of the network is based on river-basin accounting units (identified by 8-digit hydrologic-unit numbers) designated by the Office of Water Data Coordination in consultation with the Water Resources Council. Primary objectives of the network are (1) to depict areal variability of streamflow and water-quality conditions nationwide on a year-by-year basis and (2) to detect and assess long-term changes in streamflow and stream quality.

Pesticide program is a network of regularly sampled water-quality stations where samples are collected to determine the concentration and distribution of pesticides in streams where potential contamination could result from the application of the commonly used insecticides and herbicides. Operation of the network is a Federal interagency activity.

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radiosotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium network is a network of stations which has been established to provide base line information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

## EXPLANATION OF STAGE AND WATER-DISCHARGE RECORDS

## COLLECTION AND COMPUTATION OF DATA

The base data collected at gaging stations consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and contents of lakes or reservoirs. In addition, observations of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement base data in determining the daily flow or volume of water in storage. Records of stage are obtained from either direct readings on a nonrecording gage or from a water-stage recorder that gives either a continuous graph of the fluctuations or a tape punched at selected time intervals. Measurements of discharge are made with a current meter, using the general methods adopted by the Geological Survey. These methods are described in standard text-books, in Water-Supply Paper 888, and in U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chapter A6.

For stream-gaging stations, rating tables giving the discharge for any stage are prepared from stage-discharge relation curves. If extensions to the rating curves are necessary to express discharge greater than measured, they are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, computation of flow over dams or weirs), step-backwater techniques, velocity-area studies, and logarithmic plotting. The daily mean discharge is computed from gage heights and rating tables, then the monthly and yearly mean discharges are computed from the daily figures. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is computed by the shifting-control method, in which correction factors based on individual discharge measurements and notes by hydrologists and observers are used in applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge is computed by what is basically the shifting-control method.

At some stream-gaging stations the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

At some northern stream-gaging stations the stage-discharge relation is affected by ice in the winter, and it becomes impossible to compute the discharge in the usual manner. Discharge for periods of ice effect is computed on the basis of gage-height record and occasional winter discharge measurements. Consideration is given to the available information on temperature and precipitation, notes by gage observers and hydrologists, and comparable records of discharge for other stations in the same or nearby basins.

For a lake or reservoir station, capacity tables giving the contents for any stage are prepared from stage-area relation curves defined by surveys. The application of the stage to the capacity table gives the contents, from which the daily, monthly, or yearly change in contents is computed.

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If the stage-capacity curve is subject to changes because of deposition of sediment in the reservoir, periodic resurveys of the reservoir are necessary to define new stage-capacity curves. During the period between reservoir surveys the computed contents may be increasingly in error due to the gradual accumulation of sediment.

For some gaging stations there are periods when no gage-height record is obtained or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods the daily discharges are estimated on the basis of recorded range-in-stage, prior and subsequent records, discharge measurements, weather records, and comparison with records for other stations in the same or nearby basins. Likewise daily contents may be estimated on the basis of operator's log, prior and subsequent records, inflow-outflow studies, and other information.

The data in this report generally comprise a description of the station and tabulations of daily and monthly figures. For gaging stations on streams or canals a table showing the daily discharge and monthly and yearly discharge is given. For gaging stations on lakes and reservoirs a monthly summary table of stage and contents or a table showing the daily contents is given. Tables of daily mean gage heights are included for some streamflow stations and for some reservoir stations. Records are published for the water year, which begins on October 1 and ends on September 30.

The description of the gaging station gives the location, drainage area, period of record, notations of revisions of previously published records, type and history of gages, general remarks, average discharge, and extremes of discharge or contents. The location of the gaging station and the drainage area are obtained from most accurate maps available. River mileage, given under "LOCATION" for some stations, is that determined and used by the Corps of Engineers or other agencies. Periods for which there are published records for the present station or for stations generally equivalent to the present one are given under "PERIOD OF RECORD."

Previously published streamflow records of some stations have been found to be in error on the basis of data or information later obtained. Revisions of such records are usually published along with the current records in one of the annual or compilation reports. In order to make it easier to find such revised records, a paragraph headed "REVISED RECORDS" has been added to the description of all stations for which revised records have been published. Listed herein are all the reports in which revisions have been published, each followed by the water years for which figures are revised in that report. In listing the water years only one number is given; for instance, 1965 stands for the water year October 1, 1964, to September 30, 1965. If no daily, monthly, or annual figures of discharge are affected by the revision, the fact is brought out by notations after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the revised figure was first published is given. It should be noted that for all stations for which cubic feet per second per square mile and runoff in inches are published, a revision of the drainage area necessitates corresponding revision of all figures based on the drainage area. Revised figures of cubic feet per second per square mile and runoff in inches resulting from a revision of the drainage area only are usually not published in the annual series of reports.

The type of gage currently in use; the datum of the present gage referred to National Geodetic Vertical Datum; and a condensed history of the types, locations, and datums of previous gages used during the period of record are given under "GAGE." National Geodetic Vertical Datum is explained in "DEFINITION OF TERMS."

Information pertaining to the accuracy of the discharge records and to conditions which affect the natural flow of the gaging station is given under "REMARKS." For reservoir stations, information on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir is given under "REMARKS."

The average discharge for the number of years indicated is given under "AVERAGE DISCHARGE"; it is not given for stations having fewer than 5 complete years of record or for stations where changes in water development during the period of record cause the figure to have little significance. In addition, the median of yearly mean discharges is given for stream-gaging stations having 10 or more complete years of record if the median differs from the average by more than 10 percent. Under "EXTREMES" are given first, the extremes for the period of record, second, information available outside the period of record, and last, those for the current year. Unless otherwise qualified, the maximum discharge (or contents) is the instantaneous maximum corresponding to the crest stage obtained by use of a water-stage recorder (graphic or digital), a crest-stage gage, or a nonrecording gage read at the time of crest. If the maximum gage height did not occur on the same day as the maximum discharge (or contents), it is given separately. Similarly, the minimum is the instantaneous minimum unless otherwise qualified. For some stations, peak discharges are listed with "EXTREMES FOR CURRENT YEAR." If they are, all independent peaks above the selected base are published in tabular format with the time of occurrence and corresponding gage heights, including the maximum for the year. The base discharge, which is given in the table heading, is selected so that an average of about three peaks a year will be presented. Peak discharges are not published for any canals, ditches, drains, or for any stream for which the peaks are subject to substantial control by man. Time of day is expressed in 24-hour local standard time; for example, 12:30 a.m. is 0030, 1:30 p.m. is 1330. The minimums for these stations are published in a separate paragraph following the table of peaks.

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The daily table for stream-gaging stations gives the mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also may be expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN"), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion, if the drainage area includes large noncontributing areas, or if the average annual rainfall over the drainage basin is usually less than 20 inches. In the yearly summary below the monthly summary, the figures shown are the appropriate daily discharges for the calendar and water years.

Footnotes to the table of daily discharge are introduced by the word "NOTE." Footnotes are used to indicate periods for which the discharge is computed or estimated by special methods because of no gage-height record, backwater from various sources, or other unusual conditions. Periods of no gage-height record are indicated if the period is continuous for a month or more or includes the maximum discharge for the year. Periods of backwater from an unusual source, of indefinite stage-discharge relation, or of any other unusual condition at the gage site are indicated only if they are a month or more in length and the accuracy of the records is affected. Days on which the stage-discharge relation is affected by ice are not indicated. The methods used in computing discharge for various unusual conditions have been explained in preceding paragraphs.

For most gaging stations on lakes and reservoirs the data presented comprise a description of the station and a monthly summary table of stage and contents. For some reservoirs a table showing daily contents or stage is given.

Data collected at partial-record stations follow the information for continuous record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. Occasionally, a series of discharge measurements are made within a short time period to investigate the seepage gains or losses along a reach of a stream or to determine the low-flow characteristics of an area. Such measurements are also given in special tables following the tables of partial-record stations.

## ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretations of records.

The station description under "REMARKS" states the degree of accuracy of the records. "Excellent" means that about 95 percent of the daily discharges are within 5 percent; "good," within 10 percent; and "fair," within 15 percent. "Poor" means that daily discharges have less than "fair" accuracy.

Figures of daily mean discharge in this report are shown to the nearest hundredth of a cubic foot per second for discharges of less than 1 ft<sup>3</sup>/s; to tenths between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to 3 significant figures above 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the figure. The same rounding rules apply to discharge figures listed for partial-record stations.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff in inches are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

## OTHER DATA AVAILABLE

Information of a more detailed nature than that published for most of the gaging stations such as observations of water temperatures, discharge measurements, gage-height records, and rating tables is on file in the district office. Also most gaging-station records are available in computer-usable form and many statistical analyses have been made.

Information on the availability of unpublished data or statistical analyses may be obtained from the district office.

## RECORDS OF DISCHARGE COLLECTED BY AGENCIES OTHER THAN THE GEOLOGICAL SURVEY

The National Water Data Exchange, Water Resources Division, U.S. Geological Survey, National Center, Reston, VA 22092, maintains an index of all discharge measurement sites in the State. Information on records available at specific sites can be obtained upon request.

## WATER RESOURCES DATA FOR MINNESOTA, 1983

## EXPLANATION OF WATER-QUALITY RECORDS

## COLLECTION AND EXAMINATION OF DATA

Surface-water samples for analyses usually are collected at or near gaging stations. The quality-of-water records are given immediately following the discharge records at these stations.

The descriptive heading for water-quality records gives the period of record for all water-quality data; the period of daily record for parameters that are measured on a daily basis (specific conductance, pH, dissolved oxygen, water temperature, sediment discharge, etc.); extremes for the period of daily record; extremes for the current year; and general remarks.

For ground-water records, no descriptive statements are given; however, the well number, depth of well, date of sampling and (or) other pertinent data are given in the table containing the chemical analyses of the ground water.

If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

## WATER ANALYSIS

Most methods for collecting and analyzing water samples are described in the U.S. Geological Survey Techniques of Water-Resources Investigations listed on a following page.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the district office.

## WATER TEMPERATURE

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small daily temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published.

## SEDIMENT

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

## WATER RESOURCES DATA FOR MINNESOTA, 1983

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of the quantities of suspended sediment, records of the periodic measurements of the particle-size distribution of the suspended sediment and bed material are included.

### EXPLANATION OF GROUND-WATER LEVEL RECORDS

#### COLLECTION OF THE DATA

Only ground-water-level data from a basic network of observation wells are published herein. This basic network contains observation wells so located that the most significant data are obtained from the fewest wells in the most important aquifers.

Each well is identified by means of (1) a 15-digit number that is based on latitude and longitude and (2) a local number that is provided for local needs. See figure 6.

Measurements are made in many types of wells, under varying conditions of access and at different temperatures, hence, neither the method of measurement nor the equipment can be standardized. At each observation well, however, the equipment and techniques used are those that will ensure that measurements at each well are consistent.

Water-level measurements in this report are given in feet with reference to either NGVD of 1929 or land-surface datum (lsd). NGVD of 1929 is the datum plane on which the national network of precise levels is based; land-surface datum is a datum plane that is approximately at land surface at each well. If known, the altitude of the land-surface datum in NGVD of 1929 is given in the well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (eom).

Water levels are reported to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth to water of several hundred feet, the error in determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given only to a tenth of a foot or a larger unit.

Hydrographs showing water-level fluctuations are included for 88 representative wells; 27 bedrock, 48 surficial sand, and 13 buried-sand wells.

#### ACCESS TO WATSTORE DATA

The National Water Data Storage and Retrieval System (WATSTORE) was established for handling water data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from each of the Water Resources Division's district offices (see address given on back of the title page).

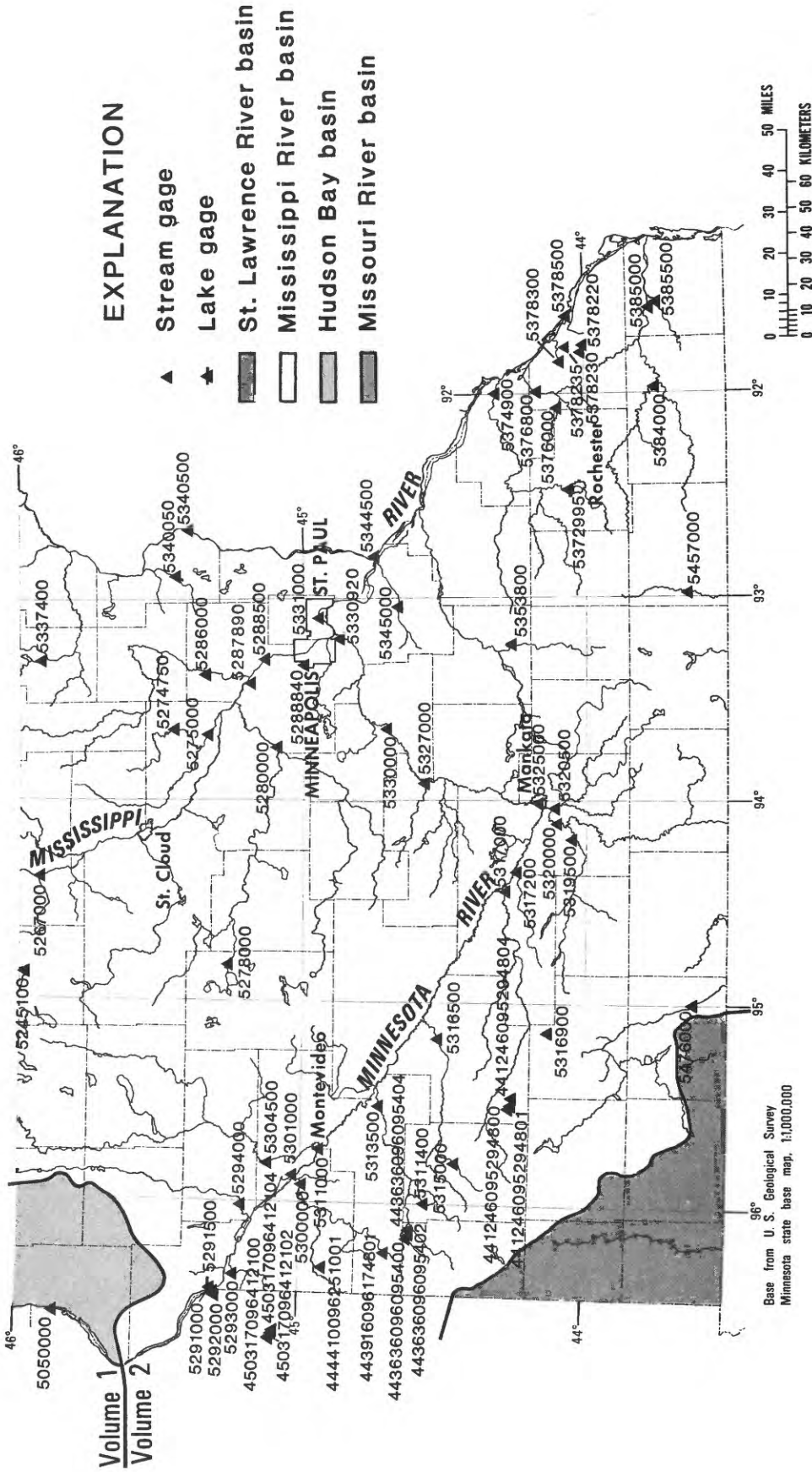
General inquiries about WATSTORE may be directed to:

Chief Hydrologist  
U.S. Geological Survey  
437 National Center  
Reston, Virginia 22092

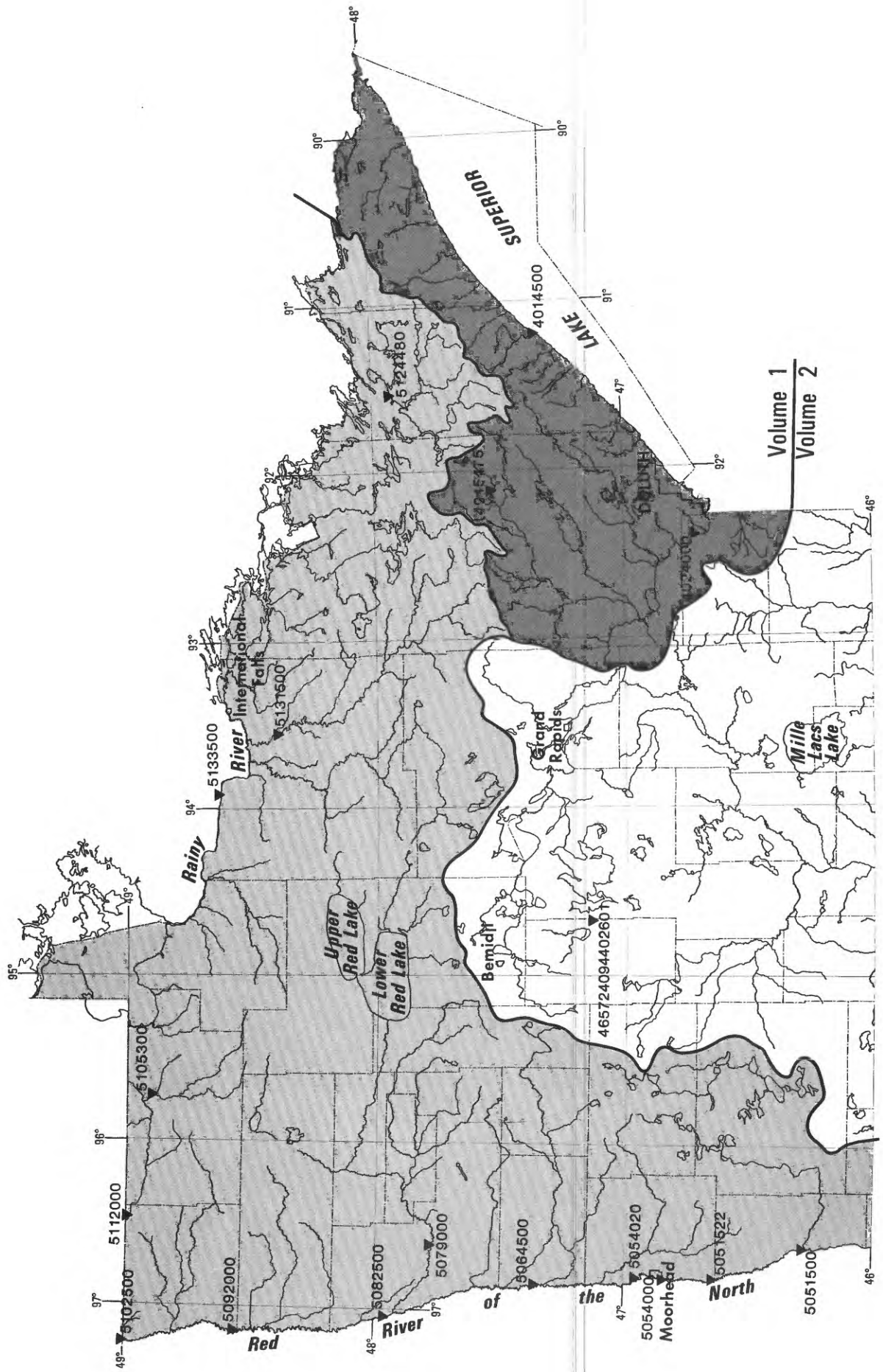


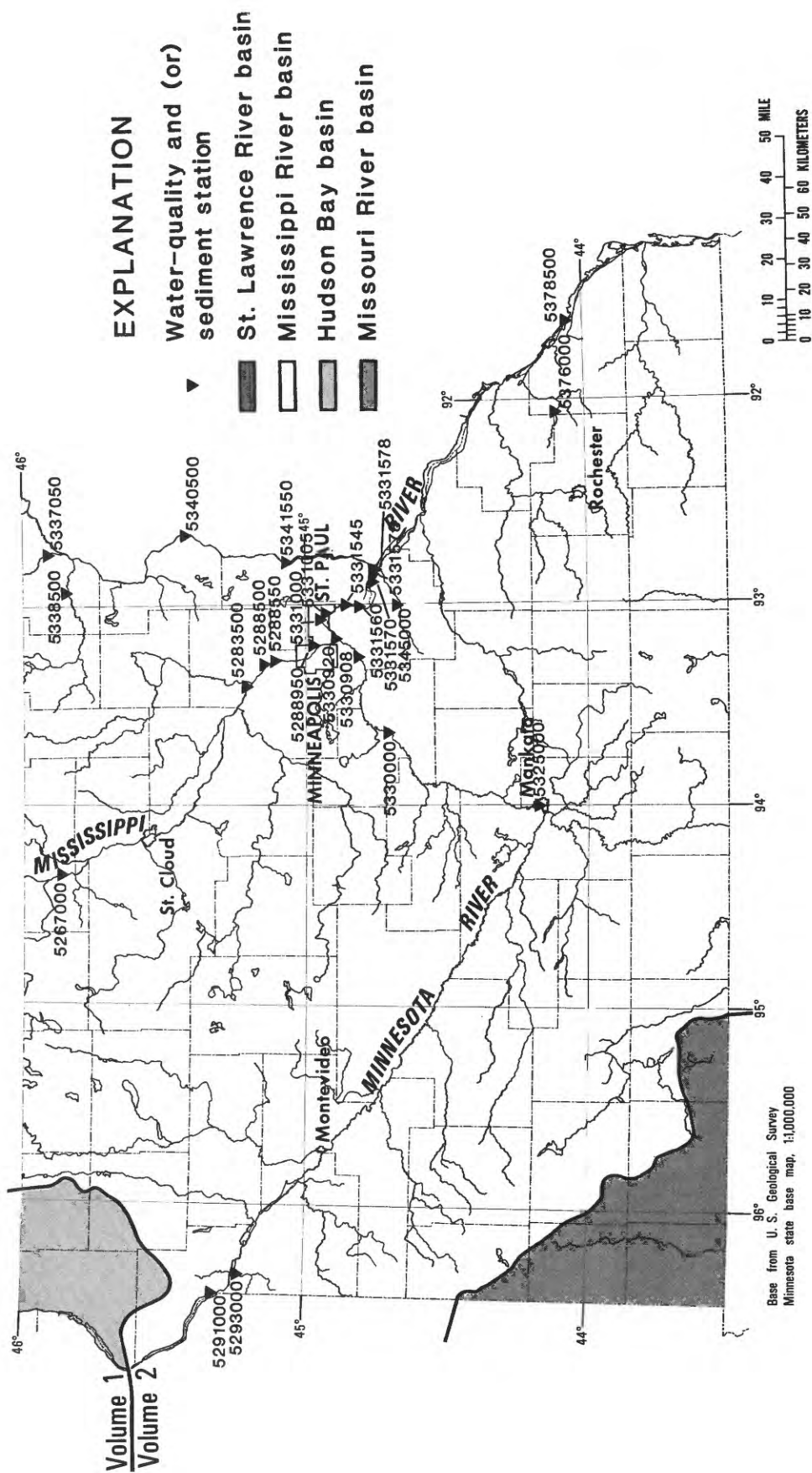






**Figure 8.--Location of water-discharge stations**





**Figure 9.--Location of water-quality stations**

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

Thirty-seven manuals by the U.S. Geological Survey have been published to date in the series on techniques describing procedures for planning and executing specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) is on surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises. The reports listed below are for sale by the U.S. Geological Survey, Branch of Distribution, 604 South Pickett St., Alexandria, VA 22304 (authorized agent of the Superintendent of Documents, Government Printing Office).

NOTE: When ordering any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations".

- 1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. *Application of surface geophysics to ground-water investigations*, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-E1. *Application of borehole geophysics to water-resources investigations*, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 3-A1. *General field and office procedures for indirect discharge measurements*, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. *Measurement of peak discharge at culverts by indirect methods*, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. *Measurement of peak discharge at width contractions by indirect methods*, by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
- 3-A5. *Measurement of peak discharge at dams by indirect methods*, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 3-A6. *General procedure for gaging streams*, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. *Stage measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. *Discharge measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 3-A9. *Measurement of time of travel and dispersion in streams by dye tracing*, by E. F. Hubbard, F. A. Kilpatrick, L. A. Martens, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1982. 44 pages.
- 3-A11. *Measurement of discharge by moving-boat method*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-B1. *Aquifer-test design, observation, and data analysis*, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.
- 3-B2. *Introduction to ground-water hydraulics, a programed text for self-instruction*, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.
- 3-B3. *Type curves for selected problems of flow to wells in confined aquifers*, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.
- 3-C1. *Fluvial sediment concepts*, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. *Field methods for measurement of fluvial sediment*, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. *Computation of fluvial-sediment discharge*, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.
- 4-A1. *Some statistical tools in hydrology*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. *Frequency curves*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. *Low-flow investigations*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. *Storage analyses for water supply*, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. *Regional analyses of streamflow characteristics*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. *Computation of rate and volume of stream depletion by wells*, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. *Methods for determination of inorganic substances in water and fluvial sediments*, by M. W. Skougstad and others, editors: USGS--TWRI Book 5, Chapter A1. 1979. 626 pages.
- 5-A2. *Determination of minor elements in water by emission spectroscopy*, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
- 5-A3. *Methods for analysis of organic substances in water*, by D. F. Goerlitz and Eugene Brown: USGS--TWRI Book 5, Chapter A3. 1972. 40 pages.
- 5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, edited by P. E. Greeson, T. A. Ehlike, G. A. Irwin, B. W. Lium, and K. V. Slack: USGS--TWRI Book 5, Chapter A4. 1977. 332 pages.
- 5-A5. *Methods for determination of radioactive substances in water and fluvial sediments*, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.
- 5-C1. *Laboratory theory and methods for sediment analysis*, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 7-C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. *A model for simulation of flow in singular and interconnected channels*, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. *Methods of measuring water levels in deep wells*, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-B2. *Calibration and maintenance of vertical-axis type current meters*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

## DISCONTINUED GAGING STATIONS

The following continuous-record streamflow or stage stations in Minnesota have been discontinued or converted to partial-record stations. Daily streamflow or stage records were collected and published for the period of record shown for each station.

Station number	Station name	Drainage area (mi <sup>2</sup> )	Period of record
Upper Mississippi River basin			
05210000	Mississippi River near Deer River, MN	a3,190	1945-50
*05213000	Prairie River near Grand Rapids, MN	485	1909†, 1925-49
05216800	O'Brien Creek near Pengilly, MN	-	1963-68
05217000	Swan River near Warba, MN	254	1954-69
05217500	Swan River near Swan River, MN	a290	1929
05218000	Mississippi River above Sandy River near Libby (above Sandy River), MN	4,560	1895-1915, 1925-29
05221000	Willow River near Palisade, MN	442	1929
05226200	Ripple (Mud) River near Wealthwood, MN	-	1937-39
05232000	Pelican Brook (Long Lake) near Pequot Lakes, MN	-	1938-42, 1943-47
05241500	Rabbit River near Crosby, MN	8.38	1945-63
05242700	Little Sand Lake outlet (Sand Lake outlet) near Dorset, MN	a74	1930-41
*05244000	Crow Wing River at Nimrod, MN	a1,010	1910-14, 1930-81
05244500	Crow Wing River at Motley, MN	a2,140	1909†, 1913-17, 1930-31
05244980	Diversion from Long Prairie River near Osakis, MN	-	1939-47
05245000	Long Prairie River near Osakis, MN	-	1949-54
05245500	Long Prairie River near Motley, MN	973	1909-17, 1930-31
05246000	Crow Wing River at Pillager, MN	a3,230	1903†, 1909-13, 1925-50
*05261000	Mississippi River near Fort Ripley, MN	a11,010	1906, 1909-10, 1929
05261500	Nokasippi River near Fort Ripley, MN	210	1929
*05268000	Platte (Platt) River at Royalton, MN	338	1929-36
05269000	Mississippi River near Sauk Rapids, MN	a12,400	1903-06
05270000	Mississippi River at Sartell, MN	a12,450	1929, 1943-47†
05270500	Sauk River near St. Cloud, MN	925	1909-12, 1913, 1929, 1930, 1931, 1932, 1933, 1934-81
05273500	Clearwater River at Clearwater, MN	-	1937, 1940-42
05274500	Elk River above St. Francis River near Big Lake, MN	384	1929
05274700	St. Francis River at Santiago, MN	-	1965-70, 1980-81
05274900	St. Francis River near Big Lake, MN	-	1965-70
05275500	Mississippi River at Elk River, MN	a14,500	1915-56
05276000	North Fork Crow River near Regal, MN	215	1943-54
05277000	Middle Fork Crow River at New London, MN	-	1939-42, 1943-47

"See footnotes at end of table."

## DISCONTINUED GAGING STATIONS

Station number	Station name	Drainage area (mi <sup>2</sup> )	Period of record
Upper Mississippi River basin--Continued			
05277500	Middle Fork Crow River (Calhoun Lake Diversion) near Spicer, MN	-	1939, 1940-46
05278400	North Fork Crow River near Rockford, MN	-	1909-10
05278500	South Fork Crow River at Cosmos, MN	221	1945-64
05278930	Buffalo River near Glencoe, MN	374	1972-80
*05279000	South Fork Crow River near Mayer, MN	a1,170	1934-79
05279500	South Fork Crow River near Rockford, MN	a1,250	1909-12
05283500	Mississippi River at Anoka, MN	a17,100	1897, 1905-13
05284500	Rum River at Onamia, MN	414	1910-12
05284750	Rum River at Spencer Brook MN	-	1960-64
05285000	Rum River at Cambridge, MN	a1,160	1909-14
05285500	Rum River at St. Francis, MN	-	1903
05286500	Rum River near Anoka, MN	1,430	1905-06, 1909
05289000	Minnetonka Lake (head of Minnehaha Creek) near Wayzata (at Excelsior), MN	-	1938-64
05289500	Minnehaha Creek at Minnetonka Mills, MN	130	1953-64
Minnesota River basin			
05290000	Little Minnesota River near Peever, SD	447	1939-81
05292500	Minnesota River near Odessa, MN	a1,340	1909-12, 1944-63
05293500	Pomme de Terre River near Morris, MN	-	1937-39, 1940-47
05299500	Canby Creek at Canby, MN	-	1938-39, 1940-46
05300500	Ten Mile Creek near Boyd, MN	82.8	1949-51
05302000	Little Chippewa River near Lowry, MN	a54	1941
*05302500	Little Chippewa River near Starbuck, MN	111	1938-39
05303000	Chippewa River at diversion dam near Hancock, MN	-	1930-39, 1940-46
05303500	Chippewa River at Benson, MN	a1,270	1949-51
05304000	Shakopee Creek near Benson, MN	352	1949-54
05305000	Chippewa River near Watson, MN	a2,050	1910-17, 1931-36
*05311400	South Branch Yellow Medicine River at Minneota, MN	a111	1960-81
05311500	Yellow Medicine River near Cottonwood, MN	465	1945-46
05312000	Spring Creek near Clarkfield, MN	a89	1945-46
05312500	Spring Creek near Hazel Run, MN	101	1945-48
05313000	Yellow Medicine River near Hanley Falls, MN	606	1945-47
05313521	Hawk Creek at outlet of Eagle Lake near Willmar, MN	-	1972-73
05313560	Eagle Lake tributary No. 7 near Willmar, MN	-	1972-73
05313570	Eagle Lake tributary No. 8 near Willmar, MN	-	1972-73
05314000	Chetomba Creek near Maynard, MN	a200	1949-51
*05314500	Hawk Creek near Maynard, MN	474	1949-54
*05315200	Prairie Ravine near Marshall, MN	5.63	1959-64
05315500	Redwood River near Green Valley, MN	436	1945-57

"See footnotes at end of table."

## DISCONTINUED GAGING STATIONS

Station number	Station name	Drainage area (mi <sup>2</sup> )	Period of record
Minnesota River basin--Continued			
05316000	Redwood River near Seaforth, MN	573	1945-46
05316770	Minnesota River at New Ulm, MN	9,536	1968-76
05317500	Minnesota River at Judson, MN	all,200	1938-50
*05318000	East Branch (East Fork) Blue Earth River near Bricelyn, MN	132	1951-70
05319000	South Fork Watonwan River at diversion dam near St. James, MN	-	1939, 1940-46
05321000	Blue Earth River at Mankato, MN	a3,550	1938-39, 1940-42
05330400	Sand Creek at diversion dam near Jordan, MN	-	1938-39, 1940-46
05330800	Purgatory Creek at Eden Prairie, MN	-	1975-80
05330900	Nine Mile Creek at Bloomington, MN	-	1963-73
St. Croix River basin			
*05336200	Glaishby Brook near Kettle River, MN	24.2	1959-70
05336500	Kettle River near Sandstone, MN	825	1908-16
05337000	Grindstone River at Hinckley, MN	-	1940-47
05337500	Snake River at Mora, MN	422	1909-13
05338000	Snake River at Sanatorium Bridge near Pine City, MN	-	1937-38
*05338500	Snake River near Pine City, MN	958	1913-17, 1951-81
05339500	St. Croix River near Rush City, MN	a5,120	1923-61
05340000	Sunrise River near Stacy, MN	167	1949-65
Lower Mississippi River basin			
05345500	Vermillion River at Empire (Empire City), MN	124	1942-44
05346000	Vermillion River at Hastings, MN	195	1942-47
*05355200	Cannon River at Welch, MN	al,320	1909-14, 1930-71
05371500	Mississippi River at Wabasha, MN	a56,600	1934
*05372800	South Fork Zumbro River on Belt Line at Rochester, MN	155	1981
*05372930	Bear Creek at Rochester, MN	80.0	1981
*05372950	Silver Creek at Rochester, MN	17.3	1981
*05372990	Cascade Creek at Rochester, MN	35.8	1981
05373000	South Fork Zumbro River near Rochester, MN	304	1952-81
05373500	Zumbro River (South Branch) near Zumbro Falls, MN	821	1911-17
05374000	Zumbro River at Zumbro Falls, MN	-	1909-17, 1929-80
05374500	Zumbro River at Theilman, MN	al,320	1938-56
*05376500	South Fork Whitewater River near Altura, MN	76.8	1939-71
05377000	Beaver Creek at Beaver, MN	15.4	1939-40
05377500	Whitewater River at Beaver, MN	288	1936-38 1939-56
05379000	Gilmore Creek at Winona, MN	8.95	1939-63
05380500	Mississippi River at Lamoile, MN	a60,000	1930-31
05383500	Mississippi River at LaCrosse, WI	-	1929-55
05383600	North Branch Root River tributary near Stewartville, MN	0.73	1959-64
*05384500	Rush Creek near Rushford, MN	129	1942-79

"See footnotes at end of table."

## DISCONTINUED GAGING STATIONS

Station number	Station name	Drainage area (mi <sup>2</sup> )	Period of record
Lower Mississippi River basin--Continued			
05386000	Root River below South Fork near Houston, MN	al,560	1938-61
05456500	Turtle Creek near Austin, MN	144	1947-51
05475000	Heron Lake outlet near Heron Lake, MN	-	1930-43
Big Sioux River basin			
*06483000	Rock River at Luverne, MN	440	1911-14
06603000	Little Sioux River near Lakefield, MN	17.1	1948-63
06603500	Jackson County ditch No. 11 near Lakefield, MN	7.69	1948-61

\* Presently operated as a high-flow partial-record station.

† Stage records only.

a Approximately.



## UPPER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER MAIN STEM

## 05201000 WINNIBIGOSHISH LAKE NEAR DEER RIVER, MN

LOCATION.--Lat 47°25'42", long 94°03'00", in sec.25, T.146 N., R.27 W., Itasca County, Hydrologic Unit 07010101, on Leech Lake Indian Reservation, at dam on Mississippi River, 1 mi (1.6 km) northwest of Little Winnibigoshish Lake, 14 mi (23 km) northwest of town of Deer River, and at mile 1,248 (2,008 km) upstream from Ohio River.

DRAINAGE AREA.--1,442 mi<sup>2</sup> (3,735 km<sup>2</sup>).

PERIOD OF RECORD.--April 1884 to current year. Prior to October 1941 monthend contents only, published in WSP 1308. Published as Winnibigoshish Reservoir near Deer River October 1941 to September 1956.

REVISED RECORDS.--WSP 1308: 1905(M).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to July 8, 1949, nonrecording gage at same site, and July 9, 1949, to July 10, 1973, water-stage recorder at same site and at datum of 1,288.94 ft (392.869 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by Winnibigoshish Lake and several other natural lakes controlled by a concrete and timber dam, completed in 1884; storage began in 1884. Capacity between elevations 1,294.94 ft (394.700 m) and 1,303.14 ft (397.200 m) (maximum allowable range) is 668,737 acre-ft (825 hm<sup>3</sup>) of which 439,636 acre-ft (542 hm<sup>3</sup>) is controlled storage between elevations 1,294.94 ft (394.700 m) and 1,300.94 ft (396.530 m) (normal operating range). Contents shown herein are contents above elevation 1,286.00 ft (391.973 m). Prior to September 1978, published contents as contents above elevation 1,288.94 ft (392.869 m). Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 996,500 acre-ft (1,230 hm<sup>3</sup>) capacity table then in use, July 30, 1905, elevation, 1,303.39 ft (397.273 m); minimum observed, 33,680 acre-ft (41.5 hm<sup>3</sup>) below zero of capacity table then in use, Oct. 20, 1931, elevation, 1,288.25 ft (392.659 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 708,900 acre-ft (874 hm<sup>3</sup>) July 4, elevation, 1,299.07 ft (395.957 m); minimum, 555,060 acre-ft (684 hm<sup>3</sup>) Feb. 27, elevation, 1,296.74 ft (395.246 m).

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30 .....	1,298.21	649,750	
Oct. 31 .....	1,298.52	670,640	+20,890
Nov. 30 .....	1,298.28	645,440	-16,200
Dec. 31 .....	1,297.85	625,900	-28,540
CAL YR 1982 .....			+3,280
Jan. 31 .....	1,297.22	585,200	-40,700
Feb. 28 .....	1,296.75	555,680	-29,520
Mar. 31 .....	1,297.12	578,860	+23,180
Apr. 30 .....	1,297.49	602,480	+23,620
May 31 .....	1,297.71	616,740	+14,260
June 30 .....	1,298.80	689,790	+73,050
July 31 .....	1,298.68	681,550	-8,240
Aug. 31 .....	1,298.31	656,450	-25,100
Sept. 30 .....	1,298.05	639,100	-17,360
WTR YR 1983 .....			-10,660

## MISSISSIPPI RIVER MAIN STEM

## 05201500 MISSISSIPPI RIVER AT WINNIBIGOSHISH DAM NEAR DEER RIVER, MN

LOCATION.--Lat 47°25'42", long 94°03'00", in SW¼ sec.25, T.146 N., R.27 W., Itasca County, Hydrologic Unit 07010101, on Leech Lake Indian Reservation, at dam 1 mi (1.6 km) northwest of Little Winnibigoshish Lake, 14 mi (23 km) northwest of town of Deer River, and at mile 1,248 (2,008 km) upstream from Ohio River.

DRAINAGE AREA.--1,442 mi<sup>2</sup> (3,735 km<sup>2</sup>).

PERIOD OF RECORD.--May 1884 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder on headwater and nonrecording gage on tailwater. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to June 30, 1973, gages at same sites with datum at 1,289.47 ft (393.030 m) adjustment of 1912. Prior to July 8, 1949, nonrecording headwater gage at same site and datum in use.

REMARKS.--Daily discharge is computed on the basis of modified weir formula and corrected to conform with discharge measurements, the head being determined from readings of headwater and tailwater gages. Flow completely regulated by Winnibigoshish Lake (station 05201000).

COOPERATION.--Daily discharge computed by Corps of Engineers.

AVERAGE DISCHARGE (unadjusted).--99 years, 516 ft<sup>3</sup>/s (14.61 m<sup>3</sup>/s), 4.86 in/yr (123 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 4,370 ft<sup>3</sup>/s (124 m<sup>3</sup>/s) Aug. 6, 1905; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1,200 ft<sup>3</sup>/s (34.0 m<sup>3</sup>/s) July 6-8; minimum daily, 105 ft<sup>3</sup>/s (2.97 m<sup>3</sup>/s) Mar. 5-28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	304	890	1000	994	987	298	106	106	106	985	1180	591		
2	304	888	1000	994	986	179	106	106	106	982	1180	591		
3	304	889	1000	994	987	179	106	106	106	984	1180	591		
4	304	889	1000	992	986	179	106	106	107	1080	1180	591		
5	305	889	1000	992	986	105	106	106	107	1080	1170	591		
6	304	889	1000	992	986	105	106	106	107	1200	1170	591		
7	305	889	1000	992	984	105	106	106	107	1200	1170	591		
8	306	889	1000	992	984	105	106	106	107	1200	1170	590		
9	400	982	1000	992	984	105	106	106	107	1190	1170	590		
10	400	982	1000	992	984	105	106	106	107	1190	1080	590		
11	402	982	1000	992	984	105	106	106	107	1190	986	590		
12	402	984	999	992	891	105	106	106	107	1190	987	590		
13	506	980	999	991	891	105	106	106	107	1190	868	590		
14	604	979	997	991	891	105	106	106	107	1190	870	591		
15	604	979	997	991	891	105	106	106	107	1190	870	593		
16	710	980	997	991	891	105	106	106	205	1190	776	590		
17	709	980	999	991	891	105	106	106	407	1190	781	347		
18	710	980	997	991	891	105	106	106	507	1190	768	350		
19	796	980	997	991	796	105	106	106	506	1190	781	350		
20	797	1000	997	991	798	105	106	106	506	1190	782	351		
21	794	1010	997	991	798	105	106	106	607	1180	781	352		
22	794	1000	997	991	798	105	106	106	765	1180	782	353		
23	793	1000	997	989	703	105	106	106	798	1180	687	353		
24	793	1000	997	989	610	105	106	106	892	1180	589	352		
25	793	1000	997	989	514	105	106	106	989	1180	591	352		
26	890	1000	997	989	418	105	106	106	989	1180	590	353		
27	890	1000	996	989	420	105	106	106	987	1180	590	353		
28	890	1000	996	987	420	105	106	106	985	1180	591	353		
29	890	1000	996	987	---	106	106	106	984	1180	590	353		
30	890	1000	996	987	---	106	106	106	984	1180	590	353		
31	890	---	996	987	---	106	---	106	---	1180	590	---		
TOTAL	18783	28910	30941	30713	23350	3673	3180	3286	12713	35971	27090	14376		
MEAN	606	964	998	991	834	118	106	106	424	1160	874	479		
MAX	890	1010	1000	994	987	298	106	106	989	1200	1180	593		
MIN	304	888	996	987	418	105	106	106	106	982	589	347		
CFSM	.42	.67	.69	.69	.58	.08	.07	.07	.29	.80	.61	.33		
IN.	.48	.75	.80	.79	.60	.09	.08	.08	.33	.93	.70	.37		
AC-FT	37260	57340	61370	60920	46310	7290	6310	6520	25220	71350	53730	28510		
CAL YR 1982	TOTAL	242339	MEAN	664	MAX	1440	MIN	89	CFSM	.46	IN	6.25	AC-FT	480700
WTR YR 1983	TOTAL	232986	MEAN	638	MAX	1200	MIN	105	CFSM	.44	IN	6.01	AC-FT	462100



## LEECH LAKE RIVER BASIN

465724094402601 WILLIAMS LAKE NEAR AKELEY, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	PHYTO- PLANK- TON, TOTAL (CELLS PER ML) (60050)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
OCT											
10...	1.0	.70	1.0	106	<.100	.60	.021	23	290	3.00	<.100
24...	3.0	.90	.5	101	--	--	--	18	--	--	--
24...	3.0	.50	.5	107	--	--	.011	16	--	--	--
24...	--	--	--	--	<.100	.80	.019	--	1100	2.70	<.100
NOV											
26...	2.0	.80	.1	89	--	--	<.001	19	--	--	--
26...	<1.0	.60	.2	96	--	--	<.001	28	--	--	--
26...	--	--	--	--	<.100	.50	<.001	--	330	1.40	<.100
DEC											
23...	<5.0	1.1	.2	114	--	--	--	25	--	--	--
23...	<5.0	.90	.2	120	--	--	.009	30	--	--	--
23...	--	--	--	--	<.100	.40	.014	--	950	2.10	<.100
JAN											
30...	<5.0	.70	.1	104	--	--	--	23	--	--	--
30...	<5.0	.40	.3	96	--	--	.007	17	--	--	--
30...	--	--	--	--	<.100	.50	.008	--	160	.900	<.100
FEB											
26...	<5.0	1.6	.2	119	--	--	--	<3	--	--	--
26...	<5.0	.80	.7	113	--	--	.022	<3	--	--	--
26...	--	--	--	--	<.100	.60	.023	--	630	1.80	<.100
APR											
02...	<5.0	.80	.5	115	--	--	--	14	--	--	--
02...	<5.0	.80	.4	102	--	--	.007	10	--	--	--
02...	--	--	--	--	<.100	.70	.012	--	1300	3.90	<.100
MAY											
01...	<5.0	2.6	.3	98	--	--	--	<3	--	--	--
01...	<5.0	.70	.2	91	--	--	--	<3	--	--	--
01...	--	--	--	--	<.100	.40	.014	--	--	--	--
28...	<5.0	.80	.2	124	--	--	--	10	--	--	--
28...	<5.0	.60	.2	127	--	--	--	17	--	--	--
28...	--	--	--	--	<.100	.60	--	--	--	--	--
JUN											
15...	<5.0	.60	.2	129	--	--	--	15	--	--	--
15...	<5.0	.70	.1	125	--	--	.014	18	--	--	--
15...	--	--	--	--	<.100	.40	.013	--	--	1.10	<.100
JUL											
08...	1.0	.80	.5	99	--	--	--	10	--	--	--
08...	1.0	1.0	.5	110	--	--	--	30	--	--	--
08...	--	--	--	--	<.100	.50	.018	--	--	--	--
21...	1.0	6.9	.6	104	--	--	.039	14	--	--	--
21...	--	--	--	--	<.100	.60	.038	--	--	4.50	<.100
AUG											
03...	3.0	.70	.8	111	--	--	--	<3	--	--	--
03...	<1.0	.80	.6	120	--	--	.216	9	--	--	--
03...	--	--	--	--	<.100	.60	.030	--	--	1.70	<.100
17...	<1.0	.80	.9	104	--	--	--	11	--	--	--
17...	1.0	.80	.9	115	--	--	--	7	--	--	--
19...	--	--	--	--	<.100	.10	.015	--	--	--	--
SEP											
16...	1.0	.50	1.0	93	--	--	--	15	--	--	--
16...	2.0	.50	1.0	103	--	--	--	95	--	--	--
16...	--	--	--	--	<.100	.70	.022	--	--	--	--

## LEECH LAKE RIVER BASIN

465724094402601 WILLIAMS LAKE NEAR AKELEY, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)
OCT								
10...	1000	.00	163	7.2	13.0	--	8.9	.032
10...	1020	6.60	163	6.9	13.0	--	8.5	.018
10...	1030	13.1	163	6.7	12.5	--	8.0	.011
10...	1040	19.7	163	6.6	12.5	--	7.9	.009
10...	1050	26.2	162	6.7	12.5	--	7.5	.010
10...	1115	26.7	162	6.7	12.5	--	7.5	.021
24...	1000	.00	175	7.5	9.0	--	11.0	.006
24...	1015	3.30	176	7.3	9.0	--	10.7	--
24...	1020	6.60	178	7.2	9.0	--	10.6	.011
24...	1030	13.2	179	7.2	9.0	--	10.2	.011
24...	1040	17.8	180	7.1	9.0	--	10.1	.012
24...	1050	27.0	181	7.1	9.0	--	10.0	.011
NOV								
26...	1000	.00	164	7.8	4.0	--	12.4	<.001
26...	1025	6.60	164	7.6	4.5	--	12.1	<.001
26...	1035	13.1	164	7.6	4.0	--	12.1	<.001
26...	1045	3.30	164	7.6	4.5	--	12.2	<.001
26...	1100	26.7	170	7.0	4.5	--	8.9	<.001
DEC								
23...	1100	.00	174	7.6	2.0	--	11.3	.013
23...	1105	3.30	175	7.5	4.0	--	10.4	--
23...	1120	6.60	174	7.5	4.0	--	10.4	.017
23...	1130	13.1	174	7.6	4.0	--	10.3	.012
23...	1140	19.7	174	7.5	4.5	--	10.1	.120
23...	1150	26.2	178	7.4	4.5	--	8.5	.009
JAN								
30...	1000	.00	176	--	.5	--	12.0	.011
30...	1005	3.30	172	--	3.0	--	10.5	--
30...	1020	6.60	172	--	4.0	--	9.7	.011
30...	1030	13.1	174	--	4.0	--	8.5	.011
30...	1040	19.7	175	--	4.0	--	8.2	.010
30...	1050	26.4	184	--	5.0	722	3.7	.007
FEB								
26...	1300	.00	179	7.6	1.5	719	11.4	.023
26...	1305	3.30	179	7.6	2.5	719	10.0	--
26...	1320	6.60	179	7.4	4.5	719	7.8	.021
26...	1330	13.1	184	7.2	4.5	719	4.8	.023
26...	1340	19.7	185	7.1	4.5	719	4.5	.020
26...	1350	26.2	189	7.1	4.5	719	3.0	.022
APR								
02...	1100	.00	108	7.2	3.5	721	9.4	.002
02...	1105	3.30	179	7.1	5.0	721	10.0	--
02...	1120	6.60	179	7.1	5.0	721	10.0	.006
02...	1130	13.2	181	7.2	5.5	721	8.8	.009
02...	1140	17.8	183	7.1	5.0	721	7.6	.006
02...	1150	26.4	186	7.1	5.0	721	2.5	.007
MAY								
01...	0900	.00	169	8.0	10.0	729	9.9	.008
01...	0905	3.30	169	8.0	10.0	729	9.8	--
01...	0920	6.60	169	8.1	10.0	729	9.9	.008
01...	0930	13.2	169	8.2	9.5	729	9.8	.013
01...	0940	17.8	168	8.2	9.0	729	9.5	.009
01...	0950	26.4	172	7.8	6.5	729	7.5	.016
28...	1300	.00	184	8.0	16.5	728	9.2	.010
28...	1305	3.30	184	8.1	16.5	728	9.5	--
28...	1320	6.60	184	8.2	16.0	728	9.3	.010
28...	1330	13.2	184	8.2	15.5	728	7.3	.006
28...	1340	17.8	184	8.1	14.0	728	4.6	.001
28...	1350	26.4	186	7.8	12.0	728	3.7	.004
28...	1350	29.7	--	--	--	728	3.1	--
JUN								
15...	1100	.00	158	8.4	18.5	--	8.5	.020
15...	1105	3.30	158	8.4	18.5	--	8.6	--
15...	1120	6.60	161	8.4	18.5	--	8.8	.017
15...	1130	13.2	165	8.3	18.5	--	8.4	.017
15...	1140	19.8	165	8.3	16.0	--	7.2	.015
15...	1150	27.9	178	7.9	13.5	--	3.7	.014
JUL								
08...	1200	.00	158	8.6	25.0	--	9.1	.026
08...	1210	3.30	157	8.6	23.5	--	9.3	--
08...	1215	6.60	157	8.6	23.5	--	9.3	.014
08...	1225	13.2	157	8.6	22.5	--	9.5	.008

## LEECH LAKE RIVER BASIN

465724094402601 WILLIAMS LAKE NEAR AKELEY, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)
JUL								
08...	1235	19.8	175	8.6	18.5	--	7.7	.012
08...	1245	26.4	182	7.9	15.0	--	.9	.015
08...	1255	28.3	188	--	13.5	--	.6	--
21...	1200	.00	154	8.2	26.0	--	8.4	.024
21...	1215	3.30	154	8.3	26.0	--	8.3	--
21...	1220	6.60	154	8.3	26.0	--	8.3	.040
21...	1230	13.2	163	8.1	24.5	--	8.1	.040
21...	1240	19.8	179	7.5	19.5	--	6.2	.036
21...	1250	27.7	186	6.9	15.0	--	.7	.039
AUG								
03...	1200	.00	155	8.1	26.5	--	8.3	.013
03...	1215	3.30	156	8.3	25.5	--	8.4	--
03...	1220	6.60	156	8.3	25.5	--	8.5	.010
03...	1230	13.2	156	8.2	25.5	--	8.2	.008
03...	1240	19.8	181	7.6	20.5	--	6.6	.040
03...	1250	26.4	189	7.1	15.5	--	.8	.216
17...	1220	.00	155	8.3	26.0	--	8.6	.018
17...	1230	3.30	155	8.2	25.5	--	8.6	--
17...	1240	6.60	155	8.2	25.5	--	8.6	.017
17...	1250	13.2	155	8.2	25.5	--	8.3	.019
17...	1300	19.8	182	>7.4	22.0	--	6.2	.021
17...	1320	26.4	191	6.9	16.5	--	.7	.031
17...	1330	26.4	191	6.9	16.5	--	.7	--
SEP								
16...	1300	.00	160	7.2	18.5	--	7.5	.019
16...	1315	3.30	160	7.3	18.5	--	7.4	--
16...	1320	6.60	160	7.3	18.5	--	7.4	.013
16...	1330	13.2	160	>7.3	18.5	--	7.4	.047
16...	1340	19.8	163	7.4	18.5	--	>7.4	.017
16...	1350	26.4	177	6.9	18.0	--	4.0	.048
16...	1400	26.4	177	6.9	18.0	--	4.0	--

## LEECH LAKE RIVER BASIN

05206000 LEECH LAKE AT FEDERAL DAM, MN

LOCATION.--Lat 47°12'23", long 94°18'31", in lot 2, sec.14, T.143 N., R.29 W., Cass County, Hydrologic Unit 07010102, on Leech Lake Indian Reservation, at head of Leech Lake River on Waboose Bay, 5 mi (8 km) southwest of town of Federal Dam.

DRAINAGE AREA.--1,163 mi<sup>2</sup> (3,012 km<sup>2</sup>).

PERIOD OF RECORD.--April 1884 to current year. Monthend contents only for some periods, published in WSP 1308. Prior to October 1956, published as "Leech Lake Reservoir."

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Dec. 31, 1884, nonrecording gage 0.5 mi (0.8 km) north of outlet to Leech Lake River at datum 98.47 ft (30.014 m) higher. Dec. 31, 1884, to May 24, 1931, nonrecording gage 0.5 mi (0.8 m) north of outlet to Leech Lake River and May 25, 1931, to July 10, 1973, water-stage recorder at same site and at datum 92.70 ft (28.255 m) higher.

REMARKS.--Reservoir is formed by Leech Lake and several other natural lakes controlled by concrete and timber dam; storage began in 1884; original timber structure completed in 1884, replaced by present dam in 1902. Capacity between elevation 1,292.70 ft (394.015 m) and 1,297.94 ft (395.612 m) (maximum allowable range) is 688,985 acre-ft (850 hm<sup>3</sup>) of which 352,637 acre-ft (435 hm<sup>3</sup>) is controlled storage between elevations 1,292.70 ft (394.015 m) and 1,295.70 ft (394.929 m) (normal operating range). Contents shown herein are contents above elevation 1,290.00 ft (393.192 m). Prior to September 1978, published contents as contents above elevation 1,292.20 ft (393.863 m). Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 734,300 acre-ft (905 hm<sup>3</sup>) capacity table then in use, June 30, 1916, elevation, 1,297.88 ft (395.594 m); minimum, 51,380 acre-ft (63.4 hm<sup>3</sup>) capacity table then in use, Dec. 8, 24, 1976, elevation, 1,292.69 ft (394.012 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 573,070 acre-ft (707 hm<sup>3</sup>) July 3, elevation, 1,295.19 ft (394.774 m); minimum, 387,810 acre-ft (478 hm<sup>3</sup>) Feb. 28, elevation, 1,293.62 ft (394.295 m).

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1982 to SEPTEMBER 1983

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30 .....	1,294.80	523,620	
Oct. 31 .....	1,294.62	501,600	-22,020
Nov. 30 .....	1,294.33	467,200	-34,400
Dec. 31 .....	1,294.05	435,200	-32,000
CAL YR 1982 .....			-14,700
Jan. 31 .....	1,293.82	409,720	-25,480
Feb. 28 .....	1,293.62	387,810	-21,910
Mar. 31 .....	1,293.94	422,950	+35,140
Apr. 30 .....	1,294.20	452,190	+29,240
May 31 .....	1,294.30	463,710	+11,520
June 30 .....	1,294.72	513,770	+50,060
July 31 .....	1,294.82	526,090	+12,320
Aug. 31 .....	1,294.75	517,450	-8,640
Sept. 30 .....	1,294.47	483,640	-33,810
WTR YR 1983 .....			-39,980

LOCATION.--Lat 47°14'45", long 94°13'12", in sec.29, T.144 N., R.28 W., Cass County, Hydrologic Unit 07010102, on Leech Lake Indian Reservation, on right bank at dam on Leech Lake River at town of Federal Dam, 2 mi (3 km) downstream from natural outlet of Leech Lake.

PERIOD OF RECORD.--May 1884 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder, headwater gage, and nonrecording tailwater gage. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to June 30, 1973, gages (nonrecording headwater gage prior to July 3, 1948) at same sites with datum at 1,293.23 ft (394.176 m) adjustment of 1912. May 27 to Nov. 30, 1929, nonrecording gage at site 600 ft (183 m) downstream at different datum.

COOPERATION.--Computations of daily discharge furnished by Corps of Engineers.

AVERAGE DISCHARGE (unadjusted).--99 years, 364 ft<sup>3</sup>/s (10.31 m<sup>3</sup>/s), 4.25 in/yr (108 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,520 ft<sup>3</sup>/s (71.4 m<sup>3</sup>/s) June 7, 1957 (result of dam failure); no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1,180 ft<sup>3</sup>/s (33.4 m<sup>3</sup>/s) Nov. 15; minimum daily, 104 ft<sup>3</sup>/s (2.95 m<sup>3</sup>/s) Mar. 10-12.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	398	1120	1070	998	964	609	110	112	122	600	600	200
2	413	1140	1060	1010	964	609	110	112	122	588	530	191
3	405	1140	1100	1000	918	609	112	118	122	612	504	191
4	413	1120	1080	1000	917	506	112	118	122	1070	476	191
5	405	1120	1100	1000	936	405	110	118	122	1060	392	191
6	405	1090	1100	998	940	422	110	112	128	1020	392	191
7	420	1090	1130	1010	930	423	112	112	118	1020	413	191
8	413	1100	1060	998	930	319	112	118	122	1020	392	191
9	398	1120	1030	994	926	204	112	112	122	1010	392	186
10	442	1120	1050	1010	923	104	112	112	118	1020	392	191
11	443	1120	1030	1010	943	104	112	112	122	1030	320	191
12	443	1140	1030	996	944	104	112	112	118	1020	300	191
13	495	976	1040	1000	940	106	118	118	110	1010	209	191
14	609	1100	1050	1000	943	108	118	122	136	1010	200	186
15	598	1180	1040	1000	944	108	118	122	144	1000	200	177
16	710	1070	1040	993	938	108	118	122	672	1140	200	186
17	696	1110	1030	993	938	108	118	118	840	1130	200	186
18	696	1100	1040	987	937	108	118	118	625	1130	208	200
19	814	1100	1040	962	934	108	118	118	612	1150	208	186
20	922	1110	1040	962	938	108	118	122	613	1140	200	191
21	925	1100	1030	982	938	108	118	118	625	1130	191	186
22	925	1110	1030	984	938	108	118	132	612	824	200	186
23	923	1110	1030	982	800	108	118	118	600	820	191	186
24	945	1080	1030	989	800	108	118	118	600	820	200	186
25	922	1080	1040	956	800	108	118	122	612	820	191	177
26	1000	1080	1030	954	800	108	118	118	612	820	191	177
27	1130	1050	1020	947	700	108	118	112	588	820	200	177
28	1130	1070	1040	946	700	108	118	118	588	644	191	186
29	1150	1070	964	976	---	108	118	122	588	624	206	187
30	1150	1070	972	973	---	108	118	118	600	600	191	177
31	1120	---	971	967	---	110	---	122	---	613	200	---
TOTAL	21858	32986	32317	30577	25223	6470	3460	3646	11235	28315	8880	5624
MEAN	705	1100	1042	986	901	209	115	118	375	913	286	187
MAX	1150	1180	1130	1010	964	609	118	132	840	1150	600	200
MIN	398	976	964	946	700	104	110	112	110	588	191	177
CFSM	.61	.95	.90	.85	.78	.18	.10	.10	.32	.79	.25	.16
IN.	.70	1.06	1.03	.98	.81	.21	.11	.12	.36	.91	.28	

CAL YR 1982	TOTAL	222799	MEAN	610	MAX	1300	MIN	99	CFSM	.53	IN	7.13	AC-FT	441900
WTR YR 1983	TOTAL	210591	MEAN	577	MAX	1180	MIN	104	CFSM	.50	IN	6.74	AC-FT	417700



## MISSISSIPPI RIVER MAIN STEM

05210500 POKEGAMA LAKE NEAR GRAND RAPIDS, MN

LOCATION.--Lat 47°10'00", long 93°33'20", in NW¼ sec.17, T.54 N., R.25 W., Itasca County, Hydrologic Unit 07010101, at narrows on U.S. Highway 169, 4 mi (6 km) south of Grand Rapids and at mile 1,184 (1,905 km) upstream from Ohio River.

DRAINAGE AREA.--3,265 mi<sup>2</sup> (8,456 km<sup>2</sup>).

PERIOD OF RECORD.--April 1884 to current year. Prior to October 1941 monthend contents only, published in WSP 1308. Published as Pokegama Reservoir near Grand Rapids October 1941 to September 1956.

REVISED RECORDS.--WSP 1914: 1897(M).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to May 30, 1949, nonrecording gage at Pooles Arm of Pokegama Lake 5 mi (8 km) northwest, and May 31, 1949, to July 12, 1973, water-stage recorder at same site and at datum 64.42 ft (19.635 m) higher.

REMARKS.--Reservoir is formed by Pokegama Lake and several other natural lakes controlled by concrete dam; storage began in 1884; original timber dam completed in 1884, replaced by present structure in 1888-89. Capacity between elevation 1,270.42 ft (387.224 m) and 1,276.42 ft (389.053 m) (maximum allowable range) is 80,126 acre-ft (98.8 hm<sup>3</sup>) of which 52,483 acre-ft (64.7 hm<sup>3</sup>) is controlled storage between elevations 1,270.42 ft (387.224 m) and 1,274.42 ft (388.443 m) (normal operating range). Contents shown herein are contents above elevation 1,267.00 ft (386.182 m). Prior to September 1978, published contents as contents above elevation 1,268.92 ft (386.767 m). Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 124,100 acre-ft (153 hm<sup>3</sup>) Apr. 30, 1979, elevation, 1,276.85 ft (389.184 m); maximum elevation, 1,277.92 ft (389.510 m) May 8, 1897; minimum contents observed, 4,520 acre -ft (5.57 hm<sup>3</sup>) below zero of capacity table then in use, Sept. 30, 1934, elevation, 1,268.54 ft (386.651 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 82,670 acre-ft (102 hm<sup>3</sup>) July 5, elevation, 1,273.85 ft (388.269 m); minimum, 56,570 acre-ft (69.8 hm<sup>3</sup>) Feb. 21, elevation, 1,271.90 ft (387.675 m).

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30 .....	1,273.32	75,450	
Oct. 31 .....	1,272.72	67,360	-8,090
Nov. 30 .....	1,272.66	66,560	-800
Dec. 31 .....	1,272.16	59,960	-6,600
CAL YR 1982 .....			+8,270
Jan. 31 .....	1,272.03	58,260	-1,700
Feb. 28 .....	1,272.19	60,350	+2,090
Mar. 31 .....	1,272.39	62,980	+2,630
Apr. 30 .....	1,272.89	69,640	+6,660
May 31 .....	1,273.53	78,300	+8,660
June 30 .....	1,273.57	78,850	+550
July 31 .....	1,273.42	76,810	-2,040
Aug. 31 .....	1,273.48	77,620	+810
Sept. 30 .....	1,273.43	76,940	-680
WTR YR 1983 .....			+1,490

## MISSISSIPPI RIVER MAIN STEM

05211000 MISSISSIPPI RIVER AT GRAND RAPIDS, MN

LOCATION.--Lat 47°13'56", long 93°31'48", in SW¼NW¼ sec.21, T.55 N., R.25 W., Itasca County, Hydrologic Unit 07010103, on left bank, in super-calendar room of Blandin Paper Mill in Grand Rapids, 400 ft (122 m) downstream from Blandin Dam, 400 ft (122 m) upstream from bridge on U.S. Highway 169, 2.5 mi (4.0 km) upstream from Prairie River, and at mile 1,182 (1,902 km) upstream from Ohio River.

DRAINAGE AREA.--3,370 mi<sup>2</sup> (8,730 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--October 1883 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "at Pokegama Dam near Grand Rapids" 1942-44.

GAGE.--Water-stage recorder. Datum of gage is 1,242.03 ft (378.571 m) National Geodetic Vertical Datum of 1929. See WSP 1914 for history of changes prior to Jan. 17, 1951.

REMARKS.--Records fair. Flow regulated by Winnibigoshish Lake (station 05201000), Leech Lake (station 05206000), Pokegama Lake (station 05210500) and occasionally at low flow by powerplant at Blandin Dam. Backwater from Prairie River occurs at times in most years.

AVERAGE DISCHARGE.--100 years, 1,176 ft<sup>3</sup>/s (33.30 m<sup>3</sup>/s); median of yearly mean discharges, 1,050 ft<sup>3</sup>/s (29.7 m<sup>3</sup>/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft<sup>3</sup>/s (354 m<sup>3</sup>/s) Sept. 3, 1948, gage height, 15.2 ft (4.633 m), from floodmark, caused by dam failure at gage, from rating curve extended above 4,500 ft<sup>3</sup>/s (127 m<sup>3</sup>/s); maximum daily, 5,250 ft<sup>3</sup>/s (149 m<sup>3</sup>/s) Sept. 5, 8, 1905; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,180 ft<sup>3</sup>/s (90.1 m<sup>3</sup>/s) Aug. 3, gage height, 8.25 ft (2.515 m); minimum daily discharge, 182 ft<sup>3</sup>/s (5.15 m<sup>3</sup>/s) May 2; minimum gage height, 2.60 ft (0.792 m) Mar. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	938	2080	2400	2100	2000	2200	536	195	558	1370	2290	1580
2	1000	2060	2400	2100	2000	1970	574	182	560	1500	2320	1080
3	966	2110	2450	2100	2000	1920	550	218	575	1760	3070	840
4	890	2060	2500	2100	2000	1680	581	216	570	2140	3020	906
5	1030	2070	2500	2100	1950	1410	560	188	564	2370	2840	900
6	1090	2090	2400	2100	1950	1490	585	194	565	2320	2670	972
7	1240	2060	2300	2100	1950	1420	575	230	565	2260	2610	1150
8	1580	2060	2200	2100	1950	1320	603	215	563	2260	2520	1050
9	1780	2150	2200	2100	1950	1400	548	194	560	2210	2460	1100
10	1790	2150	2150	2100	1950	1630	582	228	553	2210	2690	1120
11	1850	2140	2150	2100	1950	1780	662	238	465	2180	2720	1080
12	1970	2110	2150	2100	1950	1750	827	210	531	2100	2670	1080
13	2140	1800	2150	2100	1950	1720	826	330	469	1930	2540	1080
14	1920	1900	2150	2100	1950	1540	791	408	495	1800	2290	1100
15	1870	1990	2150	2100	1950	1220	788	419	672	1880	1610	1230
16	1980	2080	2100	2100	1950	625	812	609	1030	2030	1550	1340
17	2100	2090	2100	2050	1950	528	787	697	1240	1970	1360	1690
18	2030	2070	2100	2050	2000	514	769	702	1330	2070	1460	1380
19	1910	2100	2100	2050	2000	487	772	706	1350	2260	1630	900
20	1930	2200	2100	2050	2050	514	684	714	1360	2380	1860	810
21	1960	2300	2100	2050	2100	518	577	719	1380	2330	1860	840
22	2240	2300	2100	2050	2100	523	607	716	1500	2290	1820	780
23	2390	2300	2100	2050	2150	528	587	592	1640	2230	1850	880
24	2440	2300	2100	2050	2150	492	581	565	1650	2250	1850	860
25	2290	2300	2050	2050	2150	565	594	567	1620	2270	1840	900
26	2150	2400	1500	2050	2200	518	600	571	1640	2290	1830	880
27	2060	2400	2200	2050	2200	532	592	483	1600	2220	1800	880
28	2080	2400	2200	2030	2200	541	584	419	1630	2210	1970	895
29	2060	2400	2200	2000	---	538	412	423	1490	2250	1780	885
30	2040	2400	2100	2000	---	544	214	398	1280	2250	1860	865
31	2080	---	2100	2000	---	550	---	491	---	2300	1840	---
TOTAL	55794	64870	67500	64180	56650	32967	18760	13037	30005	65890	66480	31053
MEAN	1800	2162	2177	2070	2023	1063	625	421	1000	2125	2145	1035
MAX	2440	2400	2500	2100	2200	2200	827	719	1650	2380	3070	1690
MIN	890	1800	1500	2000	1950	487	214	182	465	1370	1360	780
CFSM	.53	.64	.65	.61	.60	.32	.19	.13	.30	.63	.64	.31
IN.	.62	.72	.75	.71	.63	.36	.21	.14	.33	.73	.73	.34
AC-FT	110700	128700	133900	127300	112400	65390	37210	25860	59510	130700	131900	61590
CAL YR 1982	TOTAL	659446	MEAN	1807	MAX	3470	MIN	167	CFSM	.54	IN	7.28
WTR YR 1983	TOTAL	567186	MEAN	1554	MAX	3070	MIN	182	CFSM	.46	IN	6.26
									AC-FT	1308000	AC-FT	1125000

## PRAIRIE RIVER BASIN

05212700 PRAIRIE RIVER NEAR TACONITE, MN

LOCATION.--Lat 47°23'20", long 93°22'50", in NW¼SW¼ sec.27, T.57 N., R.24 W., Itasca County, Hydrologic Unit 07010103, on left bank 125 ft (38 m) upstream from bridge on County Highway 7, 1.5 mi (2.4 km) downstream from outlet of Lawrence Lake and 5 mi (8 km) north of Taconite.

DRAINAGE AREA.--360 mi<sup>2</sup> (932 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--April 1967 to September, 1983 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,294.81 ft (394.658 m) National Geodetic Vertical Datum of 1929. Prior to Aug. 31, 1967, nonrecording gage at site 125 ft (38 m) downstream at same datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--16 years, 227 ft<sup>3</sup>/s (6.429 m<sup>3</sup>/s), 8.56 in/yr (217 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,250 ft<sup>3</sup>/s (92.0 m<sup>3</sup>/s) Apr. 17, 1969, gage height, 11.81 ft (3.600 m); minimum, 7.0 ft<sup>3</sup>/s (0.20 m<sup>3</sup>/s) Oct. 5, 1970; minimum gage height, 1.34 ft (0.408 m) Nov. 7, 1976, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 709 ft<sup>3</sup>/s (20.1 m<sup>3</sup>/s) Oct. 16, 17, gage height, 6.82 ft (2.079 m); minimum, 68 ft<sup>3</sup>/s (1.93 m<sup>3</sup>/s) Aug. 9, gage height, 2.43 ft (0.741 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	82	245	323	110	85	90	142	313	232	184	115	180
2	105	229	301	110	85	90	162	324	232	167	108	187
3	143	236	284	110	85	95	188	323	230	212	105	191
4	144	235	268	110	80	95	204	320	233	312	99	190
5	153	230	258	110	80	100	218	313	229	368	93	190
6	199	230	246	110	80	138	238	307	217	361	88	189
7	279	235	230	110	75	178	260	299	205	367	80	184
8	319	246	210	110	75	218	275	280	194	387	76	178
9	360	247	200	110	75	262	285	264	188	395	70	173
10	441	251	190	105	75	264	289	254	179	393	80	168
11	510	253	180	105	75	258	288	247	179	379	89	161
12	571	262	170	105	80	262	284	240	175	348	81	154
13	628	263	165	105	80	262	285	254	198	314	78	147
14	672	250	160	105	85	256	289	264	246	280	82	138
15	701	241	155	105	85	244	277	262	343	247	85	134
16	708	228	150	105	90	230	270	259	418	223	88	137
17	706	234	145	105	90	215	262	255	443	196	91	131
18	695	225	140	105	90	202	257	250	475	177	94	131
19	672	224	135	100	90	188	252	247	511	162	93	131
20	638	272	130	100	90	175	250	250	535	154	90	134
21	593	326	125	100	90	164	250	250	540	145	88	136
22	550	353	120	100	90	154	251	246	500	142	83	148
23	508	367	115	100	90	144	247	242	460	149	79	169
24	468	377	110	100	90	134	242	241	420	156	79	182
25	431	389	110	100	90	128	239	240	350	158	85	179
26	396	397	110	95	90	124	247	233	320	154	106	166
27	362	401	110	95	90	121	266	227	290	147	117	150
28	335	394	110	95	90	117	277	228	254	141	125	135
29	308	375	110	90	---	114	295	241	219	132	139	124
30	285	349	110	90	---	114	308	242	201	128	155	116
31	264	---	110	90	---	119	---	236	---	124	168	---
TOTAL	13226	8564	5280	3190	2370	5255	7597	8151	9216	7202	3009	4733
MEAN	427	285	170	103	84.6	170	253	263	307	232	97.1	158
MAX	708	401	323	110	90	264	308	324	540	395	168	191
MIN	82	224	110	90	75	90	142	227	175	124	70	116
CFSM	1.19	.79	.47	.29	.24	.47	.70	.73	.85	.64	.27	.44
IN.	1.37	.88	.55	.33	.24	.54	.79	.84	.95	.74	.31	.49
CAL YR 1982	TOTAL 108911	MEAN 298	MAX 1870	MIN 65	CFSM .83	IN 11.25						
WTR YR 1983	TOTAL 77793	MEAN 213	MAX 708	MIN 70	CFSM .59	IN 8.04						

## SWAN RIVER BASIN

05216820 INITIAL TAILINGS BASIN OUTFLOW NEAR KEEWATIN, MN

LOCATION.--Lat 47°22'20", long 93°01'58", in SW¼SE¼ sec.32, T.57 N., R.21 W., St. Louis County, Hydrologic Unit 07010103, on right bank at breach in dike of initial tailings pond, 200 ft (61 m) upstream of Baseline Road and 2.8 mi (4.5 km) southeast of Keewatin.

DRAINAGE AREA.--2.5 mi<sup>2</sup> (6.5 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1982 to September 1983.

GAGE.--Water-stage recorder. Datum of gage is 1488.40 ft (453.664 m) National Geodetic Vertical Datum of 1929. Prior to July 7, 1982, nonrecording gage at site 15 ft (5 m) downstream at same datum.

REMARKS.--Records fair.

EXTREMES FOR CURRENT PERIOD.--April to September 1982: Maximum discharge during period, 142 ft<sup>3</sup>/s (4.02 m<sup>3</sup>/s) Apr. 15, gage height, 5.72 ft (1.743 m), site then in use; no flow on many days.

Water year 1983: Maximum discharge, 23 ft<sup>3</sup>/s (0.65 m<sup>3</sup>/s) Oct. 6, gage height, 4.90 ft (1.494 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							.00	.00	.01	.00	.25	.00
2							.00	.00	.00	.00	.25	.00
3							.00	.00	.00	1.0	.34	.00
4							.00	.16	.00	.50	.19	.00
5							.00	1.9	.00	1.0	.12	.00
6							.00	.32	.00	3.5	.08	.00
7							.00	.54	.00	3.5	.17	.00
8							.00	.30	.00	.12	.54	.00
9							.00	.20	.00	7.3	.15	.00
10							.00	1.0	.00	1.5	.02	.00
11							.00	1.5	.00	.80	.00	.00
12							.00	.16	.00	.50	.00	.00
13							1.4	5.1	.00	.37	.02	.00
14							13	7.0	.00	.23	.01	.00
15							66	5.0	.00	.12	.00	.00
16							27	3.0	.00	.15	.00	.00
17							11	1.0	.00	.28	.00	.00
18							7.0	14	.00	.19	.00	.00
19							3.2	3.5	.00	.10	.00	.00
20							2.2	.38	.00	.00	.00	.00
21							2.7	.13	.00	.19	.00	.00
22							2.4	.10	.00	.05	.00	.00
23							1.8	.07	.00	.02	.00	.00
24							1.0	.05	.00	3.0	.00	.00
25							.50	.03	.00	.77	.00	.00
26							.20	.00	.00	.28	.00	.00
27							.10	.00	.00	.17	.00	.00
28							.06	.00	.00	.12	.00	.00
29							.01	.00	.00	7.8	.00	.00
30							.00	.00	.00	4.7	.00	.00
31							---	.00	---	1.4	.00	---
TOTAL							139.57	45.44	.01	39.66	2.14	.00
MEAN							4.65	1.47	.000	1.28	.069	.000
MAX							66	14	.01	7.8	.54	.00
MIN							.00	.00	.00	.00	.00	.00
CFSM							1.86	.59	.000	.51	.03	.000
IN.							2.08	.68	.00	.59	.03	.00
AC-FT							277	90	.02	79	4.2	.00

## SWAN RIVER BASIN

05216820 INITIAL TAILINGS BASIN OUTFLOW NEAR KEEWATIN, MN--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.10	.10	.00	.00	.00	.03
2	7.2	.38	.00	.00	.00	.00	.50	.06	.00	.07	.00	.02
3	2.1	1.0	.00	.00	.00	.00	1.0	.09	.01	4.1	.00	.01
4	.40	.14	.00	.00	.00	.00	1.2	.15	.01	2.0	.00	.01
5	.19	.21	.00	.00	.00	.00	1.4	.06	.01	.42	.00	.02
6	12	.28	.00	.00	.00	.00	1.7	.02	.00	.11	.00	.03
7	13	.49	.00	.00	.00	.00	1.5	.01	.01	.05	.00	.02
8	3.3	.95	.00	.00	.00	.00	1.3	.01	.00	.04	.00	.00
9	2.5	.25	.00	.00	.00	.00	1.2	.01	.00	.02	.00	.00
10	4.6	.17	.00	.00	.00	.00	1.1	.00	.02	.00	.21	.07
11	3.0	.28	.00	.00	.00	.00	1.0	.00	.03	.00	.00	.04
12	3.4	.31	.00	.00	.00	.00	.83	.01	.01	.00	.00	.01
13	2.4	.19	.00	.00	.00	.00	.80	.17	.01	.00	.00	.00
14	1.4	.05	.00	.00	.00	.00	.80	.12	1.3	.00	.00	.00
15	.83	.01	.00	.00	.00	.00	.80	.02	1.2	.00	.00	.06
16	.23	.01	.00	.00	.00	.00	.80	.01	.57	.00	.00	.15
17	.14	.00	.00	.00	.00	.00	.80	.00	.08	.00	.00	.05
18	.15	.00	.00	.00	.00	.00	.80	.00	.02	.00	.00	.08
19	.14	.02	.00	.00	.00	.00	.79	.00	.01	.00	.00	.04
20	.17	5.0	.00	.00	.00	.00	.72	.01	.00	.00	.00	.04
21	.09	2.0	.00	.00	.00	.00	.60	.01	.00	.00	.00	.05
22	.05	.50	.00	.00	.00	.00	.55	.01	.00	.00	.00	.04
23	.04	.20	.00	.00	.00	.00	.50	.00	.00	.00	.00	.02
24	.03	.05	.00	.00	.00	.00	.45	.00	.00	.00	5.0	.00
25	.02	.02	.00	.00	.00	.00	.40	.00	.00	.00	.59	.00
26	.01	.00	.00	.00	.00	.00	.35	.00	.00	.00	.17	.00
27	.01	.00	.00	.00	.00	.00	.30	.00	.00	.00	.10	.00
28	.00	.00	.00	.00	.00	.00	.25	.00	.00	.00	.10	.00
29	.06	.00	.00	.00	---	.00	.20	.01	.00	.00	.10	.00
30	.12	.00	.00	.00	---	.00	.15	.01	.00	.00	.05	.00
31	.01	---	.00	.00	---	.00	---	.00	---	.00	.04	---
TOTAL	57.59	12.51	.00	.00	.00	.00	22.89	.89	3.29	6.81	6.36	.79
MEAN	1.86	.42	.000	.000	.000	.000	.76	.029	.11	.22	.21	.026
MAX	13	5.0	.00	.00	.00	.00	1.7	.17	1.3	4.1	5.0	.15
MIN	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00
CFSM	.74	.17	.000	.000	.000	.000	.30	.01	.04	.09	.08	.01
IN.	.86	.19	.00	.00	.00	.00	.34	.01	.05	.10	.09	.01
AC-FT	114	25	.00	.00	.00	.00	45	1.8	6.5	14	13	1.6

WTR YR 1983 TOTAL 111.13 MEAN .30 MAX 13 MIN .00 CFSM .12 IN 1.65 AC-FT 220

## SWAN RIVER BASIN

05216820 INITIAL TAILINGS BASIN OUTFLOW NEAR KEEWATIN, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1982 to September 1983.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

								SED.					
DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	CALCIUM TOTAL RECOV- ERABLE (MG/L AS CA) (00916)	MAGNE- SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927)	SODIUM, TOTAL RECOV- ERABLE (MG/L AS NA) (00929)	POTAS- SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	
OCT 07...	1335	11	8.0	260	264	8.0	25	13	22	4.8	3.2	96	
DATE		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L) (00500)	SOLIDS, VOLA- TILE ON IGNI- TION, TOTAL (MG/L) (00505)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BORON, TOTAL RECOV- ERABLE (UG/L AS B) (01022)
OCT 07...	23	2.2	4.6	184	80	<.100	.030	.60	.100	4	100	50	
DATE		CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)	
OCT 07...	1	<1	6	450	2	40	3	<1	70	5.6	12		
		DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SUSP. SIEVE DIAM. & FINER THAN .062 MM (70331)					
		OCT 07...	1335	11	8.0	260	--	--					
		APR 06...	1005	1.7	.5	240	11	96					
		12...	1105	.82	2.0	340	5	93					
		19...	1350	.79	3.5	384	7	86					
		MAY 02...	1030	.06	9.5	570	5	88					



## SANDY RIVER BASIN

05218500 SANDY LAKE AT LIBBY, MN

LOCATION.--Lat 46°47'20", long 93°19'10", in sec.25, T.50 N., R.24 W., Aitkin County, Hydrologic Unit 07010103, on dam on Sandy River at Libby, 1.2 mi (1.9 km) upstream from mouth, and 14 mi (23 m) north of McGregor.

DRAINAGE AREA.--421 mi<sup>2</sup> (1,090 km<sup>2</sup>).

PERIOD OF RECORD.--July to December 1893, October to December 1894, July 1895 to current year. Monthend contents only for some periods, published in WSP 1308. Published as Sandy Lake Reservoir at Libby October 1941 to September 1956.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Sept. 23, 1949, nonrecording gage and Sept. 24, 1949, to Nov. 28, 1962, water-stage recorder at site 1 mi (1.6 km) upstream at datum 1,207.71 ft (368.110 m) adjustment of 1912. Nov. 29, 1962, to June 30, 1973, water-stage recorder at present site at datum 1,207.71 ft (368.110 m) adjustment of 1912.

REMARKS.--Lake is formed by concrete dam which controls Sandy, Flowage, Snake, and Aitkin Lakes. Storage began in 1893; original timber crib dam completed in 1895, replaced by present structure in 1911. Capacity between elevation 1,214.31 ft (370.122 m) and 1,221.31 ft (372.255 m) (top of structure) is 73,037 acre-ft (90.0 hm<sup>3</sup>), of which 37,539 acre-ft (46.3 hm<sup>3</sup>) is controlled storage between elevations 1,214.31 ft (370.122 m) and 1,218.31 ft (371.341 m) (normal operating range). Contents shown herein are contents above elevation 1,207.00 ft (367.894 m). Prior to September 1978, published contents as contents above elevation 1,209.03 ft (368.512 m). Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 167,200 acre-ft (206 hm<sup>3</sup>) capacity table then in use, May 19, 1950, elevation, 1,224.82 ft (373.325 m); minimum observed, 5,950 acre-ft (7.34 hm<sup>3</sup>) below zero of capacity table then in use, Jan. 20, 1921, elevation, 1,207.96 ft (368.186 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 65,270 acre-ft (80.5 hm<sup>3</sup>) Aug. 10, elevation, 1,216.51 ft (370.792 m); minimum, 46,170 acre-ft (56.9 hm<sup>3</sup>) Feb. 16-25, elevation, 1,214.35 ft (370.134 m).

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,216.12	61,610	
Oct. 31.....	1,215.70	57,770	-3,840
Nov. 30.....	1,215.05	52,050	-5,720
Dec. 31.....	1,214.70	49,070	-2,980
CAL YR 1982.....			-930
Jan. 31.....	1,214.38	46,420	-2,650
Feb. 28.....	1,214.36	46,250	-170
Mar. 31.....	1,215.62	57,060	+10,810
Apr. 30.....	1,216.26	62,910	+5,850
May 31.....	1,216.37	63,940	+1,030
June 30.....	1,216.27	63,010	-930
July 31.....	1,216.30	63,290	+280
Aug. 31.....	1,216.31	63,380	+90
Sept. 30.....	1,216.26	62,910	-470
WTR YR 1983.....			+1,300



## SANDY RIVER BASIN

05219000 SANDY RIVER AT SANDY LAKE DAM, AT LIBBY, MN

LOCATION.--Lat 46°47'20", long 93°19'10", in sec.25, T.50 N., R.24 W., Aitkin County, Hydrologic Unit 07010103, at dam at outlet of Sandy Lake, at Libby, 1.2 mi (1.9 km) above mouth, and 14 mi (23 km) north of McGregor.

DRAINAGE AREA.--421 mi<sup>2</sup> (1,090 km<sup>2</sup>).

PERIOD OF RECORD.--July 1893 to March 1894, July 1894, November 1894 to March 1895, August 1895 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "below Sandy Lake Reservoir" 1893-1916.

GAGE.--Water-stage recorders on headwater and tailwater. Datum of gages is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to June 30, 1973, gages (nonrecording gages prior to June 20, 1949) at same site with datum at 1,207.71 ft (368.110 m) adjustment of 1912.

REMARKS.--Discharge computed on basis of head over dam, using modified weir formula, head being obtained from headwater and tailwater recorder records. Flow completely regulated by Sandy Lake (station 05218500).

COOPERATION.--Computations of daily discharge furnished by Corps of Engineers; discharge measurements made and records reviewed by Geological Survey.

AVERAGE DISCHARGE (unadjusted).--88 years (water years 1896-1983), 218 ft<sup>3</sup>/s (6.174 m<sup>3</sup>/s), 7.03 in/yr (179 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 3,740 ft<sup>3</sup>/s (106 m<sup>3</sup>/s) July 12, 1897; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1,310 ft<sup>3</sup>/s (37.1 m<sup>3</sup>/s) Apr. 9; minimum daily, 17 ft<sup>3</sup>/s (0.48 m<sup>3</sup>/s) Aug. 6, 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	253	1050	480	204	81	69	51	783	315	92	22	19
2	250	624	420	208	81	68	51	810	315	94	22	19
3	250	464	369	208	81	69	50	475	312	95	22	19
4	243	480	320	204	80	72	50	495	408	656	20	20
5	465	480	340	208	81	36	392	500	404	1180	18	21
6	455	480	340	208	81	36	744	500	404	960	17	21
7	680	480	320	208	81	36	1240	500	404	612	17	21
8	1150	480	300	208	81	34	1160	309	404	535	18	21
9	1240	480	340	208	83	34	1310	318	500	354	19	21
10	1300	480	340	208	83	432	1280	321	500	372	20	21
11	1180	480	380	204	84	441	1260	321	408	378	120	21
12	1150	464	390	204	84	765	912	321	412	170	117	21
13	1150	464	380	196	83	690	984	321	416	178	114	156
14	1150	496	340	192	83	576	1140	420	416	111	114	155
15	1150	544	340	118	83	468	1100	412	606	117	117	156
16	1150	560	360	118	81	495	1110	404	752	83	120	258
17	1220	280	360	118	81	384	1110	400	712	86	128	347
18	1220	268	156	115	80	444	1110	400	692	86	223	340
19	1220	252	168	115	80	492	1100	297	640	86	230	326
20	1220	440	180	118	78	516	925	297	637	170	233	188
21	1220	368	184	122	77	528	960	297	546	168	233	198
22	1250	408	192	122	77	279	960	297	166	168	228	104
23	1250	960	196	125	74	282	972	294	170	84	225	107
24	1250	920	204	125	74	146	984	294	172	84	91	108
25	1220	980	204	125	72	149	984	300	172	85	92	107
26	1150	1020	204	122	72	51	996	306	170	22	19	107
27	1150	960	204	77	72	51	996	309	172	22	19	22
28	1150	880	204	78	72	52	984	312	176	22	19	22
29	1150	840	196	78	---	52	984	312	178	22	19	22
30	1100	460	192	80	---	52	756	315	91	22	19	22
31	1100	---	192	80	---	52	---	315	---	22	18	---
TOTAL	31086	17542	8795	4704	2220	7851	26655	11955	11670	7136	2693	2990
MEAN	1003	585	284	152	79.3	253	889	386	389	230	86.9	99.7
MAX	1300	1050	480	208	94	765	1310	810	752	1180	233	347
MIN	243	252	156	77	72	34	50	294	91	22	17	19
CFSM	2.38	1.39	.68	.36	.19	.60	2.11	.92	.92	.55	.21	.24
IN.	2.75	1.55	.78	.42	.20	.69	2.36	1.06	1.03	.63	.24	.26
AC-FT	61660	34790	17440	9330	4400	15570	52870	23710	23150	14150	5340	5930
CAL YR 1982	TOTAL	142506	MEAN	390	MAX	1840	MIN	.00	CFSM	.93	IN	12.59
WTR YR 1983	TOTAL	135297	MEAN	371	MAX	1310	MIN	17	CFSM	.88	IN	11.95
									AC-FT	282700		
									AC-FT	268400		

LOCATION.--Lat 46°47'23", long 93°19'43", in SE¼NE¼ sec.25, T.50 N., R.24 W., Aitkin County, Hydrologic Unit 07010103, on right bank 600 ft (183 m) downstream from Sandy River, 0.8 mi (1.3 km) northwest of Libby, and at mile 1.106 (1.780 km) upstream from Ohio River.

PERIOD OF RECORD.--April 1930 to current year.

REVISID RECORDS.--WSP 1914: 1958.

GAGE.--Water-stage recorder. Datum of gage is 1,204.06 ft (366.997 m) National Geodetic Vertical Datum of 1929. Prior to July 28, 1931, nonrecording gage at site 600 ft (183 m) upstream at datum 3.16 ft (0.96 m) higher.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by Winnibigoshish Lake (station 05201000), Leech Lake (station 05206000), Pokegama Lake (station 05210500), and Sandy Lake (station 05218500).

AVERAGE DISCHARGE.--53 years, 2,048 ft<sup>3</sup>/s (58.00 m<sup>3</sup>/s), 5.50 in/yr (140 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft<sup>3</sup>/s (453 m<sup>3</sup>/s) May 17, 1950, gage height, 20.02 ft (6.102 m); minimum, 83 ft<sup>3</sup>/s (2.35 m<sup>3</sup>/s) Nov. 16, 1936, gage height, 1.44 ft (0.439 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,800 ft<sup>3</sup>/s (136 m<sup>3</sup>/s) Oct. 15, gage height, 10.54 ft (3.213 m); minimum, 1,130 ft<sup>3</sup>/s (32.0 m<sup>3</sup>/s) Mar. 28, gage height, 3.71 ft (1.131 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1620	3960	3800	2600	2300	2500	1300	2150	1460	2160	2510	2180
2	1650	3640	3700	2600	2300	2500	1420	1840	1510	1980	2530	2130
3	1850	3520	3700	2600	2300	2400	1580	1610	1570	2490	2760	1940
4	2090	3530	3600	2600	2200	2300	1760	1540	1620	3800	3320	1600
5	2170	3530	3600	2600	2200	2200	1980	1540	1640	4470	3600	1430
6	2400	3500	3600	2600	2200	2200	2430	1540	1650	4430	3640	1410
7	3100	3480	3500	2600	2200	2300	2760	1450	1620	4270	3540	1400
8	3680	3460	3300	2600	2200	2400	2870	1330	1610	4120	3350	1450
9	4040	3440	3200	2650	2200	2600	3040	1310	1590	3950	3150	1530
10	4400	3460	3100	2650	2200	2990	3060	1280	1510	3840	3070	1530
11	4560	3500	3100	2650	2200	3400	2780	1240	1470	3670	3170	1560
12	4620	3530	3050	2630	2200	3920	2710	1240	1430	3450	3240	1610
13	4680	3470	3000	2600	2200	3890	2950	1310	1360	3330	3260	1630
14	4740	3000	3000	2500	2200	3790	3050	1410	1530	3150	3230	1600
15	4780	2800	2900	2500	2200	3640	3020	1540	1910	2860	3110	1610
16	4740	2800	2900	2400	2190	3360	3000	1650	2220	2620	2850	1760
17	4700	2840	2900	2400	2200	2870	3000	1650	2590	2590	2530	1900
18	4710	3050	2800	2400	2300	2330	2980	1750	2840	2620	2340	2040
19	4710	3450	2700	2400	2300	1990	2800	1770	2910	2650	2210	2140
20	4680	4000	2700	2400	2300	1790	2690	1790	2920	2710	2190	1900
21	4610	4100	2700	2400	2350	1580	2680	1820	2740	2760	2270	1550
22	4550	4080	2700	2400	2400	1480	2570	1850	2560	2760	2370	1360
23	4510	4180	2700	2400	2400	1380	2510	1860	2530	2680	2330	1310
24	4510	4200	2700	2400	2400	1320	2500	1810	2570	2630	2250	1300
25	4530	4200	2700	2300	2450	1250	2480	1650	2590	2580	2220	1340
26	4520	4100	2700	2300	2450	1190	2480	1550	2590	2530	2200	1310
27	4450	4100	2700	2300	2500	1160	2530	1520	2500	2510	2200	1290
28	4330	4070	2700	2300	2500	1140	2550	1510	2400	2500	2190	1290
29	4250	3950	2600	2300	---	1150	2450	1460	2300	2480	2220	1310
30	4180	3820	2600	2300	---	1170	2330	1440	2270	2470	2280	1340
31	4130	---	2600	2300	---	1200	---	1470	---	2490	2230	---
TOTAL	122490	108760	93550	76680	64040	69390	76260	48880	62010	93550	84360	47750
MEAN	3951	3625	3018	2474	2287	2238	2542	1577	2067	3018	2721	1592
MAX	4780	4200	3800	2650	2500	3920	3060	2150	2920	4470	3640	2180
MIN	1620	2800	2600	2300	2190	1140	1300	1240	1360	1980	2190	1290
CFSM	.78	.72	.60	.49	.45	.44	.50	.31	.41	.60	.54	.32
IN.	.90	.80	.69	.56	.47	.51	.56	.36	.46	.69	.62	.35
AC-FT	243000	215700	185600	152100	127000	137600	151300	96950	123000	185600	167300	94710
CAL YR 1982	TOTAL	1139596	MEAN	3122	MAX	7180	MIN	867	CFSM	.62	IN	8.38
WTR YR 1983	TOTAL	947720	MEAN	2596	MAX	4780	MIN	1140	CFSM	.51	AC-FT	2260000
												1880000

## MISSISSIPPI RIVER MAIN STEM

05227500 MISSISSIPPI RIVER AT AITKIN, MN

LOCATION.--Lat 46°32'26", long 93°42'26", in SW¼NW¼ sec.24, T.47 N., R.27 W., Aitkin County, Hydrologic Unit 07010104, on right bank upstream side of highway bridge at north edge of Aitkin, 1 mi (1.6 km) downstream from Ripple River and at mile 1,055.9 (1,698.9 km) upstream from Ohio River.

DRAINAGE AREA.--6,140 mi<sup>2</sup> (15,900 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--March 1945 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,182.41 ft (360.40 m) National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Mar. 1, 1945, to Mar. 14, 1961, nonrecording gage, and Mar. 15, 1961, to Sept. 30, 1967, water-stage recorder at same site at datum 3.0 ft (0.9 m) higher. Diversion channel: Non-recording gage. Datum of gage is 1,182.02 ft (360.28 m) National Geodetic Vertical Datum of 1929. Apr. 9, 1955, to Apr. 10, 1956, nonrecording gage at site 4 mi (6 km) downstream at different datum. Apr. 11, 1956, to Sept. 30, 1967, nonrecording gage at same site at datum 3.0 ft (0.9 m) higher.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by Winnibigoshish Lake (see sta 05201000), Leech Lake (see sta 05206000), Pokegama Lake (see sta 05210500), and Sandy Lake (see sta 05218500). Water diverted at medium and high stages into Aitkin diversion channel 6.5 mi (10.5 km) above station, bypasses station and returns to river 15.5 mi (24.9 km) below station. Diversion began Apr. 2, 1955. These records include flow in diversion channel.

AVERAGE DISCHARGE.--38 years, 2,908 ft<sup>3</sup>/s (82.35 m<sup>3</sup>/s), 6.43 in/yr (163 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft<sup>3</sup>/s (566 m<sup>3</sup>/s) May 20, 1950, gage height, 22.49 ft (6.855 m), present datum; minimum, 151 ft<sup>3</sup>/s (4.28 m<sup>3</sup>/s) Sept. 1, 1961, gage height, 0.60 ft (0.183 m).

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 7,180 ft<sup>3</sup>/s (203 m<sup>3</sup>/s) Oct. 15; minimum daily, 1,290 ft<sup>3</sup>/s (36.5 m<sup>3</sup>/s) Sept. 29. River gage: Maximum discharge, 4,690 ft<sup>3</sup>/s (133 m<sup>3</sup>/s) Oct. 15, gage height, 11.62 ft (3.542 m); minimum daily, 1,290 ft<sup>3</sup>/s (36.5 m<sup>3</sup>/s) Sept. 29. Diversion gage: Maximum discharge, 2,530 ft<sup>3</sup>/s (71.6 m<sup>3</sup>/s) Oct. 15, gage height, 10.61 ft (3.234 m), from graph based on gage readings; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1710	5090	4400	2800	2450	2600	1700	3690	2010	2750	2620	2210
2	1790	4910	4350	2800	2400	2600	1810	3170	1990	2660	2640	2110
3	1910	4790	4300	2800	2400	2650	2020	2920	2020	2690	2670	1910
4	2060	4680	4200	2800	2400	2750	2310	2720	2060	3620	2820	1620
5	2290	4420	4100	2800	2400	2850	2720	2530	2130	5090	3280	1450
6	2730	4360	4000	2750	2400	3200	3160	2370	2120	5740	3990	1400
7	3410	4240	3900	2750	2400	3600	3620	2330	2080	5810	3760	1400
8	4290	4100	3800	2700	2400	3900	4090	2200	2040	5750	3680	1400
9	4970	4080	3700	2700	2350	4050	4380	2080	1980	5510	3470	1440
10	5740	4010	3600	2700	2350	4150	4570	2020	1920	5310	3400	1510
11	6390	3940	3550	2700	2350	4260	4670	1900	1920	5120	3270	1540
12	6830	3910	3500	2700	2350	4250	4540	1850	1900	4820	3250	1600
13	7060	3720	3450	2670	2350	4250	4370	1860	1860	4500	3270	1620
14	7130	3120	3400	2650	2350	4250	4490	1930	1820	4260	3320	1670
15	7180	2840	3350	2620	2350	4200	4530	2040	2050	3970	3330	1690
16	7160	3080	3300	2600	2350	4100	4520	2150	2530	3550	3220	1700
17	7140	3130	3300	2600	2350	3900	4540	2230	2900	3250	3020	1800
18	6980	3230	3200	2600	2400	3700	4470	2260	3260	3050	2710	2030
19	6860	3690	3200	2600	2400	3400	4460	2310	3600	3040	2460	2020
20	6720	4210	3100	2600	2450	3050	4300	2340	3670	3070	2290	2100
21	6580	4450	3100	2550	2450	2800	4110	2400	3730	3120	2190	1970
22	6310	4550	3100	2550	2450	2650	4030	2380	3590	3090	2220	1720
23	6150	4600	3050	2550	2500	2500	3890	2370	3310	3060	2290	1500
24	6010	4600	3000	2550	2500	2250	3760	2380	3170	2970	2270	1450
25	5860	4600	3000	2550	2500	2050	3730	2310	3160	2830	2220	1320
26	5750	4600	2950	2550	2550	1920	3640	2190	3140	2800	2180	1330
27	5640	4600	2950	2500	2550	1860	3660	2060	3100	2760	2120	1330
28	5560	4550	2900	2500	2550	1800	3740	2010	2910	2660	2150	1300
29	5490	4500	2900	2450	---	1750	3760	2000	2840	2680	2200	1290
30	5260	4450	2850	2450	---	1700	3880	2000	2800	2590	2260	1310
31	5170	---	2850	2450	---	1700	---	2010	---	2650	2260	---
TOTAL	164130	125050	106350	81590	67700	94690	113470	71010	77610	114770	86830	48740
MEAN	5295	4168	3431	2632	2418	3055	3782	2291	2587	3702	2801	1625
MAX	7180	5090	4400	2800	2550	4260	4670	3690	3730	5810	3990	2210
MIN	1710	2840	2850	2450	2350	1700	1700	1850	1820	2590	2120	1290
CFSM	.86	.68	.56	.43	.39	.50	.62	.37	.42	.60	.46	.27
IN.	.99	.76	.64	.49	.41	.57	.69	.43	.47	.70	.53	.30
AC-FT	325600	248000	210900	161800	134300	187800	225100	140800	153900	227600	172200	96680
CAL YR 1982	TOTAL	1421601	MEAN	3895	MAX	12200	MIN	900	CFSM	.63	IN	8.61
WTR YR 1983	TOTAL	1151940	MEAN	3156	MAX	7180	MIN	1290	CFSM	.51	IN	6.98
									AC-FT	2820000	AC-FT	2285000

## PINE RIVER BASIN

05230500 PINE RIVER RESERVOIR AT CROSS LAKE, MN

LOCATION.--Lat 46°40'09", long 94°06'44", in SW¼NW¼ sec.21, T.137 N., R.27 W., Crow Wing County, Hydrologic Unit 07010105, at dam on Pine River, at outlet of Cross Lake at village of Cross Lake.

DRAINAGE AREA.--562 mi<sup>2</sup> (1,456 km<sup>2</sup>).

PERIOD OF RECORD.--March 1886 to current year. Monthend contents only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to May 3, 1949, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by Trout, Whitefish, Rush, and Cross Lakes and several other natural lakes controlled by timber crib dams; storage began in 1886; dam completed in 1886. Capacity between elevations 1,226.32 ft (373.782 m) and 1,234.82 ft (376.373 m) (maximum allowable range) is 118,703 acre-ft (146 hm<sup>3</sup>) of which 53,272 acre-ft (65.7 hm<sup>3</sup>) is controlled storage between elevations 1,226.32 ft (373.782 m) and 1,230.32 ft (375.002 m) (normal operating range). Contents shown herein are contents above an elevation 1,216.00 ft (340.157 m). Prior to September 1978, published contents as contents above elevation 1,218.67 ft (371.451 m). Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 173,600 acre-ft (214 hm<sup>3</sup>) capacity table then in use, July 10, 1916, elevation, 1,234.56 ft (376.294 m); minimum observed, 1,310 acre-ft (1.62 hm<sup>3</sup>) below zero of capacity table then in use, Aug. 20, 1918, elevation, 1,217.67 ft (371.146 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 140,710 acre-ft (173 hm<sup>3</sup>) June 17, elevation, 1,229.65 ft (374.797 m); minimum, 73,960 acre-ft (91.2 hm<sup>3</sup>) Feb. 22, elevation, 1,227.35 ft (374.096 m).

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30 .....	1,229.23	98,980	
Oct. 31 .....	1,229.23	98,980	0
Nov. 30 .....	1,229.18	98,300	-680
Dec. 31 .....	1,228.81	93,300	-5,000
CAL YR 1982 .....			+2,550
Jan. 31 .....	1,227.99	82,360	-10,940
Feb. 28 .....	1,227.43	75,000	-7,360
Mar. 31 .....	1,228.60	90,480	+15,480
Apr. 30 .....	1,229.20	98,570	+8,090
May 31 .....	1,229.38	101,020	+2,450
June 30 .....	1,229.37	100,880	-140
July 31 .....	1,229.34	100,470	-410
Aug. 31 .....	1,229.21	98,710	-1,760
Sept. 30 .....	1,229.36	100,750	+2,040
WTR YR 1983 .....			+1,770

## PINE RIVER BASIN

05231000 PINE RIVER AT CROSS LAKE DAM, AT CROSS LAKE, MN

LOCATION.--Lat 46°40'09", long 94°06'44", in SW¼NW¼ sec.21, T.137 N., R.27 W., Crow Wing County, Hydrologic Unit 07010105, at dam at outlet of Cross Lake at Village of Cross Lake.

DRAINAGE AREA.--562 mi<sup>2</sup> (1,456 km<sup>2</sup>).

PERIOD OF RECORD.--April 1886 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "below Pine River Reservoir" 1895-1916, 1929, and as "at Pine River Dam, at Cross Lake" 1941-56.

GAGE.--Water-stage recorder, headwater gage, and nonrecording tailwater gage. Datum of gages is 1,216.32 ft (370.734 m) National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Mar. 26, 1886, to May 31, 1929, nonrecording gages on headwater and tail water at same sites and datum. June 1 to Nov. 30, 1929, nonrecording gage in tailwater at datum 1.60 ft (0.49 m) lower. Dec. 1, 1929, to May 2, 1949, nonrecording gage on headwater and Dec. 1, 1929, to August 1949, nonrecording gage on tailwater at present sites and datum.

REMARKS.--Discharge computed principally on basis of modified weir formula, the head being obtained from twice-daily readings on tailwater gage and from headwater recorder. Flow completely regulated by Pine River Reservoir (station 05230500).

COOPERATION.--Computations of daily discharge furnished by Corps of Engineers.

AVERAGE DISCHARGE (unadjusted).--97 years 217 ft<sup>3</sup>/s (6.145 m<sup>3</sup>/s), 5.24 in/yr (133 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,250 ft<sup>3</sup>/s (63.7 m<sup>3</sup>/s) in June 1896 (does not include flow bypassing dam through crevasse); no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1,000 ft<sup>3</sup>/s (28.3 m<sup>3</sup>/s) June 18-20; minimum daily, 30 ft<sup>3</sup>/s (0.85 m<sup>3</sup>/s) Mar. 1 - Apr. 11, Aug 9-12, Aug. 16-19, 23-26, Aug. 30 - Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	260	275	275	370	30	30	90	250	410	35	30
2	60	260	275	275	370	30	30	90	250	410	35	30
3	60	260	275	275	370	30	30	90	250	410	35	30
4	60	260	275	275	370	30	30	90	250	410	35	30
5	60	260	275	370	370	30	30	90	250	760	35	30
6	60	260	275	370	370	30	30	90	250	760	125	30
7	60	260	275	370	370	30	30	50	250	760	137	30
8	60	260	275	370	370	30	30	50	250	760	109	30
9	200	260	275	370	370	30	30	50	167	760	30	30
10	200	260	275	370	370	30	30	50	150	760	30	30
11	400	250	275	370	370	30	30	50	238	733	30	30
12	400	200	275	370	370	30	80	50	250	440	30	30
13	492	200	275	370	370	30	90	50	250	440	125	30
14	500	200	275	370	370	30	203	250	250	225	125	30
15	500	200	275	370	370	30	250	250	378	210	105	30
16	500	200	275	370	370	30	250	250	578	210	30	30
17	500	200	275	370	370	30	250	158	600	210	30	30
18	500	200	275	370	370	30	250	150	1000	210	30	30
19	500	200	275	370	365	30	250	150	1000	210	30	30
20	500	200	275	370	270	30	250	150	1000	210	150	30
21	500	200	275	370	270	30	250	233	670	210	150	30
22	500	200	275	370	270	30	250	250	880	210	75	30
23	500	200	275	370	160	30	183	250	880	210	30	30
24	308	200	275	370	160	30	160	250	635	210	30	30
25	300	266	275	370	160	30	160	250	600	210	30	30
26	380	275	275	370	60	30	101	250	900	125	30	30
27	380	275	275	370	60	30	90	250	713	125	105	30
28	380	275	275	370	60	30	90	250	410	35	105	30
29	380	275	275	370	---	30	90	250	410	35	61	30
30	260	275	275	370	---	30	90	250	410	35	30	30
31	260	---	275	370	---	30	---	250	---	35	30	---
TOTAL	9820	7091	8525	11090	8495	930	3667	4981	14369	10738	1967	900
MEAN	317	236	275	358	303	30.0	122	161	479	346	63.5	30.0
MAX	500	275	275	370	370	30	250	250	1000	760	150	30
MIN	60	200	275	275	60	30	30	50	150	35	30	30
CFSM	.56	.42	.49	.64	.54	.05	.22	.29	.85	.62	.11	.05
IN.	.65	.47	.56	.73	.56	.06	.24	.33	.95	.71	.13	.06
AC-FT	19480	14060	16910	22000	16850	1840	7270	9880	28500	21300	3900	1790
CAL YR 1982	TOTAL	100261	MEAN	275	MAX	1600	MIN	30	CFSM	.49	IN	6.64
WTR YR 1983	TOTAL	82573	MEAN	226	MAX	1000	MIN	30	CFSM	.40	IN	5.47
									AC-FT	198900		
									AC-FT	163800		

## CROW WING RIVER BASIN

05245100 LONG PRAIRIE RIVER AT LONG PRAIRIE, MN

LOCATION.--Lat 45°58'30", long 94°51'56", in NE¼NW¼ sec.20, T.129 N., R.33 W., Todd County, Hydrologic Unit 07010108, on right bank 90 ft (27 m) upstream from bridge on First Avenue at Long Prairie and 400 ft (122 m) downstream from Venewitz Creek.

DRAINAGE AREA.--432 mi<sup>2</sup> (1,119 km<sup>2</sup>).

PERIOD OF RECORD.--October 1971 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,281.74 ft (390.674 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--12 years, 144 ft<sup>3</sup>/s (4.078 m<sup>3</sup>/s), 4.53 in/yr (115 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,270 ft<sup>3</sup>/s (92.6 m<sup>3</sup>/s) July 22, 1972, gage height, 9.37 ft (2.856 m); minimum daily, 0.84 ft<sup>3</sup>/s (0.02 m<sup>3</sup>/s) Jan. 12-18, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 525 ft<sup>3</sup>/s (14.9 m<sup>3</sup>/s) Mar. 10, gage height, 5.35 ft (1.631 m) (backwater from ice); minimum discharge, 50 ft<sup>3</sup>/s (1.42 m<sup>3</sup>/s) Sept. 29; minimum gage height, 1.47 ft (0.448 m) Sept. 27, 28, 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	109	150	84	70	150	246	164	117	149	115	77
2	93	105	165	83	70	150	264	158	109	158	103	75
3	102	107	180	82	70	155	270	156	106	179	105	72
4	100	106	155	82	70	175	266	150	104	213	102	78
5	104	93	135	81	70	215	253	148	102	204	96	83
6	204	88	120	80	70	315	242	145	100	198	93	77
7	246	111	110	80	70	475	245	142	98	181	88	71
8	249	107	110	80	70	435	246	139	96	158	83	65
9	273	97	105	79	70	450	244	131	93	138	80	63
10	331	98	100	79	70	480	239	134	91	122	80	70
11	353	100	95	78	70	475	231	139	92	112	78	70
12	361	110	90	78	70	470	224	149	93	104	76	69
13	366	70	88	78	70	500	225	169	108	98	75	66
14	356	95	88	77	70	432	232	183	256	93	72	64
15	338	100	88	76	70	395	230	188	283	88	69	67
16	312	95	88	75	70	370	224	176	300	83	79	78
17	298	90	88	75	70	334	215	163	303	84	101	84
18	264	90	88	74	70	297	209	153	261	94	94	88
19	216	110	88	74	70	264	205	152	212	103	101	83
20	194	180	88	73	70	244	206	150	186	183	112	73
21	177	190	88	73	70	222	205	150	180	172	116	68
22	163	165	88	72	70	200	205	144	186	172	106	62
23	152	160	88	72	70	197	197	138	178	182	96	58
24	144	165	88	72	75	185	191	129	190	182	87	57
25	137	170	88	71	80	173	185	123	183	161	81	55
26	131	165	87	71	75	167	182	118	145	137	82	53
27	127	160	87	71	75	164	182	136	125	119	79	51
28	129	165	86	71	135	164	178	148	115	107	78	51
29	124	160	86	70	---	164	179	139	115	98	93	50
30	116	150	85	70	---	166	174	129	147	96	95	53
31	112	---	85	70	---	196	---	124	---	123	82	---
TOTAL	6344	3711	3175	2351	2050	8779	6594	4567	4674	4291	2797	2031
MEAN	205	124	102	75.8	73.2	283	220	147	156	138	90.2	67.7
MAX	366	190	180	84	135	500	270	188	303	213	116	88
MIN	72	70	85	70	70	150	174	118	91	83	69	50
CFSM	.48	.29	.24	.18	.17	.66	.51	.34	.36	.32	.21	.16
IN.	.55	.32	.27	.20	.18	.76	.57	.39	.40	.37	.24	.17
AC-FT	12580	7360	6300	4660	4070	17410	13080	9060	9270	8510	5550	4030
CAL YR 1982	TOTAL	63727	MEAN 175	MAX 1130	MIN 34	CFSM .41	IN 5.49	AC-FT 126400				
WTR YR 1983	TOTAL	51364	MEAN 141	MAX 500	MIN 50	CFSM .33	IN 4.42	AC-FT 101900				

## CROW WING RIVER BASIN

05246500 GULL LAKE NEAR BRAINERD, MN

LOCATION.--Lat 46°24'40", long 94°21'26", in N½ sec.20, T.134 N., R.29 W., Cass County, Hydrologic Unit 07010106, in pool of dam on Gull River, 800 ft (244 m) south of outlet of Gull Lake, 0.2 mi (0.3 km) upstream from Gull Lake Dam, and 8 mi (13 km) northwest of Brainerd.

DRAINAGE AREA.--287 mi<sup>2</sup> (743 km<sup>2</sup>).

PERIOD OF RECORD.--August 1911 to current year. Prior to October 1941 monthend contents only, published in WSP 1308. Published as Gull Lake Reservoir October 1941 to September 1956.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Aug. 10, 1949, nonrecording gage 800 ft (244 m) north of present site at same datum. Aug. 11, 1949, to June 30, 1973, water-stage recorder at present site and at datum 1,188.14 ft (362.145 m) adjustment of 1912.

REMARKS.--Reservoir is formed by Gull Lake and several other natural lakes controlled by concrete dam completed in 1913; storage began in 1912. Capacity between elevation 1,192.75 ft (363.550 m) and 1,194.75 ft (364.160 m) (maximum allowable range and normal operating range) is 26,008 acre-ft (32.1 hm<sup>3</sup>). Contents shown herein are contents above elevation 1,188.00 ft (362.102 m). Prior to September 1978, published contents as contents above elevation 1,188.75 ft (362.331 m). Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 74,800 acre-ft (92.2 hm<sup>3</sup>) capacity table then in use, June 30, 1914, elevation, 1,195.05 ft (364.251 m); minimum observed, 22,250 acre-ft (27.4 hm<sup>3</sup>) capacity table then in use, Mar. 20, 1924, elevation, 1,190.75 ft (362.941 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 70,260 acre-ft (86.6 hm<sup>3</sup>) June 16, 17, elevation, 1,194.65 ft (364.129 m); minimum, 48,920 acre-ft (60.3 hm<sup>3</sup>) Feb. 25, elevation, 1,193.01 ft (363.629 m).

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,193.92	60,720	
Oct. 31.....	1,193.70	57,850	-2,870
Nov. 30 .....	1,193.68	57,590	-260
Dec. 31 .....	1,193.57	56,160	-1,430
CAL YR 1982 .....			+5,300
Jan. 31 .....	1,193.34	53,180	-2,980
Feb. 28 .....	1,193.64	57,070	+3,890
Mar. 31 .....	1,193.95	61,110	+4,040
Apr. 30 .....	1,194.00	61,760	+650
May 31 .....	1,194.00	61,760	0
June 30 .....	1,194.05	62,410	+650
July 31 .....	1,193.90	60,460	-1,950
Aug. 31 .....	1,193.77	58,760	-1,700
Sept. 30 .....	1,193.67	57,460	-1,300
WTR YR 1983 .....			-3,260

## CROW WING RIVER BASIN

05247000 GULL RIVER AT GULL LAKE DAM, NEAR BRAINERD, MN

LOCATION.--Lat 46°24'40", long 94°21'12", in sec.20, T.134 N., R.29 W., Cass County, Hydrologic Unit 07010106, in headwater and tailwater of dam at outlet of Gull Lake, 8 mi (13 km) northwest of Brainerd.

DRAINAGE AREA.--287 mi<sup>2</sup> (743 km<sup>2</sup>).

PERIOD OF RECORD.--August 1911 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "Gull Lake Reservoir" 1929.

GAGE.--Water-stage recorder on headwater and nonrecording gage on tailwater. Datum of gages is National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). August 1911 to May 23, 1929, and Dec. 1, 1929, to Aug. 1, 1949, both gages were nonrecording gages at same site and datum in use. May 24 to Nov. 30, 1929, non recording gage 500 ft (152 m) downstream at different datum. Aug. 2, 1949, to June 30, 1973, at present sites with datum of gage at 1,188.14 ft (362.145 m) adjustment of 1912.

REMARKS.--Discharge computed at dam on basis of modified weir formulas, the head being obtained from twice-daily readings on tailwater gage and from headwater recorder. Flow completely regulated by Gull Lake (station 05246500).

COOPERATION.--Computations of daily discharge furnished by Corps of Engineers.

AVERAGE DISCHARGE (unadjusted).--72 years, 108 ft<sup>3</sup>/s (3.059 m<sup>3</sup>/s), 5.11 in/yr (130 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,120 ft<sup>3</sup>/s (31.7 m<sup>3</sup>/s) May 15, 1938; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 615 ft<sup>3</sup>/s (17.4 m<sup>3</sup>/s) June 17, 18; minimum daily, 19 ft<sup>3</sup>/s (0.54 m<sup>3</sup>/s) Mar. 5, 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	200	142	140	186	178	21	200	96	525	23	22
2	51	96	142	140	184	69	21	200	96	400	23	22
3	51	96	142	140	184	69	21	200	96	410	23	22
4	51	96	142	140	184	69	21	200	152	410	23	22
5	77	96	142	184	184	19	146	94	152	410	22	22
6	77	142	142	184	184	19	146	94	152	410	22	22
7	160	142	142	187	184	20	201	94	152	400	22	22
8	305	142	142	187	184	20	201	93	152	400	22	22
9	366	142	142	187	184	20	201	91	152	212	22	22
10	366	142	142	187	184	20	201	21	149	208	22	22
11	366	142	142	187	184	20	201	21	65	208	22	22
12	366	142	142	187	184	20	201	21	65	160	22	22
13	481	142	142	187	184	20	201	21	65	160	22	22
14	481	142	142	187	184	20	201	152	67	52	22	22
15	481	142	142	187	179	20	201	152	460	52	22	22
16	476	142	141	187	178	20	201	152	470	51	22	23
17	476	142	141	186	178	20	201	152	615	50	22	23
18	471	142	141	186	178	20	201	96	615	52	22	23
19	471	142	141	186	178	20	201	96	600	204	22	23
20	463	142	141	186	178	20	201	96	600	204	22	23
21	208	142	141	186	178	20	201	96	600	90	22	23
22	208	142	141	186	178	20	201	96	570	90	22	23
23	208	142	141	186	178	20	201	96	570	90	22	23
24	208	142	141	186	178	20	201	95	570	90	22	23
25	208	142	141	186	178	20	200	95	570	89	22	23
26	208	142	141	186	178	20	200	95	570	23	22	23
27	205	142	141	186	178	20	200	95	555	23	22	23
28	200	142	141	186	178	20	200	95	525	23	22	23
29	200	142	141	186	---	20	200	96	525	23	22	23
30	200	142	140	186	---	21	200	96	525	23	22	23
31	200	---	140	186	---	21	---	96	---	23	22	---
TOTAL	8339	4134	4384	5588	5071	925	5194	3297	10551	5565	686	675
MEAN	269	138	141	180	181	29.8	173	106	352	180	22.1	22.5
MAX	481	200	142	187	186	178	201	200	615	525	23	23
MIN	50	96	140	140	178	19	21	21	65	23	22	22
CFSM	.94	.48	.49	.63	.63	.10	.60	.37	1.23	.63	.08	.08
IN.	1.08	.54	.57	.72	.66	.12	.67	.43	1.37	.72	.09	.09
AC-FT	16540	8200	8700	11080	10060	1830	10300	6540	20930	11040	1360	1340
CAL YR 1982	TOTAL	60277	MEAN	165	MAX	568	MIN	31	CFSM	.58	IN	7.81
WTR YR 1983	TOTAL	54409	MEAN	149	MAX	615	MIN	19	CFSM	.52	IN	7.05
									AC-FT	119600		
									AC-FT	107900		



## CROW WING RIVER BASIN

05247500 CROW WING RIVER NEAR PILLAGER, MN

LOCATION.--Lat 46°18'18", long 94°22'38", in SW¼NE¼ sec.30, T.133 N., R.29 W., Cass County, Hydrologic Unit 07010106, at Sylvan dam powerplant of Minnesota Power Co., 3.6 mi (5.8 km) above mouth and 4.9 mi (7.9 km) southeast of Pillager.

PERIOD OF RECORD.--October 1968 to current year. Records for August 1924 to September 1968 available in files of the Minnesota district office.

REMARKS.--Records poor. Discharge computed on basis of powerplant records. Records for Oct. 1, 1968 to Sept. 30, 1975, were adjusted for storage change in the Sylvan dam reservoir. Flow partly regulated by powerplants and Gull Lake (station 05246500).

COOPERATION.--Records collected by Minnesota Power Co. under general supervision of Geological Survey, in connection with a Federal Power Commission project.

AVERAGE DISCHARGE.--15 years, 1,264 ft<sup>3</sup>/s (35.80 m<sup>3</sup>/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 16,600 ft<sup>3</sup>/s (470 m<sup>3</sup>/s) Apr. 12, 13, 1969; minimum daily, 60 ft<sup>3</sup>/s (1.70 m<sup>3</sup>/s) Aug. 10, 11, 13, 14, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum daily discharge since 1924, 18,300 ft<sup>3</sup>/s (518 m<sup>3</sup>/s) Apr. 14, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 4,310 ft<sup>3</sup>/s (122 m<sup>3</sup>/s) June 17; minimum daily, 362 ft<sup>3</sup>/s (10.3 m<sup>3</sup>/s) Sept. 8.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	963	1680	1520	803	634	1310	450	1790	1120	3590	1590	394
2	871	1610	1610	772	720	1020	1580	1670	1010	3690	1300	669
3	1060	1610	1740	726	790	1530	1860	1540	1420	3980	1220	585
4	1320	1610	1750	837	705	1600	2050	1430	1470	4040	1230	469
5	1570	1600	1680	1030	637	1690	2230	1320	1010	4100	937	435
6	1380	1380	1460	879	792	3430	2210	1320	1320	4120	1010	452
7	1870	1320	1030	723	744	4290	2230	1190	1170	4080	1060	437
8	2100	1510	934	956	711	2800	2200	1220	876	3830	858	362
9	2840	1420	693	894	511	2830	2210	1170	1030	3680	784	463
10	2900	1410	945	1020	655	3250	2210	1090	811	3540	747	555
11	3430	1420	1200	925	637	3740	2160	1020	1060	3090	651	652
12	3420	1480	1030	852	686	3860	2100	936	1100	2730	818	483
13	3300	1100	1040	789	711	3620	2160	1400	1240	2520	899	442
14	3420	576	1070	897	710	3440	2170	1860	3050	2320	813	520
15	3460	763	992	906	710	3290	2070	1770	3850	2160	713	733
16	3460	1250	928	818	710	2810	1960	1670	4020	2010	535	767
17	3420	1300	971	817	781	2550	1970	1610	4310	1750	879	786
18	3110	1380	980	972	789	2200	1970	1610	4060	2130	809	737
19	2930	1560	928	818	789	2080	1970	1610	4000	2140	741	754
20	2700	2060	974	789	1050	2020	1970	1610	3440	2200	741	725
21	2510	1850	1020	765	1080	1820	1870	1370	2910	2070	741	735
22	2330	1660	995	710	1080	1580	1890	1210	2770	1970	628	499
23	2200	1380	965	907	1080	1280	1890	1320	2450	1980	628	577
24	2200	900	970	763	924	1340	1860	1010	2740	1980	630	596
25	1900	972	1090	788	958	1380	1800	1150	3520	1870	631	520
26	1770	1350	1070	724	1020	1240	1710	1240	3860	1660	502	482
27	1800	1440	951	789	813	1180	1690	1240	3330	1620	546	484
28	1820	1280	970	733	1090	1130	1780	1260	3300	1610	608	465
29	1800	1320	1010	742	---	1400	1840	1610	3340	1590	503	486
30	1760	1500	877	636	---	1700	1800	1700	3480	1340	462	428
31	1760	---	807	779	---	1140	---	1690	---	1480	428	---
TOTAL	71374	41691	34200	25559	22517	68550	57860	43636	73067	80870	24642	16692
MEAN	2302	1390	1103	824	804	2211	1929	1408	2436	2609	795	556
MAX	3460	2060	1750	1030	1090	4290	2230	1860	4310	4120	1590	786
MIN	871	576	693	636	511	1020	450	936	811	1340	428	362
CFSM	.70	.42	.33	.25	.24	.67	.59	.43	.74	.79	.24	.17
IN.	.80	.47	.39	.29	.25	.77	.65	.49	.82	.91	.28	.19
AC-FT	141600	82690	67840	50700	44660	136000	114800	86550	144900	160400	48880	33110
CAL YR 1982	TOTAL	516068	MEAN	1414	MAX	5450	MIN	271	CFSM	.43	IN	5.82
WTR YR 1983	TOTAL	560658	MEAN	1536	MAX	4310	MIN	362	CFSM	.47	IN	6.32
									AC-FT	1024000	AC-FT	1112000

## MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN

LOCATION.--Lat 45°51'41", long 94°21'33", in lot 2, sec.20, T.39 N., R.32 W., Morrison County, Hydrologic Unit 07010104, at plant of Minnesota Power Co., 4 mi (6.4 km) northwest of Royalton, 4.5 mi (7.2 km) downstream from Swan River, and at mile 956 (1,538 km) upstream from Ohio River.

DRAINAGE AREA.--11,600 mi<sup>2</sup> (30,000 km<sup>2</sup>), approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1924 to current year.

REMARKS.--Records good. Discharge computed using average tailwater readings furnished by powerplant. Flow partly regulated by powerplants and Winnibigoshish, Leech, Pokegama, Sandy, and Gull Lakes and by Pine River Reservoir (see stations 05201000, 05206000, 05210500, 05218500, 05230500, 05246500).

COOPERATION.--Records collected by Minnesota Power Co. under general supervision of Geological Survey, in connection with a Federal Power Commission project.

AVERAGE DISCHARGE.--59 years, 4,503 ft<sup>3</sup>/s (127.5 m<sup>3</sup>/s), 5.27 in/yr (134 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 37,700 ft<sup>3</sup>/s (1,070 m<sup>3</sup>/s) Apr. 16, 1965; minimum daily, 254 ft<sup>3</sup>/s (7.19 m<sup>3</sup>/s) Nov. 25, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 14,000 ft<sup>3</sup>/s (396 m<sup>3</sup>/s) Oct. 15, 16; minimum daily, 1,940 ft<sup>3</sup>/s (54.9 m<sup>3</sup>/s) Sept. 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	2850	7700	7940	4520	4340	4160	3990	7460	4340	9260	5090	2850		
2	3160	7700	8190	4520	4160	4340	3650	6980	4160	8700	5090	2700		
3	3990	8190	8700	4520	4160	4900	5680	5480	4160	9560	5090	3160		
4	3650	7700	8980	4520	4160	4900	5680	5680	4340	10200	4520	3160		
5	4160	6980	8980	4520	4160	5480	5680	5680	5090	10200	4340	3480		
6	5880	6980	7460	4520	4160	7460	7460	4900	4340	13000	4710	2850		
7	6520	6980	5880	4520	4160	8700	6520	5090	4340	13000	5680	2310		
8	8440	6980	5880	4520	4340	12000	7220	4900	4340	13000	4520	2700		
9	8980	6980	4710	4520	4160	9850	7940	4340	3990	12300	6300	2060		
10	11100	6750	4520	4520	4160	11100	7940	4340	3990	12000	5090	2850		
11	11100	6980	4710	4520	3650	11100	8190	4160	3990	11400	5090	2180		
12	13000	6980	4340	4520	3650	11400	8190	4160	4160	10400	4340	2700		
13	13700	6520	4340	4520	3990	11400	8190	3990	3990	10200	4710	2700		
14	13700	5280	5680	4520	3650	10400	8190	4340	4340	9560	4710	2850		
15	14000	4900	4900	4520	4160	10200	7940	5090	7700	8980	4710	2060		
16	14000	4160	4710	4520	3990	9560	7940	4710	8980	7700	4710	3320		
17	13700	6300	4340	4520	4160	8980	8190	4710	9560	6980	4710	2570		
18	13700	5480	4520	4520	4160	8980	8190	4520	10400	6300	5280	3160		
19	12700	6520	4900	4520	3650	7940	7940	4710	10200	6300	3820	2700		
20	12000	7220	5680	4520	4160	7460	6750	4520	10400	5880	3480	3480		
21	11700	8700	5090	4520	4160	6980	8190	5090	9850	6520	3160	3160		
22	11400	8190	4900	4520	4160	6300	8190	4710	8980	6520	3650	3320		
23	10800	6750	4900	4340	4160	5880	8190	5090	8980	5480	3160	2850		
24	10400	4900	4900	4520	4160	5090	8190	4710	7940	6300	3320	2850		
25	10400	4900	4520	4340	4340	5090	7220	4710	8980	5880	3650	2440		
26	9260	6090	4710	4340	3990	4710	6520	3650	9560	5280	3160	2850		
27	8700	5680	4520	4340	4160	5090	6750	4900	10200	5280	3160	2440		
28	9260	5680	4520	4340	3990	4710	6300	3990	8440	5090	3000	1940		
29	9260	7700	4900	4160	---	3000	6750	4520	9260	5090	3000	2440		
30	8980	7700	4520	4160	---	4710	7460	3990	9260	4710	3480	2180		
31	8190	---	4710	4160	---	4900	---	4900	---	5090	3160	---		
TOTAL	298680	199570	171550	138140	114300	226770	215230	150020	208260	256160	131890	82310		
MEAN	9635	6652	5534	4456	4082	7315	7174	4839	6942	8263	4255	2744		
MAX	14000	8700	8980	4520	4340	12000	8190	7460	10400	13000	6300	3480		
MIN	2850	4160	4340	4160	3650	3000	3650	3650	3990	4710	3000	1940		
CFSM	.83	.57	.48	.38	.35	.63	.62	.42	.60	.71	.37	.24		
IN.	.96	.64	.55	.44	.37	.73	.69	.48	.67	.82	.42	.26		
AC-FT	592400	395800	340300	274000	226700	449800	426900	297600	413100	508100	261600	163300		
CAL YR 1982	TOTAL	2823350	MEAN	7735	MAX	33600	MIN	1660	CFSM	.67	IN	9.05	AC-FT	5600000
WTR YR 1983	TOTAL	2192880	MEAN	6008	MAX	14000	MIN	1940	CFSM	.52	IN	7.03	AC-FT	4350000

## MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1963-66, 1975 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: November 1980 to September 1983 (discontinued).  
WATER TEMPERATURES: November 1980 to September 1983 (discontinued).

INSTRUMENTATION.--Water-quality minimonitor since November 1980.

REMARKS.--Letter K indicates non-ideal colony count. Letter E indicates estimated value.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 819 micromhos July 26, 1981; minimum, 157 micromhos May 9, 1981.  
WATER TEMPERATURES: Maximum, 31.0°C July 18, 1981; minimum, 0.0°C several days during winter period.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 441 micromhos July 24; minimum, 211 micromhos Oct. 15.  
WATER TEMPERATURES: Maximum, 30.5°C Aug. 6; minimum, 0.0°C several days during winter period.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 20...	1430	12100	370	240	8.2	8.0	3.5	8.5	6.0	740	10.2
DEC 14...	1130	5770	308	288	8.0	7.6	-1.5	.0	2.7	--	14.6
FEB 09...	1200	4120	290	333	7.8	7.4	-8.0	.0	2.0	742	9.8
APR 04...	1200	6160	292	294	8.3	7.7	9.5	4.0	2.9	743	13.2
JUN 15...	1240	8710	285	276	8.1	7.4	16.0	20.0	6.6	E740	7.1
AUG 22...	1400	3610	240	287	8.2	7.9	25.5	28.0	4.4	736	8.2

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT 20...	90	K38	180	31	9.5	3.6	1.3	108	13	2.9	.20
DEC 14...	E103	51	67	46	13	5.5	1.5	149	13	3.7	<.10
FEB 09...	69	68	86	43	15	5.7	1.8	171	11	3.8	.10
APR 04...	103	140	210	39	12	4.9	2.2	141	12	4.3	.10
JUN 15...	--	130	740	37	11	4.7	1.4	134	10	3.6	.10
AUG 22...	109	K140	200	39	13	4.7	1.4	143	10	3.5	<.10

## MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L AS (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, CHARGE, SUS- PENDED (MG/L) (80154)	SEDI- MENT, CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 20...	9.8	164	.120	.040	1.5	.050	.050	.020	14	453	96
DEC 14...	11	196	.230	.040	.50	.060	<.010	<.010	3	47	87
FEB 09...	11	194	.350	.100	.60	.030	.020	.020	5	56	74
APR 04...	10	190	.260	.050	.80	.050	.010	<.010	--	--	--
JUN 15...	5.5	173	.110	.060	.80	.020	.020	<.010	12	282	91
AUG 22...	13	198	<.100	.020	.70	.060	.040	.020	14	136	88

DATE	TIME	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
FEB 09...	1200	<10	1	59	<1	<1	--	<3	6	120	2
JUN 15...	1240	<10	1	54	<.5	<1	3	<3	4	72	<1
AUG 22...	1400	30	3	55	<.5	<1	<1	<3	2	38	1

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
FEB 09...	<4	38	.3	<10	4	<1	<1	83	<6	<4
JUN 15...	8	1	.2	<10	1	<1	<1	77	<6	7
AUG 22...	<4	6	.2	<10	1	<1	<1	78	<6	13

## MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	269	267	268	231	229	230	256	252	255	333	329	331
2	275	268	271	236	230	233	252	245	250	329	325	327
3	275	263	270	236	232	234	248	242	246	325	322	323
4	271	268	270	236	233	234	251	241	249	326	322	325
5	272	269	271	240	237	239	258	250	256	327	323	325
6	275	269	271	241	238	240	258	257	258	329	326	328
7	277	264	273	244	240	242	263	258	260	333	328	330
8	266	254	257	245	242	243	268	263	266	334	331	333
9	260	255	258	245	243	244	270	266	268	332	329	330
10	262	256	259	248	245	246	273	270	272	333	329	331
11	261	240	251	248	244	246	277	273	275	333	330	331
12	240	230	235	245	243	244	277	272	274	332	329	330
13	231	216	224	249	244	247	278	272	274	333	331	332
14	218	214	216	252	247	249	313	277	298	334	331	333
15	219	211	215	252	250	251	311	304	307	333	330	331
16	216	212	214	250	244	248	309	305	307	332	331	331
17	218	214	216	249	241	244	312	308	310	333	332	333
18	220	217	219	257	248	253	318	309	314	333	331	332
19	220	218	219	258	253	256	318	310	314	332	329	330
20	218	216	218	261	255	257	317	310	313	331	329	330
21	220	218	219	264	262	263	319	314	317	332	331	332
22	221	217	219	273	263	270	326	318	321	332	329	330
23	222	220	221	272	260	264	328	325	326	331	330	331
24	221	219	220	266	260	263	328	323	325	331	329	330
25	224	220	222	271	265	267	330	326	329	332	329	330
26	227	224	226	271	257	262	329	327	327	334	331	333
27	225	222	223	264	258	261	332	327	330	337	334	335
28	226	224	225	265	260	262	333	331	332	339	336	338
29	226	225	226	266	261	265	333	330	331	340	338	339
30	229	224	227	260	255	258	331	328	330	341	339	340
31	231	227	229	---	---	---	332	330	331	338	336	337
MONTH	277	211	237	273	229	251	333	241	296	341	322	331
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	339	335	337	317	309	312	296	293	294	240	238	239
2	339	337	338	310	308	309	301	295	298	240	238	239
3	337	333	335	310	307	308	300	278	289	241	238	239
4	333	328	330	310	304	308	285	278	280	242	238	240
5	328	325	326	306	303	305	290	287	288	243	241	242
6	325	323	324	303	291	298	289	286	288	244	242	243
7	323	318	319	292	263	280	288	277	283	252	244	247
8	318	313	315	260	246	250	277	269	274	254	252	253
9	318	315	317	250	245	248	269	259	264	256	252	254
10	322	318	320	246	235	241	258	225	249	255	251	253
11	319	318	319	235	227	231	241	231	236	259	255	257
12	318	317	318	228	224	226	235	228	232	262	258	260
13	319	317	318	229	226	227	228	221	223	267	263	265
14	317	316	317	236	230	232	221	218	219	268	265	267
15	319	317	318	239	235	237	224	218	220	266	262	264
16	320	318	319	241	239	240	221	219	220	281	264	274
17	320	317	318	242	240	241	221	219	220	283	279	281
18	320	319	319	244	240	242	223	219	221	279	271	276
19	320	317	318	246	244	245	224	222	223	271	267	270
20	319	318	318	252	246	249	224	221	223	270	267	269
21	319	318	318	258	253	255	225	223	224	270	268	269
22	319	318	318	260	257	259	225	223	224	269	263	267
23	319	316	317	266	261	264	224	222	223	267	263	265
24	317	315	316	270	265	268	229	224	226	267	261	264
25	316	315	316	272	269	271	231	229	230	264	259	261
26	318	316	317	279	272	275	232	230	231	266	264	265
27	317	315	316	288	279	283	235	231	233	265	263	264
28	318	316	318	289	287	289	236	233	234	270	266	268
29	---	---	---	292	287	290	239	233	236	272	267	271
30	---	---	---	294	290	292	240	237	238	276	273	275
31	---	---	---	295	292	293	---	---	---	276	273	275
MONTH	339	313	321	317	224	267	301	218	245	283	238	261

## MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	281	275	279	274	264	269	301	294	299	292	289	291
2	286	280	284	278	273	276	298	292	295	293	291	292
3	286	279	283	280	276	278	301	296	299	296	293	294
4	281	271	276	279	276	278	304	299	301	297	295	296
5	276	272	273	280	276	278	302	296	300	298	295	296
6	278	275	277	283	273	280	306	295	298	299	297	298
7	277	271	274	273	269	271	308	297	302	298	295	297
8	273	268	271	269	259	263	313	305	309	296	294	295
9	277	267	273	258	255	257	309	303	306	297	293	295
10	272	265	268	259	255	257	307	299	303	298	291	295
11	270	267	269	264	259	262	300	283	293	304	296	300
12	273	269	271	267	262	265	284	277	279	303	300	302
13	270	267	269	270	263	266	277	267	273	301	299	300
14	271	267	269	277	268	272	273	267	271	303	298	300
15	274	263	269	283	273	276	277	272	274	305	301	303
16	284	267	280	278	274	275	294	272	277	304	300	302
17	280	242	261	291	276	281	278	273	277	300	298	299
18	245	236	238	300	286	294	277	274	275	301	298	299
19	241	236	238	300	281	293	287	276	281	302	301	301
20	248	241	245	338	302	322	283	280	282	303	301	302
21	249	245	248	341	303	324	286	283	285	303	302	302
22	246	243	245	370	319	336	286	284	285	302	300	301
23	249	243	245	436	374	411	284	281	283	300	297	299
24	250	244	247	441	327	421	285	283	284	297	293	295
25	249	243	246	370	324	348	286	284	285	295	292	293
26	268	249	260	395	370	384	286	281	285	295	291	292
27	272	268	269	396	312	363	286	282	285	294	291	292
28	272	264	268	318	312	315	291	286	288	294	292	293
29	264	261	263	317	272	297	292	286	290	297	292	295
30	265	263	264	298	272	290	289	285	287	300	297	298
31	---	---	---	301	298	300	292	286	288	---	---	---
MONTH	286	236	264	441	255	300	313	267	288	305	289	297

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	14.5	14.5	14.5	8.5	7.0	7.0	.0	.0	.0	.0	.0	.0
2	14.5	14.0	14.0	7.0	6.5	7.0	.0	.0	.0	.0	.0	.0
3	14.0	13.0	13.5	6.5	5.5	6.0	.0	.0	.0	.0	.0	.0
4	13.5	13.0	13.0	5.5	4.0	4.5	.0	.0	.0	.0	.0	.0
5	13.5	13.0	13.0	4.0	3.0	3.0	.0	.0	.0	.0	.0	.0
6	13.5	13.0	13.5	3.0	2.5	2.5	.0	.0	.0	.0	.0	.0
7	13.0	12.5	12.5	2.5	2.0	2.5	.0	.0	.0	.0	.0	.0
8	12.5	11.0	11.5	2.5	2.5	2.5	.0	.0	.0	.0	.0	.0
9	11.5	11.0	11.0	2.5	2.5	2.5	.0	.0	.0	.0	.0	.0
10	11.0	10.5	11.0	2.5	2.0	2.0	.0	.0	.0	.0	.0	.0
11	11.0	10.5	10.5	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0
12	10.5	10.0	10.5	1.5	.0	1.0	.0	.0	.0	.0	.0	.0
13	10.0	10.0	10.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	10.5	10.0	10.0	.0	.0	.0	.5	.0	.0	.0	.0	.0
15	10.5	10.0	10.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	10.0	9.5	10.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	9.5	9.5	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
18	10.0	9.5	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	9.5	9.0	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
20	9.0	7.0	8.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
21	8.0	7.0	7.5	1.0	.0	.5	.0	.0	.0	.0	.0	.0
22	7.5	7.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
23	7.0	6.5	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
24	7.0	7.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
25	7.5	7.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	7.5	7.0	7.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	7.5	7.5	7.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
28	7.5	7.5	7.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
29	8.0	7.5	7.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
30	8.0	7.5	7.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
31	7.5	7.0	7.0	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	14.5	6.5	10.0	8.5	.0	1.5	.5	.0	.0	.0	.0	.0

## MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.0	.0	.0	.0	.0	.0	2.5	2.0	2.0	13.5	12.5	13.0
2	.0	.0	.0	.0	.0	.0	3.0	2.0	2.5	13.5	12.5	13.0
3	.0	.0	.0	.5	.0	.0	3.5	2.5	3.0	14.5	12.5	13.0
4	.0	.0	.0	.5	.5	.5	4.0	3.0	3.5	15.0	13.0	14.0
5	.0	.0	.0	.5	.0	.0	4.0	3.5	4.0	15.0	13.5	14.0
6	.0	.0	.0	.5	.0	.0	4.5	4.0	4.5	14.5	14.0	14.5
7	.0	.0	.0	.5	.0	.0	4.5	3.5	4.0	15.0	14.0	14.5
8	.0	.0	.0	.5	.0	.0	5.5	3.5	4.5	14.0	13.5	14.0
9	.0	.0	.0	.5	.0	.0	5.5	5.0	5.0	14.5	14.0	14.0
10	.0	.0	.0	.5	.0	.0	5.0	4.5	5.0	14.5	14.0	14.5
11	.0	.0	.0	.5	.0	.0	6.0	4.5	5.5	16.0	14.5	15.0
12	.0	.0	.0	.5	.0	.0	6.5	5.5	6.0	16.5	15.5	16.0
13	.0	.0	.0	.5	.0	.5	6.0	4.5	5.5	17.0	16.5	16.5
14	.0	.0	.0	.5	.0	.5	4.5	3.5	4.0	17.0	15.5	16.5
15	.0	.0	.0	.5	.5	.5	4.0	3.5	3.5	15.5	14.5	15.0
16	.0	.0	.0	.5	.0	.0	5.0	3.5	4.5	17.0	14.0	15.0
17	.0	.0	.0	.5	.0	.0	5.0	4.5	4.5	15.5	14.0	14.5
18	.0	.0	.0	.5	.0	.5	5.5	4.5	5.0	15.5	14.5	15.0
19	.0	.0	.0	.5	.5	.5	6.0	5.0	5.5	15.5	15.0	15.0
20	.0	.0	.0	.5	.5	.5	7.5	5.5	6.5	15.0	14.5	15.0
21	.0	.0	.0	.5	.5	.5	10.5	6.5	8.5	14.5	14.0	14.5
22	.0	.0	.0	.5	.0	.5	10.0	8.0	9.0	15.0	14.5	14.5
23	.0	.0	.0	.5	.0	.5	10.5	9.0	10.0	17.0	15.0	16.0
24	.0	.0	.0	1.0	.5	.5	12.5	10.0	11.0	17.5	16.0	16.5
25	.0	.0	.0	1.0	1.0	1.0	12.0	10.5	11.5	18.0	16.0	17.0
26	.0	.0	.0	1.5	1.0	1.0	13.0	12.0	12.5	17.0	16.5	17.0
27	.0	.0	.0	1.5	1.0	1.0	13.0	12.0	12.5	17.5	17.0	17.5
28	.0	.0	.0	1.5	1.5	1.5	12.5	12.5	12.5	17.5	17.0	17.5
29	---	---	---	2.5	1.5	2.0	13.0	12.5	12.5	17.5	16.5	17.0
30	---	---	---	3.0	2.0	2.5	15.5	12.0	13.5	16.5	16.0	16.5
31	---	---	---	3.0	2.0	2.0	---	---	---	17.0	15.5	16.5
MONTH	.0	.0	.0	3.0	.0	.5	15.5	2.0	6.5	18.0	12.5	15.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	17.5	16.0	16.5	24.5	21.0	22.5	27.5	25.0	26.0	25.5	25.0	25.0
2	18.0	17.5	17.5	23.0	22.0	22.5	26.5	25.0	25.5	25.5	25.5	25.5
3	20.5	18.0	18.5	24.0	22.5	22.5	27.5	25.0	26.0	26.0	25.5	25.5
4	19.5	18.5	18.5	22.0	21.5	22.0	28.0	25.5	26.5	25.5	25.0	25.0
5	19.5	18.5	19.0	23.0	20.5	21.5	28.5	26.5	27.0	25.0	24.0	24.5
6	19.5	18.5	19.0	22.0	21.0	21.5	30.5	27.5	28.5	24.0	23.0	23.5
7	21.0	18.0	19.5	22.5	21.5	22.0	29.5	27.0	28.0	23.0	22.0	22.5
8	20.0	18.0	19.0	26.0	22.0	23.5	28.0	27.5	27.5	22.0	21.5	22.0
9	24.0	19.0	21.0	25.0	23.5	24.5	27.5	26.5	27.0	22.5	21.5	22.0
10	22.5	19.0	20.5	25.5	24.0	25.0	26.5	25.0	26.0	22.0	21.5	21.5
11	22.0	20.5	21.5	25.5	24.5	25.0	25.5	24.5	25.0	21.5	21.0	21.5
12	22.5	22.0	22.5	25.5	24.5	25.0	25.0	24.0	24.5	21.5	20.5	21.0
13	23.0	22.5	22.5	26.0	24.5	25.0	26.0	24.0	25.0	21.0	19.5	20.5
14	22.5	22.0	22.5	26.5	25.0	26.0	27.5	24.0	25.5	19.5	18.0	18.5
15	22.0	19.5	21.0	27.0	26.0	26.5	27.0	25.0	26.0	18.0	17.5	17.5
16	19.5	19.0	19.0	27.5	26.0	26.5	26.0	25.0	25.5	17.5	17.0	17.0
17	20.0	18.0	19.0	26.5	25.5	26.0	27.0	25.0	25.5	17.0	16.0	16.5
18	19.5	18.5	19.0	26.5	25.0	25.5	26.0	24.5	25.0	16.0	15.5	16.0
19	19.5	18.0	18.5	26.5	25.0	25.5	25.5	24.5	25.0	15.5	15.5	15.5
20	20.5	19.0	20.0	26.5	25.0	25.5	25.5	24.5	25.0	15.5	15.0	15.0
21	21.0	20.0	20.5	29.0	25.5	26.5	26.0	24.5	25.0	15.0	14.0	14.5
22	22.5	20.5	21.0	28.5	26.0	27.0	25.0	24.0	24.5	14.0	12.5	13.5
23	26.5	21.5	23.5	27.0	26.5	26.5	25.0	24.0	24.0	12.5	12.0	12.0
24	24.0	22.5	23.5	28.0	26.0	26.5	24.0	23.5	24.0	12.0	11.5	12.0
25	24.5	22.5	23.5	28.0	25.5	26.5	24.5	24.0	24.0	12.5	11.5	12.0
26	25.0	23.5	24.0	26.0	25.5	26.0	28.0	24.0	25.5	18.0	12.5	14.5
27	24.0	23.0	23.5	26.0	25.5	25.5	26.5	25.5	26.0	17.0	13.5	15.0
28	23.0	22.0	22.5	25.5	25.0	25.5	27.0	25.5	25.5	15.5	13.5	14.5
29	22.0	21.5	21.5	28.5	25.5	26.5	26.5	25.0	25.5	15.5	15.5	15.5
30	22.5	20.5	21.5	28.0	26.0	26.5	26.5	25.5	26.0	16.0	15.5	16.0
31	---	---	---	26.0	25.5	25.5	26.0	25.0	25.5	---	---	---
MONTH	26.5	16.0	20.5	29.0	20.5	25.0	30.5	23.5	25.5	26.0	11.5	18.5

## ELK RIVER BASIN

05274750 ST. FRANCIS RIVER ABOVE ZIMMERMAN, MN

LOCATION.--Lat 45°28'17", long 93°39'50", in NW¼NE¼ sec.2, T.34 N., R.27 W., Sherburne County, Hydrologic Unit 07010203, in Sherburne National Wildlife Refuge, on right bank 9 mi (14.5 km) southwest of Santiago, 3.5 mi (5.6 km) west and 2 mi (3.2 km) north of Zimmerman.

PERIOD OF RECORD.--May 1980 to December 1981, April to November 1982, March to September 1983.

GAGE.--Water-stage recorder.

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,360 ft<sup>3</sup>/s (38.5 m<sup>3</sup>/s) July 2, 1983, gage height, 10.71 ft (3.264 m), minimum discharge, 5.8 ft<sup>3</sup>/s (0.16 m<sup>3</sup>/s) Sept. 26, 1982; minimum gage height, 3.38 ft (1.030 m) Nov. 12, 1982.

EXTREMES FOR CURRENT PERIOD.--Maximum discharge, 1,360 ft<sup>3</sup>/s (38.5 m<sup>3</sup>/s) July 2, gage height, 10.71 ft (3.264 m); minimum discharge, 12 ft<sup>3</sup>/s (0.34 m<sup>3</sup>/s) Sept. 8, gage height, 3.84 ft (1.170 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	50				139	156	107	96	1280	143	14
2	27	51				139	148	107	91	1280	119	13
3	30	53				139	141	103	90	985	96	13
4	30	54				139	136	101	87	699	78	13
5	34	52				166	133	96	84	440	63	14
6	38	---				225	156	94	81	332	53	14
7	40	---				434	190	95	69	298	44	13
8	39	---				635	213	92	57	281	37	13
9	39	---				819	232	105	52	269	31	15
10	40	---				937	248	171	49	258	27	17
11	39	---				1020	257	204	48	250	24	17
12	39	---				1040	240	203	48	240	22	16
13	38	---				887	230	206	50	231	19	16
14	38	---				659	205	202	69	221	18	15
15	40	---				393	169	196	95	210	16	15
16	39	---				310	143	192	109	198	17	16
17	39	---				279	121	209	115	189	19	16
18	41	---				257	111	234	116	177	19	16
19	45	---				239	127	203	115	149	18	17
20	50	---				223	228	166	113	125	18	17
21	49	---				210	305	159	129	103	17	18
22	47	---				199	342	173	147	87	17	18
23	48	---				194	319	177	147	75	16	17
24	49	---				194	289	177	144	65	15	17
25	50	---				196	252	170	143	58	15	17
26	50	---				200	211	160	162	52	16	18
27	51	---				206	171	143	178	52	16	18
28	51	---				203	143	127	284	65	16	18
29	50	---				195	125	119	487	93	15	20
30	51	---				178	116	112	874	119	15	20
31	51	---				165	---	104	---	139	14	---
TOTAL	1295	---				11219	5857	4707	4329	9020	1053	481
MEAN	41.8	---				362	195	152	144	291	34.0	16.0
MAX	51	---				1040	342	234	874	1280	143	20
MIN	23	---				139	111	92	48	52	14	13
CFSM	.28	---				2.40	1.29	1.01	.95	1.93	.23	.11
IN.	.32	---				2.76	1.44	1.16	1.07	2.22	.26	.12
AC-FT	2570	---				22250	11620	9340	8590	17890	2090	954



## ELK RIVER BASIN

05275000 ELK RIVER NEAR BIG LAKE, MN

LOCATION.--Lat 45°20'02", long 93°40'00", in NE¼SW¼ sec.23, T.33 N., R.27 W., Sherburne County, Hydrologic Unit 07010203, on right bank at upstream side of highway bridge, 4 mi (6 km) east of Big Lake and 4 mi (6 km) downstream from St. Francis River.

DRAINAGE AREA.--615 mi<sup>2</sup> (1,593 km<sup>2</sup>).

PERIOD OF RECORD.--April 1911 to September 1917, April to September 1931, April to November 1932, March to November 1933, March 1934 to current year.

REVISED RECORDS.--WSP 895: 1939. WSP 1308: 1912(M), 1915-17(M).

GAGE.--Water-stage recorder. Datum of gage is 899.60 ft (274.198 m) National Geodetic Vertical Datum of 1929. April 1911 to Sept. 30, 1917, April 1, 1931, to July 26, 1934, nonrecording gage at same site and datum.

REMARKS.--Records good except those for winter periods, which are fair.

AVERAGE DISCHARGE.--55 years (water years 1912-17, 1935-83), 260 ft<sup>3</sup>/s (7.363 m<sup>3</sup>/s), 5.74 in/yr (146 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,360 ft<sup>3</sup>/s (208 m<sup>3</sup>/s) Apr. 16, 1965, gage height, 10.86 ft (3.310 m); minimum, 3.6 ft<sup>3</sup>/s (0.102 m<sup>3</sup>/s) July 31, 1934.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,750 ft<sup>3</sup>/s (77.9 m<sup>3</sup>/s) July 3, gage height, 7.00 ft (2.134 m); minimum, 124 ft<sup>3</sup>/s (3.51 m<sup>3</sup>/s) Aug. 16, gage height, 1.00 ft (0.305 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	154	264	607	190	175	400	538	374	253	2500	257	200
2	170	259	600	189	175	510	552	370	237	2530	257	183
3	204	257	585	189	175	600	560	363	244	2690	254	171
4	202	252	563	188	174	670	596	351	242	2620	242	169
5	197	248	550	188	174	806	633	331	233	2240	231	175
6	230	243	540	187	173	904	644	316	220	1900	213	177
7	293	242	502	186	173	1050	635	306	208	1600	198	170
8	316	246	422	185	172	1190	609	298	194	1340	184	190
9	334	259	358	184	172	1320	594	292	176	1160	168	238
10	393	290	345	183	172	1850	603	285	159	980	164	260
11	505	318	345	182	171	2280	619	285	147	845	157	258
12	602	354	340	182	171	2400	628	299	139	729	150	265
13	624	285	315	181	171	2310	692	347	135	644	139	273
14	617	304	285	181	170	2080	747	376	150	568	135	291
15	607	315	260	180	170	1790	767	389	178	512	130	326
16	590	350	245	180	170	1500	770	400	192	481	128	356
17	557	380	230	180	170	1250	795	399	201	458	164	357
18	511	405	210	180	170	1080	786	382	208	461	193	339
19	475	440	198	180	170	953	725	377	210	461	199	330
20	483	543	197	180	170	850	667	381	210	454	205	342
21	465	510	196	180	169	769	628	384	330	438	210	353
22	430	520	194	179	169	705	609	368	604	411	213	345
23	402	510	193	179	168	645	616	342	690	379	221	319
24	381	502	192	178	178	594	657	323	702	341	219	290
25	362	532	192	178	198	549	661	309	674	308	205	267
26	344	555	191	178	190	515	614	301	753	275	218	252
27	325	577	191	177	210	495	560	294	862	260	231	240
28	307	585	191	177	280	485	510	291	1000	260	219	229
29	294	590	190	177	---	478	460	286	1450	252	221	220
30	281	594	190	176	---	472	412	281	2320	246	240	225
31	270	---	190	176	---	506	---	269	---	260	223	---
TOTAL	11925	11729	9807	5630	5000	32006	18887	10369	13321	28603	6188	7810
MEAN	385	391	316	182	179	1032	630	334	444	923	200	260
MAX	624	594	607	190	280	2400	795	400	2320	2690	257	357
MIN	154	242	190	176	168	400	412	269	135	246	128	169
CFSM	.63	.64	.51	.30	.29	1.68	1.02	.54	.72	1.50	.33	.42
IN.	.72	.71	.59	.34	.30	1.94	1.14	.63	.81	1.73	.37	.47
AC-FT	23650	23260	19450	11170	9920	63480	37460	20570	26420	56730	12270	15490
CAL YR 1982	TOTAL	108961	MEAN	299	MAX	2320	MIN	56	CFSM	.49	IN	6.59
WTR YR 1983	TOTAL	161275	MEAN	442	MAX	2690	MIN	128	CFSM	.72	IN	9.76
									AC-FT	216100		
									AC-FT	319900		

## CROW RIVER BASIN

05278000 MIDDLE FORK CROW RIVER NEAR SPICER, MN

LOCATION.--Lat 45°15'45", long 94°48'10", in NE¼ sec.27, T.121 N., R.33 W., Kandiyohi County, Hydrologic Unit 07010204, on right bank 75 ft (23 m) upstream from highway bridge, 1.5 mi (2.4 km) downstream from Lake Calhoun, 3 mi (4.8 km) downstream from Green Lake, and 6.8 mi (10.9 km) northeast of Spicer.

DRAINAGE AREA.--179 mi<sup>2</sup> (464 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--March 1949 to current year.

REVISED RECORDS.--WSP 1508: 1949(M), 1950.

GAGE.--Water-stage recorder and concrete and steel sharp-crested V-notch weir. Datum of gage is 1,147.93 ft (349.889 m) National Geodetic Vertical Datum of 1929 (Kandiyohi County Highway Department bench mark). Prior to July 20, 1950, nonrecording gage at bridge 75 ft (23 m) downstream at same datum.

REMARKS.--Records good except those for winter period, which are fair. Flow affected by natural storage and some regulation from lakes above station.

AVERAGE DISCHARGE.--34 years, 55.5 ft<sup>3</sup>/s (1.572 m<sup>3</sup>/s), 4.21 in/yr (107 mm/yr); median of yearly mean discharges, 42 ft<sup>3</sup>/s (1.19 m<sup>3</sup>/s), 3.19 in/yr (81 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 509 ft<sup>3</sup>/s (14.4 m<sup>3</sup>/s) June 22, 1983, gage height, 6.02 ft (1.835 m); maximum gage height, 6.67 ft (2.033 m) June 25, 1957; no flow Mar. 15-24, 1949, Feb. 26 to Mar. 26, 1960, Dec. 8, 1963, Feb. 10-21, 1965, Feb. 19-28, 1968, Jan. 11-30, 1975.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 509 ft<sup>3</sup>/s (14.4 m<sup>3</sup>/s) June 22, gage height, 6.02 ft (1.835 m); minimum discharge, 43 ft<sup>3</sup>/s (1.22 m<sup>3</sup>/s) June 11,13, gage height, 2.88 ft (0.878 m), minimum gage height, 2.88 ft (0.878 m) Oct. 1, June 11, 13.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	98	109	98	66	104	209	155	72	379	138	87
2	55	99	115	97	66	104	206	156	69	369	133	83
3	59	102	124	96	66	108	202	156	72	360	131	80
4	58	105	125	95	65	115	199	148	70	355	127	80
5	58	105	120	94	64	129	191	147	67	343	123	87
6	79	104	120	93	64	147	191	141	63	326	120	86
7	88	103	117	92	64	174	195	136	59	310	116	84
8	87	103	113	90	64	170	190	128	56	299	112	81
9	87	106	111	90	64	174	187	121	54	291	108	96
10	91	110	111	89	64	175	188	118	50	280	104	112
11	93	118	110	88	64	181	184	123	47	271	99	118
12	95	150	109	87	65	184	179	122	45	262	96	118
13	95	140	108	87	66	190	183	128	54	251	92	115
14	95	135	108	85	68	195	199	126	110	242	89	111
15	95	130	108	84	70	195	195	118	109	231	87	116
16	95	128	107	83	71	198	194	111	103	220	91	121
17	93	125	107	82	72	203	187	108	93	214	96	119
18	92	122	107	80	73	209	185	104	87	220	92	118
19	93	122	106	78	74	210	190	101	83	219	89	117
20	96	122	106	77	76	210	185	98	82	210	90	116
21	93	120	103	75	77	210	183	97	364	203	89	116
22	98	118	102	73	79	210	178	98	485	197	85	114
23	96	112	102	71	81	209	174	94	397	190	81	112
24	95	110	102	70	83	210	171	91	332	181	78	110
25	95	109	102	68	82	207	168	87	304	173	77	109
26	95	109	102	67	80	205	171	82	307	165	75	109
27	96	109	101	66	83	208	171	79	309	159	73	108
28	97	109	101	66	95	205	168	79	300	156	71	107
29	97	109	101	66	---	198	164	80	316	152	80	124
30	97	109	99	66	---	196	160	77	369	148	94	142
31	98	---	98	66	---	205	---	75	---	144	90	---
TOTAL	2706	3441	3354	2519	2006	5638	5547	3484	4928	7520	3026	3196
MEAN	87.3	115	108	81.3	71.6	182	185	112	164	243	97.6	107
MAX	98	150	125	98	95	210	209	156	485	379	138	142
MIN	45	98	98	66	64	104	160	75	45	144	71	80
CFSM	.49	.64	.60	.45	.40	1.02	1.03	.63	.92	1.36	.55	.60
IN.	.56	.72	.70	.52	.42	1.17	1.15	.72	1.02	1.56	.63	.66
AC-FT	5370	6830	6650	5000	3980	11180	11000	6910	9770	14920	6000	6340
CAL YR 1982	TOTAL	37194	MEAN 102	MAX 355	MIN 36	CFSM .57	IN 7.73	AC-FT 73770				
WTR YR 1983	TOTAL	47365	MEAN 130	MAX 485	MIN 45	CFSM .73	IN 9.84	AC-FT 93950				

## CROW RIVER BASIN

05280000 CROW RIVER AT ROCKFORD, MN

LOCATION.--Lat 45°05'12", long 93°44'02", in sec.29, T.119 N., R.24 W., Hennepin County, Hydrologic Unit 07010204, on right bank at Rockford, 150 ft (46 m) downstream from bridge on State Highway 55 and 1 mi (1.6 km) downstream from confluence of North and South Forks.

DRAINAGE AREA.--2,520 mi<sup>2</sup> (6,530 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--April to July 1906 (published as "near Dayton"), June 1909 to September 1917, April to November 1929, March 1930 to September 1931, April to November 1932, March to November 1933, March 1934 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1115: 1932. WSP 1508: 1933. WDR MN-77-2: 1972 (M)(m).

GAGE.--Water-stage recorder. Datum of gage is 893.08 ft (272.211 m) National Geodetic Vertical Datum of 1929. Apr. 13 to July 21, 1906, nonrecording gage at Berning Mill 14 mi (22.5 km) downstream at different datum. June 4, 1909, to Sept. 30, 1917, nonrecording gage at site 600 ft (183 m) downstream at different datum. Apr. 23, 1929, to Aug. 21, 1934, nonrecording gage at site 600 ft (183 m) downstream at present datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--58 years (water years 1910-17, 1931, 1935-83), 664 ft<sup>3</sup>/s (18.80 m<sup>3</sup>/s), 3.58 in/yr (91 mm/yr); median of yearly mean discharges, 514 ft<sup>3</sup>/s (14.6 m<sup>3</sup>/s), 2.77 in/yr (70 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,400 ft<sup>3</sup>/s (634 m<sup>3</sup>/s) Apr. 16, 1965, gage height, 19.27 ft (5.874 m) from floodmark; minimum, 1.8 ft<sup>3</sup>/s (0.051 m<sup>3</sup>/s) Nov. 15, 1936, gage height, 1.05 ft (0.320 m), caused by ice jam upstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,080 ft<sup>3</sup>/s (172 m<sup>3</sup>/s) Apr. 20, gage height, 10.18 ft (3.103 m); minimum discharge, 400 ft<sup>3</sup>/s (11.3 m<sup>3</sup>/s) Oct. 1, gage height, 2.88 ft (0.878 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	411	985	2350	1060	530	2050	2900	2770	1100	4520	1440	788
2	433	953	2000	1070	520	2390	3060	2680	1060	4490	1360	765
3	502	933	1800	1080	510	2850	3210	2580	1080	4680	1280	725
4	651	907	1700	1080	500	4080	3330	2480	1080	4960	1210	682
5	721	882	1630	1080	490	4850	3450	2390	1060	5020	1140	667
6	749	857	1600	1070	485	5020	3680	2320	1020	5050	1070	633
7	779	838	1600	1060	480	5090	4060	2270	966	5000	1010	583
8	846	816	1600	1040	470	5100	4390	2220	915	4870	942	548
9	938	796	1620	1000	460	5070	4550	2170	858	4690	881	525
10	1010	841	1710	980	450	5240	4560	2100	812	4450	824	506
11	1060	921	1800	950	440	5450	4440	2040	764	4160	761	489
12	1100	1060	1830	920	430	5510	4280	1970	719	3840	706	489
13	1140	1150	1800	880	420	5510	4320	1970	688	3540	659	507
14	1160	1210	1770	850	410	5400	4380	1950	727	3250	606	524
15	1170	1410	1700	820	405	5170	4540	1900	807	3050	570	556
16	1170	1360	1600	780	405	4910	4780	1850	903	2950	540	595
17	1160	1380	1500	750	405	4680	5110	1800	1010	2920	535	632
18	1150	1360	1430	720	405	4490	5570	1750	1090	2970	510	646
19	1140	1410	1370	700	410	4290	5950	1710	1140	2930	498	653
20	1170	1520	1300	680	430	4100	6060	1670	1180	2890	503	662
21	1170	1630	1240	670	490	3920	5840	1620	1370	2760	492	653
22	1190	1740	1180	660	660	3740	5420	1570	1730	2630	479	634
23	1190	1810	1130	650	970	3570	4940	1520	1990	2500	456	623
24	1190	1880	1100	638	1110	3400	4510	1460	2160	2360	440	602
25	1180	2000	1080	620	1250	3240	4130	1390	2270	2220	430	580
26	1160	2100	1070	610	1380	3120	3800	1320	2480	2080	618	562
27	1140	2200	1070	600	1550	3040	3520	1270	3200	1940	852	544
28	1110	2300	1060	590	1770	2970	3290	1220	4020	1830	818	525
29	1080	2460	1050	570	---	2850	3120	1190	4430	1710	728	522
30	1050	2400	1050	560	---	2750	2950	1160	4530	1610	719	533
31	1020	---	1040	540	---	2770	---	1130	---	1530	766	---
TOTAL	30940	42109	45780	25278	18235	126620	128140	57440	47159	103400	23843	17953
MEAN	998	1404	1477	815	651	4085	4271	1853	1572	3335	769	598
MAX	1190	2460	2350	1080	1770	5510	6060	2770	4530	5050	1440	788
MIN	411	796	1040	540	405	2050	2900	1130	688	1530	430	489
CFSM	.40	.56	.59	.32	.26	1.62	1.70	.74	.62	1.32	.31	.24
IN.	.46	.62	.68	.37	.27	1.87	1.89	.85	.70	1.53	.35	.27
AC-FT	61370	83520	90800	50140	36170	251200	254200	113900	93540	205100	47290	35610
CAL YR 1982	TOTAL	522606	MEAN	1432	MAX	7290	MIN	179	CFSM	.57	IN	7.71
WTR YR 1983	TOTAL	666897	MEAN	1827	MAX	6060	MIN	405	CFSM	.73	IN	9.84
									AC-FT			1037000
									AC-FT			1323000

## RUM RIVER BASIN

05284000 MILLE LACS LAKE AT GARRISON, MN

LOCATION.--Lat 46°18'05", long 93°49'05", in SW¼SE¼ sec.12, T.44 N., R.28 W., Crow Wing County, Hydrologic Unit 07010207, at pumphouse of Minnesota Division of Game and Fish, 0.2 mi (0.3 km) southwest of Borden Lake outlet and 0.8 mi (1.3 km) northeast of Garrison.

PERIOD OF RECORD.--June 1931 to current year. Monthend records for the period October 1939 to September 1953 published in WSP 1278 (fragmentary 1940-41). Prior to October 1939, published as "at Wealthwood."

GAGE.--Water-stage recorder. Datum of gage is 1,240.40 ft (378.074 m) National Geodetic Vertical Datum of 1929. Gage readings have been reduced to elevations NGVD. Prior to Oct. 1, 1941, nonrecording gage at Wealthwood, 8.3 mi (13.4 km) northeast of present site, at various datums; gage readings have been reduced to elevations, adjustment of 1912. October 1, 1941, to Sept. 30, 1958, water-stage recorder at datum 1,240.50 ft (378.104 m) adjustment of 1912. To convert these records to National Geodetic Vertical Datum of 1929, subtract 0.10 ft (0.030 m).

REMARKS.--Water level affected by fixed-crest spillway constructed in 1953 at outlet of Ogechie Lake, 2.7 mi (4.3 km) downstream from outlet of Mille Lacs Lake, with crest at elevation 1,250.50 ft (381.152 m). Water level subject to fluctuation caused by change in direction and velocity of wind and by seiches.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 1,253.87 ft (382.180 m) Aug. 14, 1972, affected by wind action and seiche action; maximum daily, 1,253.43 ft (382.045 m) Aug. 22, 1972; minimum observed, 1,245.74 ft (379.702 m) Oct. 16-19, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,252.43 ft (381.741 m) July 17, affected by wind action and seiche action; maximum daily, 1,252.08 ft (381.634 m) July 7; minimum, 1,250.96 ft (381.293 m) Nov. 12, affected by wind action and seiche action; minimum daily, 1,251.26 ft (381.384 m) Sept. 21, 22, 26.

## MONTHEND ELEVATION, IN FEET NGVD, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

Oct. 31 .....	1,251.53	Feb. 28 .....	1,251.62	June 30 .....	1,251.92
Nov. 30 .....	1,251.57	Mar. 31 .....	1,251.81	July 31 .....	1,251.87
Dec. 31 .....	1,251.68	Apr. 30 .....	1,251.98	Aug. 31 .....	1,251.58
Jan. 31 .....	1,251.69	May 31 .....	1,251.88	Sept.30 .....	1,251.33

NOTE.--Elevations other than those shown are available.

## RUM RIVER BASIN

05286000 RUM RIVER NEAR ST. FRANCIS, MN

LOCATION--Lat 45°19'40", long 93°22'20", in SE¼ sec.19, T.33 N., R.24 W., Anoka County, Hydrologic Unit 07010207, on left bank at upstream side of highway bridge, 4 mi (6.4 km) south of St. Francis and 15.8 mi (25.4 km) upstream from mouth.

DRAINAGE AREA.--1,360 mi<sup>2</sup> (3,520 km<sup>2</sup>), approximately.

PERIOD OF RECORD.-- May to November 1929, March 1930 to September 1931, April to November 1932, March 1933 to current year.

REVISED RECORDS.--WSP 1308: 1930(M), 1932(M).

GAGE.--Water-stage recorder. Datum of gage is 860.74 ft (262.354 m) National Geodetic Vertical Datum of 1929 (levels by Anoka County Highway Department). Prior to Nov. 9, 1933, nonrecording gage at site 50 ft (15 m) downstream at same datum.

REMARKS.--Records good except those for winter period, which are fair. Occasional regulation by Ogechie (also controls Mille Lacs Lake) and Onamia Lakes.

AVERAGE DISCHARGE.--51 years (water years 1931, 1934-83), 602 ft<sup>3</sup>/s (17.05 m<sup>3</sup>/s), 6.01 in/yr (153 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,100 ft<sup>3</sup>/s (286 m<sup>3</sup>/s) Apr. 20, 1965, Apr. 13, 1969; maximum gage height, 11.63 ft (3.545 m) Apr. 13, 1969; minimum discharge, 29 ft<sup>3</sup>/s (0.82 m<sup>3</sup>/s) Aug. 18, 1934, gage height, 1.91 ft (0.582 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,920 ft<sup>3</sup>/s (168 m<sup>3</sup>/s) Mar. 13, gage height, 8.46 ft (2.579 m); minimum discharge, 292 ft<sup>3</sup>/s (8.27 m<sup>3</sup>/s) Aug. 16, gage height, 2.77 ft (0.844 m); minimum gage height, 2.73 ft (0.832 m) Sept. 3, 4.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	364	720	1300	660	414	739	1150	1250	733	1430	473	327
2	369	694	1330	645	414	800	1280	1240	739	1490	469	312
3	384	673	1420	630	414	990	1420	1220	753	1580	457	307
4	398	649	1310	620	414	1250	1560	1190	746	1710	436	307
5	439	616	1340	600	414	1660	1710	1140	733	1650	412	307
6	525	595	1360	590	414	2080	1820	1090	713	1490	406	312
7	615	583	1380	580	414	2390	1950	1030	687	1350	389	332
8	699	575	1400	565	414	2710	2030	984	661	1280	374	368
9	846	560	1390	555	414	2850	2060	948	629	1190	358	400
10	1020	573	1310	545	414	3200	2020	912	598	1070	345	411
11	1200	592	1270	535	414	4150	2010	891	573	945	337	422
12	1360	639	1200	520	414	5470	2010	862	561	843	321	427
13	1510	590	1160	510	414	5890	2060	869	555	757	317	478
14	1620	513	1110	505	414	5590	2130	884	585	685	317	531
15	1700	565	1080	500	414	4940	2200	891	629	628	307	561
16	1740	590	1020	490	414	4240	2260	919	642	583	307	585
17	1710	620	1000	480	414	3640	2320	962	623	558	416	598
18	1630	644	960	475	414	3150	2440	970	616	586	450	604
19	1500	707	930	465	414	2740	2580	941	629	584	450	648
20	1400	817	900	460	414	2400	2590	905	616	629	467	674
21	1300	890	880	455	414	2110	2580	869	667	683	455	661
22	1220	1070	850	450	414	1880	2530	841	828	668	478	616
23	1160	1110	825	445	414	1710	2400	821	955	665	496	567
24	1120	1210	800	440	425	1540	2220	807	1090	637	484	519
25	1070	1350	775	438	480	1400	2010	786	1170	585	472	478
26	1010	1540	760	433	650	1290	1810	753	1300	540	461	446
27	946	1890	740	430	759	1180	1650	726	1270	515	422	417
28	892	1860	720	427	733	1100	1500	706	1280	529	395	386
29	835	1390	705	423	---	1050	1400	706	1290	504	373	372
30	791	1330	690	420	---	1020	1320	713	1360	481	363	373
31	747	---	675	414	---	1070	---	726	---	480	342	---
TOTAL	32120	26155	32590	15705	12569	76229	59020	28552	24231	27325	12549	13746
MEAN	1036	872	1051	507	449	2459	1967	921	808	881	405	458
MAX	1740	1890	1420	660	759	5890	2590	1250	1360	1710	496	674
MIN	364	513	675	414	414	739	1150	706	555	480	307	307
CFSM	.76	.64	.77	.37	.33	1.81	1.45	.68	.59	.65	.30	.34
IN.	.88	.72	.89	.43	.34	2.09	1.61	.78	.66	.75	.34	.38
AC-FT	63710	51880	64640	31150	24930	151200	117100	56630	48060	54200	24890	27270
CAL YR 1982	TOTAL	293241	MEAN	803	MAX	4570	MIN	190	CFSM	.59	IN	8.02
WTR YR 1983	TOTAL	360791	MEAN	988	MAX	5890	MIN	307	CFSM	.73	IN	9.87
									AC-FT	581600		
									AC-FT	715600		

## ELM CREEK BASIN

05287890 ELM CREEK NEAR CHAMPLIN, MN

LOCATION.--Lat 45°09'48", long 93°26'11", in NE¼NW¼ sec.35, T.120 N., R.22 W., Hennepin County, Hydrologic Unit 07010206, on left bank, 33 ft (10 m) downstream from bridge on Elm Creek Road, 2.5 mi (4.0 km) southwest of Champlin.

DRAINAGE AREA.--84.9 mi<sup>2</sup> (220 km<sup>2</sup>).

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 850.71 ft (259.296 m) National Geodetic Vertical Datum of 1929. Prior to March 15, 1979, nonrecording gage at present site and datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--5 years, 25.2 ft<sup>3</sup>/s (0.714 m<sup>3</sup>/s), 4.03 in/yr (102 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 414 ft<sup>3</sup>/s (11.7 m<sup>3</sup>/s) Apr. 3, 1982, gage height, 9.23 ft (2.813 m); minimum daily, 1.3 ft<sup>3</sup>/s (0.037 m<sup>3</sup>/s) Feb. 5-20, 1982; minimum gage height, 2.86 ft (0.872 m) Feb. 24, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 408 ft<sup>3</sup>/s (11.6 m<sup>3</sup>/s) Mar. 9, gage height, 8.98 ft (2.737 m); minimum discharge, 2.8 ft<sup>3</sup>/s (0.079 m<sup>3</sup>/s) Oct. 1; minimum gage height, 3.22 ft (0.981 m) Oct. 1, Nov. 8-9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	3.6	16	9.5	4.9	51	88	83	18	11	59	28
2	4.2	3.5	18	9.0	4.8	72	94	78	17	9.2	52	29
3	4.4	3.9	19	8.5	4.7	115	100	71	22	18	46	30
4	3.5	3.8	17	8.0	4.6	167	109	66	23	45	39	32
5	3.1	3.4	17	7.8	4.5	206	117	62	21	35	33	36
6	3.9	3.4	15	7.4	4.4	262	118	59	20	26	28	36
7	4.4	3.4	15	7.2	4.3	344	122	57	18	19	23	35
8	4.3	3.3	15	7.0	4.2	384	126	53	16	14	19	33
9	4.2	3.3	15	6.8	4.1	397	122	50	15	13	15	33
10	4.2	5.5	15	6.7	4.1	385	121	47	14	14	12	34
11	4.0	7.1	14	6.6	4.0	357	118	43	13	17	9.0	32
12	3.8	9.8	15	6.5	3.9	334	113	41	13	20	7.2	30
13	3.7	14	15	6.4	3.9	306	113	43	13	22	5.6	28
14	3.8	17	13	6.4	3.9	266	113	39	18	23	4.9	24
15	3.9	18	9.4	6.3	4.0	224	114	37	17	23	4.4	26
16	3.8	11	8.4	6.2	4.0	197	115	34	15	27	4.6	30
17	3.6	8.6	7.2	6.1	4.2	173	116	32	14	36	6.0	28
18	3.5	8.5	7.0	6.0	4.2	155	117	29	14	65	6.4	25
19	3.6	12	6.6	6.0	4.5	140	120	31	13	101	6.4	23
20	7.5	23	6.4	5.8	4.9	126	122	30	13	116	6.0	22
21	6.9	28	6.3	5.4	5.4	114	126	28	14	115	6.5	21
22	5.6	26	6.3	5.0	6.3	103	130	26	16	112	9.8	20
23	5.4	27	8.0	4.7	7.4	95	135	24	15	107	10	18
24	5.1	24	11	4.5	9.5	85	135	23	15	102	11	17
25	4.8	19	15	5.0	21	79	133	21	16	98	9.4	15
26	4.3	19	13	5.2	23	73	124	19	17	93	13	15
27	3.8	22	11	5.4	15	71	113	19	18	88	20	13
28	3.9	14	10	5.0	32	67	105	18	18	85	23	12
29	3.8	14	12	4.5	---	64	100	19	16	79	24	13
30	3.7	14	11	4.4	---	63	91	19	13	72	26	17
31	3.5	---	10	4.5	---	76	---	19	---	66	27	---
TOTAL	131.1	373.1	377.6	193.8	205.7	5551	3470	1220	485	1671.2	566.2	755
MEAN	4.23	12.4	12.2	6.25	7.35	179	116	39.4	16.2	53.9	18.3	25.2
MAX	7.5	28	19	9.5	32	397	135	83	23	116	59	36
MIN	2.9	3.3	6.3	4.4	3.9	51	88	18	13	9.2	4.4	12
CFSM	.05	.15	.14	.07	.09	2.11	1.37	.46	.19	.64	.22	.30
IN.	.06	.16	.17	.08	.09	2.43	1.52	.53	.21	.73	.25	.33
AC-FT	260	740	749	384	408	11010	6880	2420	962	3310	1120	1500
CAL YR 1982	TOTAL	10519.6	MEAN 28.8	MAX 406	MIN 1.3	CFSM .34	IN 4.61	AC-FT	20870			
WTR YR 1983	TOTAL	14999.7	MEAN 41.1	MAX 397	MIN 2.9	CFSM .48	IN 6.57	AC-FT	29750			

## MISSISSIPPI RIVER MAIN STEM

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN

LOCATION.--Lat 45°07'36", long 93°17'48", in SW¼ sec.12, T.119 N., R.21 W., Hennepin County, Hydrologic Unit 07010206, on right bank 0.4 mi (0.6 km) downstream from Coon Creek, 1.3 mi (2.1 km) downstream from Coon Rapids dam at Coon Rapids, 6.5 mi (10.5 km) downstream from Anoka, and at mile 864.8 (1,391.5 km) upstream from Ohio River.

DRAINAGE AREA.--19,100 mi<sup>2</sup> (49,500 km<sup>2</sup>), approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1931 to current year. Prior to October 1931 published as "at Coon Rapids, near Anoka."

GAGE.--Water-stage recorder. Datum of gage is 804.53 ft (245.221 m) National Geodetic Vertical Datum of 1929. Prior to June 14, 1932, at site 1.2 mi (1.9 km) upstream at different datum.

REMARKS.--Records good. Flow slightly regulated by six reservoirs on headwaters; total usable capacity, 1,640,600 acre-ft (2.02 km<sup>3</sup>). Diurnal regulation caused by dam above station.

AVERAGE DISCHARGE.--52 years, 7,655 ft<sup>3</sup>/s (216.8 m<sup>3</sup>/s), 5.44 in/yr (138 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 91,000 ft<sup>3</sup>/s (2,580 m<sup>3</sup>/s) Apr. 17, 1965, gage height, 19.53 ft (5.953 m); minimum, 529 ft<sup>3</sup>/s (15.0 m<sup>3</sup>/s) Aug. 29, 1976, gage height, 0.04 ft (0.012 m), result of regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 31,200 ft<sup>3</sup>/s (884 m<sup>3</sup>/s) Mar. 13, gage height, 9.57 ft (2.817 m); maximum gage height, 11.36 ft (3.463 m) Nov. 29 (backwater from ice); minimum discharge, 3,990 ft<sup>3</sup>/s (113 m<sup>3</sup>/s) Sept. 29, gage height, 2.40 ft (0.732 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	5270	11900	14700	8380	6840	9900	12500	13900	8410	23200	9070	6060		
2	5130	11500	16200	8940	6900	11100	12200	13800	7910	22700	8630	5650		
3	4890	11400	15800	8390	5850	12300	12800	13300	7750	22900	8350	5640		
4	5400	11100	15000	8200	5940	13700	14200	12400	7950	24000	8230	6230		
5	6310	10600	15000	8960	5820	16100	15100	12000	8070	23900	7980	6220		
6	7220	10100	14700	8690	5960	19100	15600	11500	7880	23500	7470	6020		
7	9190	9990	12700	8690	6300	22800	16800	10900	7470	24900	7670	5660		
8	10700	9930	11000	8540	5930	28000	17200	10800	7470	24100	8140	5040		
9	12700	9780	8920	7930	5910	27600	17900	9980	7070	23600	7390	5550		
10	14200	10400	8170	8900	6950	26700	19100	9280	6910	22200	8150	5300		
11	15900	10100	7340	9270	6500	29000	18600	9340	6510	21100	7470	6190		
12	17500	10900	7050	8570	6560	30200	18500	8680	6480	19500	7030	5650		
13	18800	9840	7690	8180	6500	30800	19100	9390	6750	17900	6410	6010		
14	19000	9530	9140	8570	6660	30000	19500	9330	6790	16700	6840	6230		
15	19200	9160	10400	8300	7420	28200	19100	9720	8140	15600	6640	6520		
16	19700	8750	10400	8020	5730	25900	19300	9900	10600	14800	6710	5900		
17	18800	8780	9770	8010	6810	24300	19900	9770	12100	14000	7530	7130		
18	19100	9990	9480	7960	6710	22600	20200	9600	12600	13300	7130	6830		
19	18600	10400	9840	7900	6580	21000	20400	9660	13300	13000	7050	7030		
20	17800	12100	10000	8060	6840	19200	20500	9870	13500	13400	6790	6660		
21	16900	13100	9710	8670	6720	17900	20000	9310	14300	12700	6050	6920		
22	16200	14300	9070	8630	6940	16400	19900	9380	16300	12900	6120	6880		
23	15800	14000	10100	7950	7470	15400	18900	9060	16400	12300	6300	6640		
24	15100	11700	10500	7520	7430	14800	18000	9130	16600	11500	5530	6020		
25	15500	11200	11000	7420	7560	13100	17200	8820	17200	11600	5650	5850		
26	14400	11500	9910	7250	7830	13000	16500	8500	19200	11000	6580	5360		
27	13300	10700	8890	6220	8460	12400	15600	8050	22400	10100	6180	5650		
28	13000	11100	7750	6020	9400	12300	15200	8420	23000	10200	6330	4870		
29	13000	12900	5750	8350	---	11600	14300	8050	22200	9670	6020	4360		
30	12500	14200	6990	7710	---	10200	14200	8220	23200	9380	6050	5340		
31	11900	---	8460	7180	---	11600	---	8260	---	8990	6070	---		
TOTAL	423010	330950	321430	251380	190520	597200	518300	308320	364460	514640	217560	179410		
MEAN	13650	11030	10370	8109	6804	19260	17280	9946	12150	16600	7018	5980		
MAX	19700	14300	16200	9270	9400	30800	20500	13900	23200	24900	9070	7130		
MIN	4890	8750	5750	6020	5730	9900	12200	8050	6480	8990	5530	4360		
CFSM	.72	.58	.54	.43	.36	1.01	.91	.52	.64	.87	.37	.31		
IN.	.82	.64	.63	.49	.37	1.16	1.01	.60	.71	1.00	.42	.35		
AC-FT	839000	656400	637600	498600	377900	1185000	1028000	611600	722900	1021000	431500	355900		
CAL YR 1982	TOTAL	4211990	MEAN	11540	MAX	44200	MIN	2990	CFSM	.60	IN	8.20	AC-FT	8354000
WTR YR 1983	TOTAL	4217180	MEAN	11550	MAX	30800	MIN	4360	CFSM	.61	IN	8.21	AC-FT	8365000

## MISSISSIPPI RIVER MAIN STEM

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

## WATER-QUALITY RECORDS

LOCATION.--Sediment samples collected at Camden Avenue bridge, in Minneapolis, 7.0 mi (11 km) downstream from gage. Tritium samples collected at gage near right bank. Prior to October 1, 1978, sediment samples collected at Lowry Avenue bridge.

DRAINAGE AREA.--19,600 mi<sup>2</sup> (50,800 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--Water years 1963-67, 1975 to current year.

## PERIOD OF RECORD.--

WATER TEMPERATURES: October 1975 to current year.

SUSPENDED SEDIMENT DISCHARGE: August 1975 to current year.

REMARKS.--During the winter period, daily suspended-sediment load was estimated on the basis of water records and monthly sediment samples. Water temperature was obtained once-daily for most of the open water period and monthly for winter period.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES (water years 1976-77, 1979-80, 1982-83): Maximum daily, 31.0°C Aug. 25, 26, 1976, July 19, 1977; minimum daily, 0.0°C several days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 210 mg/L Apr. 3, 1982; minimum daily mean, 1 mg/L on several days in 1978, 1980, 1981, and 1982.

SEDIMENT LOADS: Maximum daily, 17,400 tons (15,800 tonnes) Apr. 20, 1982; minimum daily, 3.9 tons (3.5 tonnes) Feb. 2, 1981.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum daily, 30.0°C Aug. 6, 29; minimum daily, 0.0°C several days during winter period.

SEDIMENT CONCENTRATION: Maximum daily mean, 125 mg/L June 28; minimum daily mean, 5 mg/L Nov. 9-10.

SEDIMENT LOADS: Maximum daily, 7,760 tons (7,040 tonnes) June 28; minimum daily, 79 tons (72 tonnes) Sept. 28.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.0	9.0	---	---	---	---	5.0	14.0	19.0	22.0	---	27.0
2	14.0	8.0	4.0	---	---	4.0	5.0	15.0	18.0	---	28.0	28.0
3	16.0	5.0	2.0	---	---	6.0	---	15.0	20.0	---	28.0	26.0
4	15.0	4.0	---	---	---	5.0	7.0	15.0	20.0	23.0	---	25.0
5	17.0	2.0	---	---	---	4.0	6.0	17.0	---	22.0	29.0	24.0
6	---	3.0	.0	---	---	---	5.0	15.0	---	23.0	30.0	23.0
7	12.0	6.0	---	---	---	2.0	5.0	13.0	21.0	24.0	30.0	23.0
8	13.0	4.0	---	---	---	---	7.0	16.0	21.0	25.0	29.0	---
9	13.0	---	---	---	---	.0	---	15.0	22.0	26.0	24.0	25.0
10	13.0	---	---	---	---	---	6.0	17.0	22.0	28.0	25.0	22.0
11	12.0	---	---	---	---	4.0	8.0	19.0	23.0	27.0	25.0	22.0
12	12.0	.0	---	---	---	1.0	7.0	18.0	25.0	26.0	---	20.0
13	11.0	---	---	---	---	3.0	7.0	18.0	24.0	28.0	24.0	20.0
14	13.0	---	---	---	---	4.0	---	15.0	21.0	29.0	28.0	19.0
15	12.0	---	---	---	---	2.0	6.0	17.0	21.0	28.0	28.0	16.0
16	11.0	---	---	---	---	2.0	6.0	16.0	20.0	27.0	25.0	16.0
17	12.0	1.0	---	---	---	3.0	7.0	17.0	20.0	25.0	24.0	12.0
18	12.0	3.0	---	---	---	3.0	7.0	15.0	20.0	26.0	26.0	18.0
19	10.0	4.0	---	---	---	3.0	8.0	14.0	22.0	25.0	27.0	16.0
20	8.0	5.0	---	---	---	---	9.0	15.0	22.0	27.0	27.0	14.0
21	9.0	2.0	---	---	---	2.0	11.0	17.0	23.0	29.0	25.0	13.0
22	9.0	.0	---	---	---	2.0	10.0	17.0	24.0	29.0	26.0	12.0
23	---	---	---	---	---	3.0	---	18.0	25.0	28.0	26.0	14.0
24	10.0	---	---	---	2.0	4.0	---	18.0	25.0	27.0	---	11.0
25	10.0	---	---	---	---	4.0	---	17.0	26.0	27.0	27.0	18.0
26	10.0	---	---	---	---	---	---	19.0	26.0	---	29.0	16.0
27	9.0	---	---	---	4.0	3.0	---	17.0	21.0	26.0	29.0	17.0
28	9.0	---	---	---	3.0	5.0	---	---	22.0	27.0	28.0	18.0
29	10.0	---	---	---	---	4.0	14.0	---	21.0	27.5	30.0	18.0
30	8.0	---	---	---	---	5.0	14.0	---	23.0	27.0	28.0	---
31	8.0	---	---	---	---	5.0	---	17.0	---	26.0	27.0	---



SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

TOTAL LOAD FOR YEAR: 354756 TONS.

## MISSISSIPPI RIVER MAIN STEM

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	TRITIUM IN WATER MOLE- CULES (TU) (07012)	TRITIUM WATER MOLE- CULES COUNT ERROR (TU) (07013)
NOV 08...	1400	48.7	2.0
FEB 16...	1409	48.3	2.0
MAR 23...	1045	38.9	1.7
MAY 19...	1010	44.4	1.7
JUN 20...	1047	42.4	1.7

## MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN

LOCATION.--Lat 45°06'12", long 93°16'37", in SW¼NE¼ sec.10, T.30 N., R.24 W., Anoka County, Hydrologic Unit 07010206, on left bank at St. Paul Pumping Station in Fridley, 0.9 mi (1.5 km) upstream from Rice Creek, and 3.4 mi (5.5 km) downstream from Coon Rapids Dam, and at mile 862.8 (1,388 km) upstream from Ohio River.

PERIOD OF RECORD.--Water years 1975 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: November 1974 to current year.

pH: November 1974 to current year.

WATER TEMPERATURES: November 1974 to current year.

DISSOLVED OXYGEN: November 1974 to current year.

INSTRUMENTATION.--Water-quality monitor since November 1974.

REMARKS.--Extremes are published for years with 80 percent or more daily record.

COOPERATION.--Water-quality monitor is operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water year 1981, 1983): Maximum, 473 micromhos Sept. 30, 1981; minimum, 202 micromhos Nov. 12, 17, 1982.

pH (water year 1981-83): Maximum, 8.7 units Apr. 16, 18-20, 1981; minimum, 7.1 units Apr. 4-6, 1982.

WATER TEMPERATURES (water year 1981-83): Maximum, 29.5°C July 6, 1981; Aug. 7, 1983; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN (water year 1981-83): Maximum, 17.6 mg/L Mar. 7, 8, 1981; minimum, 2.9 mg/L July 27, 1981.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 389 micromhos Mar. 30-31, Apr. 4; minimum, 202 micromhos Nov. 12, 17.

pH: Maximum, 8.6 units June 9-10, Aug. 7, 9, 12-14, 26-27, Sept. 2; minimum, 7.4 units Oct. 10-11, 20, 23-28, Nov. 26, Mar. 13-15.

WATER TEMPERATURES: Maximum, 29.5°C Aug. 7; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN: Maximum, 16.1 mg/L Dec. 13; minimum, 4.4 mg/L Aug. 18.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	295	294	295	---	---	---	359	340	358
2	---	---	---	295	294	295	---	---	---	359	357	359
3	---	---	---	297	294	295	---	---	---	359	358	359
4	---	---	---	297	288	294	---	---	---	359	351	354
5	313	309	311	292	289	291	---	---	---	352	351	352
6	312	287	308	296	293	294	---	---	---	352	351	352
7	305	292	297	298	297	298	358	340	351	351	350	351
8	292	289	291	301	300	300	354	343	346	351	349	350
9	291	288	289	303	278	300	349	346	348	350	348	349
10	288	259	283	303	297	301	350	349	350	351	349	350
11	259	255	257	300	293	297	357	351	353	351	349	350
12	256	252	254	296	202	291	359	340	355	345	343	344
13	251	245	248	298	296	297	359	340	343	341	339	340
14	246	244	245	301	298	299	342	340	341	336	334	336
15	245	240	243	301	300	300	359	340	348	332	331	332
16	259	240	256	304	301	303	357	355	357	326	325	326
17	---	---	---	308	202	301	356	355	356	322	321	322
18	---	---	---	308	303	306	357	356	356	321	320	321
19	---	---	---	310	307	309	359	357	358	323	322	322
20	254	251	253	311	308	309	359	357	358	329	327	328
21	254	252	253	307	301	304	357	356	357	334	332	333
22	256	253	254	303	298	301	358	355	356	337	335	336
23	258	254	256	298	296	297	357	355	356	341	339	340
24	259	255	257	302	298	301	357	340	352	344	343	344
25	290	257	276	303	300	301	353	350	351	350	348	349
26	292	288	290	303	299	300	359	342	353	349	348	349
27	295	291	293	---	---	---	355	353	354	351	349	350
28	296	295	295	---	---	---	356	354	355	352	351	352
29	296	295	296	---	---	---	358	356	357	353	352	353
30	296	295	296	---	---	---	359	357	359	353	351	352
31	295	294	295	---	---	---	359	340	346	351	349	350
MONTH	---	---	---	---	---	---	---	---	---	359	320	344

## MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	350	344	346	358	351	353	383	380	381	303	300	302
2	346	344	345	353	350	352	383	242	347	319	300	303
3	346	346	346	353	350	352	242	242	242	310	300	305
4	347	345	346	353	342	349	389	242	337	311	302	308
5	348	347	348	359	340	343	384	376	378	313	309	311
6	348	347	348	359	340	349	375	344	355	313	310	312
7	348	346	347	359	340	353	341	338	340	313	310	311
8	356	346	352	358	353	354	365	335	347	312	308	310
9	356	355	356	353	342	348	361	353	357	318	310	314
10	356	355	356	342	341	341	353	350	351	319	313	318
11	356	355	356	343	340	341	359	350	355	359	340	346
12	356	352	355	341	319	338	359	350	355	---	---	---
13	358	352	355	319	312	316	350	343	347	---	---	---
14	383	358	376	312	311	312	343	318	334	---	---	---
15	388	382	384	---	---	---	343	313	330	---	---	---
16	383	381	382	---	---	---	343	340	342	---	---	---
17	382	380	381	---	---	---	343	340	342	351	340	345
18	380	359	377	---	---	---	349	340	344	348	340	343
19	381	359	379	---	---	---	353	343	349	343	313	337
20	383	381	382	---	---	---	351	343	346	343	340	342
21	382	382	382	---	---	---	344	315	333	350	340	345
22	382	381	382	---	---	---	320	317	319	352	343	350
23	382	381	382	---	---	---	319	309	313	352	348	350
24	382	352	370	---	---	---	313	304	309	353	350	351
25	353	350	352	---	---	---	306	303	305	353	350	352
26	352	350	351	---	---	---	317	300	308	359	340	350
27	353	350	351	---	---	---	319	300	302	359	340	347
28	353	350	351	---	---	---	303	300	302	359	340	347
29	---	---	---	383	380	382	303	300	301	353	350	352
30	---	---	---	389	380	384	303	300	302	352	340	347
31	---	---	---	389	380	383	---	---	---	358	340	345
MONTH	388	344	362	---	---	---	389	242	332	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	358	339	349	298	290	293	313	310	311	350	340	345
2	349	346	347	303	293	300	319	310	315	353	342	349
3	352	305	341	303	289	298	343	310	330	353	350	351
4	349	330	332	298	291	293	345	334	340	353	342	349
5	346	327	330	301	290	295	349	332	341	---	---	---
6	343	324	337	303	299	301	345	336	338	---	---	---
7	343	339	341	311	301	305	335	322	328	346	316	320
8	342	340	341	313	310	311	337	318	328	357	327	342
9	351	340	345	313	310	311	328	300	314	356	325	353
10	352	341	346	313	310	311	319	308	312	360	335	356
11	353	342	349	313	310	312	319	300	313	339	330	334
12	353	342	349	313	310	311	313	310	311	343	324	327
13	352	309	341	319	310	314	313	310	312	345	326	331
14	342	311	324	319	300	310	319	300	308	351	341	347
15	---	---	---	319	293	311	319	300	312	343	310	322
16	---	---	---	319	252	307	313	280	305	318	303	312
17	---	---	---	318	300	310	319	300	314	342	312	329
18	---	---	---	313	302	311	319	300	312	343	318	334
19	---	---	---	319	300	306	303	300	302	343	342	343
20	---	---	---	309	300	304	319	300	304	343	319	338
21	---	---	---	319	309	312	319	300	302	318	310	313
22	---	---	---	343	311	325	319	300	305	313	309	311
23	---	---	---	343	340	342	319	300	302	308	302	304
24	---	---	---	343	319	337	303	300	301	310	303	306
25	---	---	---	341	313	321	313	301	307	313	310	312
26	---	---	---	319	313	317	312	298	304	341	312	336
27	---	---	---	341	310	324	312	300	306	351	340	347
28	298	290	293	313	310	312	349	308	324	353	350	351
29	300	293	298	343	312	330	348	319	341	358	351	353
30	299	291	294	343	313	340	348	303	339	359	340	344
31	---	---	---	319	310	313	348	340	342	---	---	---
MONTH	---	---	---	343	252	312	349	280	317	---	---	---

## PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	FEBRUARY				MARCH				APRIL				MAY		
1	7.8	7.8	7.8		8.1	8.0	8.0		7.8	7.8	7.8		8.2	8.0	8.0
2	7.8	7.8	7.8		8.0	8.0	8.0		---	---	---		8.1	7.9	8.0
3	7.8	7.8	7.8		8.1	8.0	8.0		---	---	---		8.1	8.0	8.0
4	7.8	7.8	7.8		8.1	8.0	8.0		7.9	7.8	7.9		8.1	8.0	8.1
5	7.8	7.8	7.8		8.0	8.0	8.0		8.0	7.9	7.9		8.1	8.0	8.1
6	7.8	7.8	7.8		8.0	7.9	7.9		8.0	7.8	7.9		8.1	7.9	8.0
7	7.8	7.8	7.8		7.9	7.9	7.9		8.0	7.8	7.9		8.0	7.8	7.9
8	7.8	7.8	7.8		7.9	7.8	7.8		8.1	7.8	7.9		8.1	8.0	8.0
9	7.8	7.8	7.8		7.8	7.5	7.7		8.1	7.9	8.0		8.1	8.0	8.1
10	7.8	7.8	7.8		7.5	7.5	7.5		8.0	7.8	7.9		8.1	8.0	8.1
11	7.8	7.8	7.8		7.5	7.5	7.5		8.1	7.9	8.0		8.2	8.0	8.1
12	7.8	7.8	7.8		7.5	7.5	7.5		8.1	7.9	8.0		---	---	---
13	7.8	7.8	7.8		7.5	7.4	7.5		7.9	7.5	7.7		---	---	---
14	7.9	7.8	7.8		7.4	7.4	7.4		7.6	7.5	7.5		---	---	---
15	7.9	7.9	7.9		7.8	7.4	7.7		7.9	7.5	7.7		---	---	---
16	7.9	7.9	7.9		---	---	---		7.9	7.8	7.9		---	---	---
17	7.9	7.9	7.9		---	---	---		7.9	7.8	7.9		8.2	8.0	8.1
18	8.0	7.9	7.9		---	---	---		7.9	7.8	7.9		8.1	8.0	8.1
19	8.0	8.0	8.0		---	---	---		8.0	7.8	7.9		8.0	7.9	7.9
20	8.0	8.0	8.0		---	---	---		8.0	7.8	7.9		8.0	7.8	7.9
21	8.0	8.0	8.0		---	---	---		8.1	7.9	8.0		8.1	7.9	8.0
22	8.0	8.0	8.0		---	---	---		8.1	7.9	8.0		8.2	8.0	8.1
23	8.0	8.0	8.0		---	---	---		8.1	7.9	8.0		8.2	8.0	8.1
24	8.1	8.0	8.1		---	---	---		8.1	7.9	8.0		8.2	8.0	8.1
25	8.2	8.1	8.1		---	---	---		8.1	7.9	8.0		8.4	8.0	8.1
26	8.2	8.1	8.1		---	---	---		8.2	8.0	8.1		8.4	8.0	8.1
27	8.1	8.1	8.1		---	---	---		8.1	8.0	8.1		8.1	8.0	8.1
28	8.2	8.0	8.1		---	---	---		8.1	7.9	8.0		8.2	8.0	8.1
29	---	---	---		7.9	7.8	7.8		8.1	7.9	8.0		8.2	8.0	8.1
30	---	---	---		7.9	7.8	7.8		8.1	8.0	8.1		8.1	8.0	8.0
31	---	---	---		7.9	7.8	7.8		---	---	---		8.1	7.5	8.0
MONTH	8.2	7.8	7.9		---	---	---		---	---	---		---	---	---

## MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.2	7.5	7.9	7.9	7.8	7.8	8.5	8.1	8.3	8.5	8.1	8.3
2	8.2	8.0	8.1	7.9	7.8	7.9	8.5	8.1	8.3	8.6	8.2	8.4
3	8.2	8.0	8.1	7.9	7.8	7.9	8.5	8.1	8.4	8.5	8.1	8.4
4	8.4	8.0	8.1	7.9	7.8	7.8	8.4	8.1	8.3	8.2	8.0	8.0
5	8.1	8.0	8.1	7.9	7.8	7.9	8.4	8.1	8.2	---	---	---
6	8.4	8.0	8.1	8.0	7.9	7.9	8.4	8.0	8.1	---	---	---
7	8.5	8.1	8.3	8.0	7.9	8.0	8.6	8.0	8.3	8.4	8.0	8.1
8	8.5	8.1	8.4	8.1	8.0	8.0	8.4	8.1	8.3	8.5	8.0	8.2
9	8.6	8.1	8.3	8.1	8.0	8.0	8.6	8.0	8.3	8.5	8.1	8.2
10	8.6	8.2	8.4	8.1	8.0	8.1	8.5	8.4	8.4	8.5	8.1	8.2
11	8.5	8.1	8.3	8.1	8.0	8.0	8.5	8.4	8.4	8.4	8.1	8.2
12	8.4	8.0	8.2	8.1	8.0	8.0	8.6	8.4	8.4	8.4	8.0	8.1
13	8.2	7.9	8.1	8.2	8.0	8.0	8.6	8.4	8.5	8.4	8.0	8.1
14	7.9	7.8	7.8	8.2	8.0	8.1	8.6	8.2	8.4	8.5	8.1	8.2
15	---	---	---	8.2	8.0	8.1	8.5	8.2	8.4	8.2	8.0	8.1
16	---	---	---	8.2	8.0	8.1	8.5	8.0	8.2	8.2	8.0	8.1
17	---	---	---	8.1	8.0	8.1	8.2	8.1	8.1	8.2	8.0	8.1
18	---	---	---	8.1	8.0	8.0	8.1	8.0	8.1	8.2	8.0	8.1
19	---	---	---	8.1	8.0	8.1	8.2	8.0	8.1	8.2	8.0	8.0
20	---	---	---	8.1	8.0	8.1	8.2	8.0	8.1	8.1	8.0	8.1
21	---	---	---	8.2	8.0	8.1	8.2	8.0	8.1	8.1	8.1	8.1
22	---	---	---	8.2	8.0	8.1	8.1	8.0	8.1	8.2	8.1	8.1
23	---	---	---	8.2	8.0	8.1	8.4	8.0	8.1	8.2	8.0	8.1
24	---	---	---	8.1	8.0	8.0	8.5	8.0	8.2	8.2	8.0	8.0
25	---	---	---	8.1	8.0	8.1	8.5	8.1	8.3	8.2	8.0	8.1
26	---	---	---	8.1	8.0	8.1	8.6	8.1	8.3	8.1	8.0	8.1
27	---	---	---	8.2	8.0	8.1	8.6	8.1	8.3	8.2	8.0	8.1
28	7.9	7.8	7.9	8.2	8.0	8.1	8.5	8.0	8.2	8.2	8.1	8.1
29	7.9	7.8	7.9	8.2	8.0	8.1	8.5	8.1	8.2	8.4	8.1	8.3
30	7.9	7.8	7.8	8.2	8.1	8.1	8.4	8.0	8.2	8.2	8.0	8.1
31	---	---	---	8.4	8.0	8.1	8.5	8.0	8.3	---	---	---
MONTH	---	---	---	8.4	7.8	8.0	8.6	8.0	8.3	---	---	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	6.0	5.5	6.0	---	---	---	.5	.5	.5
2	---	---	---	5.5	5.0	5.5	---	---	---	.5	.0	.5
3	---	---	---	5.0	3.0	4.5	---	---	---	.5	.5	.5
4	---	---	---	3.0	.0	1.5	---	---	---	.5	.5	.5
5	13.0	12.0	12.5	.5	.0	.0	---	---	---	.5	.0	.5
6	14.0	12.0	13.0	.5	.0	.5	---	---	---	.5	.5	.5
7	13.0	10.0	11.0	.5	.0	.5	1.0	.0	.5	.5	.0	.5
8	10.5	10.0	10.0	.5	.0	.0	3.0	.5	2.0	.5	.0	.5
9	10.5	10.0	10.0	2.0	.0	1.0	2.5	2.0	2.0	.5	.0	.5
10	10.0	9.5	10.0	2.0	.5	2.0	2.5	2.0	2.0	1.0	.0	.5
11	9.5	9.0	9.5	1.0	.0	.5	2.5	2.0	2.0	.5	.0	.5
12	9.0	8.0	8.5	2.0	.0	.0	2.5	2.0	2.0	1.0	.0	.5
13	8.0	7.5	8.0	.0	.0	.0	2.5	2.0	2.5	.5	.5	.5
14	9.0	7.0	7.5	.0	.0	.0	2.5	.0	1.0	.5	.0	.5
15	9.0	7.5	8.5	.0	.0	.0	.5	.0	.5	.5	.5	.5
16	9.5	7.0	7.5	1.0	.5	.5	.5	.5	.5	.5	.0	.5
17	---	---	---	1.0	.0	1.0	.5	.5	.5	.5	.0	.5
18	---	---	---	2.0	.0	.5	.5	.5	.5	.5	.5	.5
19	---	---	---	3.0	2.0	2.5	.5	.5	.5	.5	.0	.5
20	7.5	5.0	6.0	4.0	2.5	3.0	1.0	.5	.5	.5	.0	.5
21	6.0	5.0	5.5	3.0	2.0	2.5	.5	.5	.5	.5	.0	.5
22	6.0	5.0	5.5	2.0	.0	1.0	.5	.0	.5	.5	.0	.5
23	6.0	5.0	5.5	1.0	.5	.5	.5	.0	.5	.5	.0	.5
24	7.0	5.0	6.0	.5	.5	.5	.5	.0	.5	.5	.5	.5
25	7.5	5.5	6.5	.5	.5	.5	.5	.5	.5	.5	.0	.5
26	7.0	5.5	6.5	.5	.5	.5	.5	.0	.5	.5	.0	.5
27	7.0	5.0	6.0	---	---	---	1.0	.0	.5	.5	.0	.5
28	7.0	7.0	7.0	---	---	---	1.0	.5	.5	.5	.0	.5
29	6.5	6.5	6.5	---	---	---	.5	.5	.5	.5	.0	.5
30	6.0	6.0	6.5	---	---	---	.5	.0	.5	.5	.0	.5
31	6.5	6.0	6.0	---	---	---	.5	.0	.5	.5	.0	.5
MONTH	---	---	---	---	---	---	---	---	---	1.0	.0	.5

## MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.5	.5	.5	.5	.5	.5	4.0	2.5	2.5	13.0	12.0	12.5
2	.5	.0	.5	1.0	.0	.5	5.5	3.0	4.5	12.5	10.5	12.0
3	.5	.5	.5	2.5	.0	1.5	7.0	5.5	6.5	14.5	12.0	13.0
4	.5	.0	.5	2.5	1.0	2.0	6.0	4.0	5.5	14.0	12.0	13.0
5	.5	.5	.5	2.5	1.0	2.0	5.5	5.0	5.5	15.5	12.5	14.0
6	.5	.5	.5	3.0	2.0	2.0	5.0	4.0	4.5	15.0	12.5	14.0
7	.5	.0	.5	3.0	2.0	2.5	4.5	3.0	4.0	13.0	12.0	12.5
8	.5	.0	.5	3.0	2.0	2.5	5.5	2.5	4.5	14.5	12.0	13.0
9	.5	.0	.5	2.5	.0	1.5	5.5	4.0	5.0	14.5	12.0	13.5
10	.5	.0	.5	1.0	.0	.0	4.5	2.5	4.0	13.0	12.5	12.5
11	.5	.5	.5	1.5	.5	.5	5.5	4.5	5.0	17.0	15.0	15.5
12	.5	.0	.5	1.0	.5	.5	6.0	5.0	5.5	---	---	---
13	.5	.5	.5	1.0	.5	1.0	5.0	4.5	4.5	---	---	---
14	.5	.0	.5	1.5	1.0	1.0	4.0	2.0	2.5	---	---	---
15	.5	.0	.5	2.0	1.5	2.0	4.0	1.0	2.5	---	---	---
16	.5	.0	.5	---	---	---	5.0	2.5	3.5	---	---	---
17	.5	.5	.5	---	---	---	5.0	2.5	4.0	15.0	14.0	14.5
18	.5	.5	.5	---	---	---	5.5	4.0	5.0	15.0	13.0	14.5
19	1.0	.0	.5	---	---	---	5.5	5.0	5.5	13.0	12.0	12.5
20	.5	.0	.0	---	---	---	7.5	5.0	6.5	13.0	12.0	12.5
21	.5	.5	.5	---	---	---	9.0	7.0	8.0	15.0	12.0	13.5
22	.5	.5	.5	---	---	---	10.0	7.5	9.0	16.0	15.0	15.0
23	.5	.5	.5	---	---	---	11.0	9.0	10.0	16.0	15.0	15.5
24	1.0	.0	.5	---	---	---	12.0	10.0	11.0	17.5	15.0	16.5
25	1.0	.0	.5	---	---	---	12.5	10.5	11.5	17.5	16.0	17.0
26	.5	.0	.5	---	---	---	13.0	12.0	12.5	18.0	17.0	17.5
27	2.5	.0	1.5	---	---	---	12.5	12.0	12.5	18.0	17.0	17.0
28	2.0	.5	2.0	---	---	---	13.0	12.0	12.5	18.0	17.0	17.5
29	---	---	---	2.5	2.0	2.5	13.0	10.5	12.0	17.5	15.5	16.5
30	---	---	---	2.5	2.0	2.0	14.0	12.0	12.5	16.0	15.0	15.5
31	---	---	---	2.5	2.0	2.5	---	---	---	17.0	15.0	15.5
MONTH	2.5	.0	.5	---	---	---	14.0	1.0	7.0	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	19.0	17.0	17.5	22.5	22.0	22.5	25.0	24.0	24.5	27.0	25.0	26.0
2	18.0	17.0	17.5	24.5	22.5	23.5	26.0	24.5	25.0	28.0	25.0	26.0
3	19.5	17.0	18.5	24.0	22.5	24.0	27.5	25.0	26.5	27.0	25.0	25.5
4	20.5	19.0	19.5	23.0	22.0	22.5	28.0	27.0	27.5	26.0	25.0	25.5
5	19.5	17.5	19.0	22.5	20.5	22.0	28.0	27.0	27.5	---	---	---
6	19.0	17.0	18.0	23.0	20.5	22.0	29.0	27.0	27.5	---	---	---
7	19.0	17.0	18.0	22.5	22.0	22.5	29.5	27.0	27.5	22.5	20.0	21.0
8	20.5	17.5	19.5	25.0	22.5	24.0	27.5	27.0	27.5	22.5	20.0	21.5
9	21.0	19.5	20.0	26.0	25.0	25.0	27.5	25.0	26.5	24.0	22.0	22.5
10	22.0	20.0	20.5	27.0	25.0	26.0	25.5	24.5	25.0	23.0	20.5	22.0
11	23.0	20.0	21.5	27.0	25.5	26.0	25.0	24.0	24.5	21.0	19.5	20.5
12	22.5	21.0	22.0	26.0	25.0	25.5	25.0	22.5	24.0	20.0	17.0	19.0
13	22.5	20.0	21.0	25.5	25.0	25.5	25.5	24.0	24.5	18.0	17.0	17.5
14	21.0	20.0	20.0	27.5	25.0	26.0	25.5	24.0	25.0	18.0	17.0	17.5
15	---	---	---	27.0	25.5	26.0	26.0	25.0	25.5	17.0	15.0	15.5
16	---	---	---	26.0	25.0	25.0	26.0	25.0	25.5	15.0	15.0	15.0
17	---	---	---	26.0	25.0	25.5	26.0	25.0	25.5	15.5	14.5	15.0
18	---	---	---	25.5	24.0	24.5	26.0	25.0	25.5	17.0	14.5	15.5
19	---	---	---	25.5	24.5	25.0	27.0	25.0	25.5	15.0	14.5	14.5
20	---	---	---	26.0	25.0	25.0	26.0	25.0	25.5	15.0	13.0	14.0
21	---	---	---	27.5	25.0	26.0	25.0	24.5	25.0	13.0	12.0	12.5
22	---	---	---	27.5	26.0	27.0	26.0	24.0	24.5	12.5	10.5	11.5
23	---	---	---	27.5	27.0	27.5	25.0	22.5	24.5	10.5	9.5	10.0
24	---	---	---	27.0	25.5	25.5	24.5	22.5	23.5	10.0	9.5	10.0
25	---	---	---	26.0	25.0	25.5	25.5	23.0	24.5	12.0	10.0	11.5
26	---	---	---	26.0	25.0	25.5	27.0	25.0	25.5	12.5	11.5	12.0
27	---	---	---	25.5	24.0	25.0	28.0	25.0	26.0	14.0	12.0	13.5
28	22.5	22.0	22.5	24.5	22.5	24.0	27.5	25.0	26.0	15.5	14.5	15.0
29	22.0	20.0	20.5	25.5	24.5	25.0	28.0	25.0	26.5	15.5	15.0	15.0
30	22.5	20.0	21.5	26.0	25.0	25.5	27.5	25.5	26.5	15.0	15.0	15.0
31	---	---	---	25.0	24.0	25.0	27.5	25.0	26.0	---	---	---
MONTH	---	---	---	27.5	20.5	25.0	29.5	22.5	25.5	---	---	---

## MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	---	---	---	11.8	10.0	11.0	---	---	---	12.7	12.3	12.6
2	---	---	---	11.8	10.9	11.2	---	---	---	12.8	12.4	12.5
3	---	---	---	11.4	11.0	10.8	---	---	---	12.9	12.5	12.7
4	---	---	---	11.5	10.5	11.1	---	---	---	13.2	12.8	13.0
5	11.2	9.9	10.4	10.8	10.4	10.6	---	---	---	13.2	12.8	13.0
6	10.3	8.9	9.7	11.0	10.6	10.8	---	---	---	13.1	12.2	12.9
7	9.3	8.4	8.9	11.3	10.8	11.1	12.3	12.1	12.2	12.8	12.1	12.3
8	8.6	7.9	8.3	11.6	11.4	11.5	13.2	12.1	13.0	12.4	12.0	12.2
9	8.2	7.4	8.0	12.4	11.5	11.8	13.9	13.0	13.5	13.2	12.2	12.7
10	9.4	7.3	8.5	11.9	11.7	11.8	13.8	13.0	13.5	13.0	12.3	12.8
11	8.7	8.4	8.5	11.9	11.2	11.5	13.2	12.8	13.0	13.2	12.2	12.7
12	8.7	7.3	7.8	11.5	11.1	11.3	15.8	12.8	13.1	13.2	12.9	13.0
13	8.2	6.7	7.4	12.3	11.6	11.9	16.1	12.4	13.1	13.4	12.5	13.1
14	9.0	8.4	8.8	12.4	12.1	12.1	15.9	12.2	12.9	14.0	13.0	13.4
15	10.4	9.2	10.0	13.4	13.3	13.3	13.0	12.1	12.5	13.5	13.1	13.4
16	10.4	7.9	11.4	14.0	13.0	13.6	12.4	12.0	12.2	13.6	12.8	13.3
17	---	---	---	13.7	12.1	13.1	14.9	12.0	12.4	13.7	12.9	13.4
18	---	---	---	13.9	13.0	13.3	12.3	12.1	12.2	13.7	13.1	13.5
19	---	---	---	14.1	13.7	13.9	12.2	12.0	12.1	13.7	13.1	13.4
20	12.0	10.4	11.4	14.2	12.0	12.8	12.4	12.0	12.1	14.8	13.1	14.0
21	11.8	11.0	11.3	13.6	12.1	12.9	13.2	12.0	12.7	14.4	14.0	14.2
22	11.4	10.6	11.1	14.4	12.1	13.4	13.2	12.8	13.0	14.2	13.9	14.1
23	12.0	10.4	11.2	14.4	14.0	14.2	14.1	12.8	13.4	14.3	13.8	14.0
24	12.1	11.2	11.5	14.4	14.0	14.2	---	---	---	14.1	13.7	13.9
25	12.1	10.8	11.4	14.4	13.9	14.1	---	---	---	14.0	13.7	13.9
26	11.8	10.7	11.2	14.1	13.8	14.0	---	---	---	14.2	14.0	14.1
27	11.2	10.0	10.4	---	---	---	13.1	12.0	12.7	14.2	13.8	14.0
28	10.3	10.0	10.1	---	---	---	13.1	12.2	12.5	13.8	13.1	13.5
29	10.4	10.0	10.2	---	---	---	12.4	12.0	12.2	13.1	12.9	13.0
30	11.1	9.9	10.7	---	---	---	12.5	12.1	12.3	13.2	12.8	12.9
31	11.1	10.1	10.7	---	---	---	12.6	12.2	12.4	13.1	12.8	13.0
MONTH	---	---	---	---	---	---	---	---	---	14.8	12.0	13.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	14.2	13.1	13.7	14.8	12.8	13.6	13.2	12.8	12.9	11.0	9.0	9.9
2	14.3	13.8	14.0	15.0	14.2	14.7	13.6	10.1	12.3	11.0	9.8	10.3
3	14.1	13.8	14.0	15.2	14.0	14.6	13.2	12.8	13.0	11.2	8.9	10.6
4	14.0	13.1	13.7	15.1	14.0	14.2	13.8	12.8	13.1	11.2	10.0	10.5
5	13.6	13.0	13.3	14.1	13.0	13.6	14.1	12.2	13.4	11.2	9.8	10.5
6	13.1	12.9	13.0	14.3	12.8	13.5	13.2	12.4	12.6	10.2	8.8	9.8
7	13.2	12.8	13.0	14.2	13.0	13.8	13.5	11.8	12.8	10.2	8.8	9.4
8	14.1	12.8	13.6	14.1	13.0	13.6	13.8	12.5	13.1	11.2	8.8	10.0
9	14.3	13.8	14.0	14.1	13.7	13.9	13.5	11.9	12.7	10.4	9.0	10.0
10	14.0	13.8	13.9	14.2	13.8	13.9	13.7	12.0	12.8	9.2	8.8	9.0
11	14.1	13.2	13.9	14.0	13.7	13.9	14.5	12.9	13.7	11.8	10.0	10.6
12	13.6	13.0	13.2	14.0	13.4	13.8	14.0	12.1	12.9	---	---	---
13	14.0	13.0	13.7	13.7	13.4	13.6	12.3	11.4	12.1	---	---	---
14	14.0	13.6	13.7	13.5	13.1	13.2	12.3	11.4	11.8	---	---	---
15	14.1	13.0	13.7	13.0	12.8	12.9	13.2	11.8	12.6	---	---	---
16	14.1	13.8	14.0	---	---	---	13.3	12.7	13.0	---	---	---
17	14.0	12.9	13.5	---	---	---	13.6	12.9	13.3	11.6	10.0	10.6
18	13.0	12.8	12.9	---	---	---	14.0	13.6	13.7	10.2	9.5	10.0
19	13.1	12.8	13.0	---	---	---	14.2	14.0	14.1	9.8	4.9	8.0
20	14.4	13.0	13.8	---	---	---	14.5	13.5	13.9	10.2	8.9	9.7
21	14.4	14.0	14.1	---	---	---	14.4	13.2	13.7	10.0	8.5	9.2
22	14.3	13.8	14.0	---	---	---	13.3	12.9	13.1	10.6	8.4	9.3
23	14.2	13.8	14.0	---	---	---	13.6	12.5	12.8	10.3	8.3	9.2
24	15.2	13.8	14.6	---	---	---	13.6	12.3	12.7	9.4	8.2	8.8
25	15.2	14.0	14.6	---	---	---	13.3	11.2	12.3	9.2	8.2	8.7
26	14.3	14.0	14.1	---	---	---	12.0	11.1	11.4	10.2	8.2	9.0
27	14.4	14.0	14.1	---	---	---	11.7	10.0	10.8	9.4	8.0	8.6
28	14.4	13.6	14.0	---	---	---	11.0	9.8	10.3	8.9	7.4	8.2
29	---	---	---	13.2	12.9	13.0	11.0	9.9	10.5	9.2	7.9	8.7
30	---	---	---	13.0	12.0	12.3	10.3	10.0	10.1	9.3	7.9	8.6
31	---	---	---	13.1	11.0	12.3	---	---	---	10.2	9.1	9.6
MONTH	15.2	12.8	13.8	---	---	---	14.5	9.8	12.6	---	---	---



## MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	8.1	7.0	7.8	9.5	7.8	8.6	9.1	6.2	7.4
2	10.0	8.6	9.3	7.6	6.2	7.1	9.2	7.8	8.2	8.8	6.2	7.4
3	10.5	8.3	8.9	7.2	6.0	6.4	8.6	7.0	7.6	7.6	6.0	6.6
4	9.5	8.4	8.9	6.4	4.8	5.7	8.5	6.3	7.4	7.2	5.8	6.5
5	9.6	8.4	8.8	---	---	---	7.6	6.4	7.0	---	---	---
6	9.8	8.5	9.1	9.0	8.1	8.4	7.0	4.8	6.2	---	---	---
7	10.3	8.0	9.0	9.2	8.1	8.4	8.8	5.0	6.8	9.3	7.7	8.5
8	10.5	8.2	9.0	8.5	7.2	8.2	8.0	6.5	7.3	9.8	8.0	8.6
9	10.6	8.0	8.9	7.5	6.4	7.2	8.1	6.6	7.2	8.3	7.0	7.6
10	10.4	7.5	8.8	6.7	5.4	6.2	7.3	6.2	6.9	8.3	7.1	7.5
11	9.5	7.4	8.3	8.5	5.5	7.2	8.4	6.4	7.2	10.4	7.3	8.7
12	9.7	6.9	8.1	9.1	7.7	8.3	8.6	6.5	7.6	10.3	8.7	9.4
13	9.7	7.5	8.4	9.2	8.2	8.6	7.5	6.3	6.8	10.2	8.8	9.3
14	8.1	7.1	7.5	9.8	8.2	8.7	9.2	5.8	7.6	10.4	8.9	9.5
15	---	---	---	8.7	7.9	8.4	8.3	7.0	7.6	9.8	9.1	9.3
16	---	---	---	8.6	5.5	7.7	7.9	6.8	7.0	10.4	9.3	9.9
17	---	---	---	7.6	5.2	6.3	5.8	4.5	5.2	10.5	9.9	10.1
18	---	---	---	7.9	7.1	7.4	5.3	4.4	4.9	10.7	9.4	10.0
19	---	---	---	8.4	7.5	8.0	6.2	4.5	5.3	10.2	8.9	9.6
20	---	---	---	8.1	6.9	7.5	6.6	5.2	5.9	9.1	8.8	9.0
21	---	---	---	8.4	7.0	7.7	7.4	5.4	6.0	9.2	8.8	9.0
22	---	---	---	8.0	7.1	7.3	6.9	5.7	6.3	9.9	9.0	9.5
23	---	---	---	7.7	6.7	7.1	9.0	5.5	7.4	10.3	9.8	10.0
24	---	---	---	7.9	6.7	7.3	8.8	6.8	7.8	10.2	9.0	10.0
25	---	---	---	8.6	7.0	7.7	8.8	6.8	7.5	10.4	9.0	9.8
26	---	---	---	8.4	7.2	7.3	8.0	6.0	6.9	10.2	8.8	9.5
27	---	---	---	7.3	6.9	7.0	7.2	5.6	6.2	9.8	8.8	9.1
28	8.8	8.0	8.3	8.6	6.4	7.6	7.8	5.8	6.3	9.2	8.0	8.6
29	8.4	8.0	8.2	8.5	7.3	8.0	8.2	6.0	6.9	9.2	7.8	8.2
30	8.8	7.8	8.2	8.1	7.2	7.5	7.8	6.1	6.8	8.0	6.9	7.6
31	---	---	---	9.5	6.5	8.0	8.2	6.2	6.9	---	---	---
MONTH	---	---	---	---	---	---	9.5	4.4	6.9	---	---	---

## MISSISSIPPI RIVER BASIN

05288840 BASSETT CREEK IN GOLDEN VALLEY, MN

LOCATION.--Lat 45°00'01", long 93°19'39", in SW¼NW¼ sec.17, T.118 N., R.24 W., Hennepin County, Hydrologic Unit 07010206, on right upstream headwall of culvert on County Road 66 (Golden Valley Road), 0.45 mi (0.72 km) northeast from outlet of Sweeney Lake, in Golden Valley.

DRAINAGE AREA.--31.7 mi<sup>2</sup> (82.1 km<sup>2</sup>).

PERIOD OF RECORD.--January to December 1980, May 1981 to September 1983 (no winter record) (discontinued).

GAGE.--Water-stage recorder.

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 274 ft<sup>3</sup>/s (7.76 m<sup>3</sup>/s) June 14, 1981, gage height, 6.43 ft (1.960 m), from floodmarks; minimum recorded discharge, 2.2 ft<sup>3</sup>/s (0.062 m<sup>3</sup>/s) Sept. 20-21, 1981, Oct. 27, 1982; minimum recorded gage height, 3.32 ft (1.012 m) Oct. 27, 1982, but may have been less during winter period.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 144 ft<sup>3</sup>/s (4.08 m<sup>3</sup>/s) Mar. 6, gage height, 5.43 ft (1.655 m); minimum recorded discharge, 2.2 ft<sup>3</sup>/s (0.062 m<sup>3</sup>/s) Oct 27, gage height, 3.32 ft (1.012 m), but may have been less during winter period.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.8	4.9				---	58	32	17	23	14	25
2	5.6	4.9				---	52	41	17	23	14	23
3	5.4	5.7				---	44	31	74	38	14	20
4	5.6	4.9				49	39	29	37	46	14	18
5	6.7	4.7				48	37	30	25	28	14	21
6	21	4.4				91	45	31	20	21	14	17
7	13	4.3				89	44	40	19	25	14	15
8	8.9	4.3				65	42	27	18	22	14	13
9	7.8	5.7				57	43	25	17	21	13	22
10	7.6	37				53	42	23	15	19	13	16
11	7.1	24				49	38	22	14	18	13	13
12	7.0	32				46	42	33	14	17	13	13
13	5.9	20				46	80	41	25	17	13	13
14	5.3	13				45	61	28	46	16	13	12
15	5.2	9.0				42	68	25	24	18	13	34
16	4.6	7.4				44	70	22	20	27	48	24
17	4.4	6.9				43	65	20	19	25	41	17
18	5.3	---				40	63	20	17	59	26	16
19	20	---				37	64	56	15	48	21	16
20	48	---				34	61	37	15	43	20	18
21	18	---				31	57	30	33	35	24	16
22	12	---				29	51	24	23	32	47	14
23	8.8	---				27	45	21	18	27	25	11
24	6.2	---				25	39	20	25	22	21	9.6
25	7.2	---				23	38	19	18	21	20	8.3
26	7.1	---				23	38	18	17	18	50	7.5
27	5.4	---				24	35	18	37	18	28	8.4
28	7.4	---				26	38	19	24	17	21	8.7
29	6.3	---				26	35	19	23	17	34	8.8
30	4.9	---				29	31	17	27	16	51	9.0
31	4.5	---				74	---	18	---	15	30	---
TOTAL	288.0	---				---	1465	836	713	792	710	467.3
MEAN	9.29	---				---	48.8	27.0	23.8	25.5	22.9	15.6
MAX	48	---				---	80	56	74	59	51	34
MIN	4.4	---				---	31	17	14	15	13	7.5
CFSM	.29	---				---	1.54	.85	.75	.80	.72	.49
IN.	.34	---				---	1.72	.98	.84	.93	.83	.55
AC-FT	571	---				---	2910	1660	1410	1570	1410	927



DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	OCTOBER				NOVEMBER				DECEMBER				JANUARY		
1	14.5	14.5	14.5	---	---	---		3.0	2.5	2.5					
2	14.5	13.5	14.0	---	---	---		3.5	2.5	3.0					
3	13.5	13.0	13.5	---	---	---		3.5	3.0	3.5					
4	13.5	13.0	13.0	---	---	---		3.0	3.0	3.0					
5	14.0	13.0	13.5	---	---	---		3.0	2.5	3.0					
6	14.0	13.5	14.0	---	---	---		3.0	2.5	2.5					
7	14.0	13.0	13.5	---	---	---		---	---	---					
8	13.0	12.0	12.5	---	---	---		---	---	---					
9	12.5	12.0	12.0	---	---	---		---	---	---					
10	12.0	12.0	12.0	---	---	---		---	---	---					
11	12.0	11.5	12.0	---	---	---		---	---	---					
12	11.5	11.5	11.5	---	---	---		---	---	---					
13	11.5	11.5	11.5	---	---	---		---	---	---					
14	11.5	11.0	11.5	---	---	---		---	---	---					
15	11.5	10.0	11.0	2.5	2.5	2.5		---	---	---					
16	10.0	10.0	10.0	2.5	2.5	2.5		---	---	---					
17	10.0	9.5	10.0	2.5	2.5	2.5		---	---	---					
18	10.5	10.0	10.0	2.5	2.5	2.5		---	---	---					
19	10.0	8.5	9.5	4.0	2.5	3.0		---	---	---					
20	8.5	8.0	8.0	4.5	2.5	4.0		---	---	---					
21	8.0	7.5	7.5	4.0	3.5	3.5		---	---	---					
22	7.5	7.5	7.5	3.5	3.0	3.0		---	---	---					
23	7.5	7.5	7.5	3.0	2.5	2.5		---	---	---					
24	8.0	7.5	7.5	2.5	2.5	2.5		---	---	---					
25	8.0	7.5	8.0	2.5	2.5	2.5		---	---	---					
26	8.0	7.0	7.5	2.5	2.5	2.5		---	---	---					
27	7.5	7.0	7.0	2.5	2.5	2.5		---	---	---					
28	---	---	---	2.5	2.5	2.5		---	---	---					
29	---	---	---	2.5	2.5	2.5		---	---	---					
30	---	---	---	2.5	2.5	2.5		---	---	---					
31	---	---	---	---	---	---		---	---	---					



## MINNESOTA RIVER BASIN

## 05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD

LOCATION.--Lat 45°17'32", long 96°29'14", in SE&NW¼ sec.18, T.121 N., R.46 W., Grant County, Hydrologic Unit 07020001, on right bank 20 ft (6 m) downstream from former highway bridge site, 1.5 mi (2.4 km) west of Big Stone City, and 4.5 mi (7.2 km) upstream from Big Stone Lake.  
DRAINAGE AREA.--389 mi<sup>2</sup> (1,008 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1910 to November 1912 (no winter records), and March 1931 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 895: Drainage area. WSP 1308: 1932(M), 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 996.96 ft (303.873 m) adjustment of 1912. Mar. 8, 1910, to Nov. 30, 1912, nonrecording gage 2 mi (3 km) downstream at different datum. Mar. 18, 1931, to May 3, 1939, nonrecording gage, at site 20 ft (6 m) upstream at present datum. May 4, 1939, to Nov. 8, 1952, water-stage recorder at site 80 ft (24 m) downstream at present datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--52 years (water years 1932-83), 47.0 ft<sup>3</sup>/s (1.331 m<sup>3</sup>/s), 1.64 in/yr (42 mm/yr), 34,050 acre-ft/yr (42.0 hm<sup>3</sup>/yr); median of yearly mean discharges, 34 ft<sup>3</sup>/s (0.96 m<sup>3</sup>/s), 1.18 in/yr (30 mm/yr), 24,500 acre-ft/yr (30 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,870 ft<sup>3</sup>/s (195 m<sup>3</sup>/s) Apr. 8, 1969, gage height, 14.32 ft (4.365 m) from floodmark; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, about 26 ft (8 m) in June 1919, present site and datum, from information by local resident, discharge 29,000 ft<sup>3</sup>/s (821 m<sup>3</sup>/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 200 ft<sup>3</sup>/s (5.66 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Mar. 16	1330	286 8.10	4.01 1.222	Apr. 1	2330	*1,400 39.6	*7.75 2.362

Minimum discharge, 0.88 ft<sup>3</sup>/s (0.025 m<sup>3</sup>/s) Sept. 22, 23; minimum gage height, 1.11 ft (0.338 m) July 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	3.4	3.3	3.0	3.8	6.5	366	19	6.5	8.4	4.6	3.5
2	2.0	3.4	3.7	3.3	3.8	7.5	662	18	6.3	6.9	4.6	3.1
3	1.8	3.3	4.0	3.8	3.8	12	362	16	6.0	6.3	4.0	2.5
4	2.4	3.0	4.0	3.8	3.8	7.5	200	15	5.3	6.5	4.1	2.6
5	2.7	3.4	3.8	3.8	3.8	6.5	137	14	5.2	6.5	3.7	2.9
6	3.4	4.1	3.6	3.8	3.8	15	118	15	5.0	6.0	3.6	5.4
7	3.3	5.8	3.8	3.8	3.8	115	124	26	4.6	5.7	3.6	2.7
8	3.3	6.1	3.2	3.8	3.8	125	112	23	4.2	5.2	3.9	2.3
9	5.2	6.3	2.9	3.8	3.8	35	116	24	4.1	5.0	3.6	1.8
10	6.5	8.2	2.9	3.8	4.0	25	132	25	4.0	4.6	3.2	1.9
11	6.1	7.8	2.9	3.8	4.5	30	112	23	3.8	4.1	3.0	1.8
12	4.9	6.7	2.9	3.8	5.5	30	89	21	4.0	3.6	3.6	1.6
13	4.1	7.4	2.9	3.8	6.0	45	89	18	4.4	3.4	4.1	1.7
14	3.3	5.8	2.9	3.8	7.5	100	81	17	6.7	3.2	4.0	1.5
15	3.3	5.0	2.9	3.8	9.0	205	68	18	7.6	2.9	3.8	1.3
16	3.8	4.4	2.9	3.8	11	276	60	16	6.1	3.6	6.0	1.1
17	4.0	4.1	2.9	3.8	13	262	63	17	5.3	4.6	8.7	1.1
18	3.7	4.1	5.3	3.8	13	212	71	17	5.0	58	7.2	1.1
19	3.8	4.6	11	3.8	14	184	74	17	4.9	41	5.3	1.1
20	3.7	5.2	6.3	3.8	14	163	63	18	5.0	26	5.4	1.3
21	3.7	4.7	4.9	3.8	15	160	59	18	4.7	32	4.6	1.0
22	3.6	4.7	5.3	3.8	12	158	56	19	4.4	20	4.0	.95
23	3.3	4.4	4.0	3.8	13	146	52	16	4.2	12	3.9	1.1
24	3.3	4.2	3.3	3.8	12	123	46	14	4.1	9.2	3.8	1.1
25	3.4	4.2	3.3	3.8	9.0	112	39	13	4.0	7.4	3.6	1.2
26	3.6	4.1	4.7	3.8	8.0	103	35	11	4.4	6.3	3.2	1.1
27	3.6	4.1	3.6	3.8	7.5	98	31	9.8	4.9	5.7	3.0	1.2
28	3.6	4.1	2.7	3.8	7.0	97	27	8.4	6.5	5.0	2.7	1.4
29	3.4	4.0	3.6	3.8	---	83	24	7.6	8.9	5.0	2.6	1.1
30	3.4	3.6	2.9	3.8	---	83	21	7.4	8.7	4.9	3.6	1.5
31	3.4	---	2.9	3.8	---	96	---	7.1	---	4.6	3.2	---
TOTAL	110.9	144.2	119.3	116.5	219.2	3121.0	3489	508.3	158.8	323.6	128.2	53.95
MEAN	3.58	4.81	3.85	3.76	7.83	101	116	16.4	5.29	10.4	4.14	1.80
MAX	6.5	8.2	11	3.8	15	276	662	26	8.9	58	8.7	5.4
MIN	1.3	3.0	2.7	3.0	3.8	6.5	21	7.1	3.8	2.9	2.6	.95
CFSM	.009	.01	.01	.01	.02	.26	.30	.04	.01	.03	.01	.005
IN.	.01	.01	.01	.01	.02	.30	.33	.05	.02	.03	.01	.01
AC-FT	220	286	237	231	435	6190	6920	1010	315	642	254	107
CAL YR 1982	TOTAL	11019.81	MEAN	30.2	MAX	2840	MIN	.83	CFSM	.08	IN	1.05
WTR YR 1983	TOTAL	8492.95	MEAN	23.3	MAX	662	MIN	.95	CFSM	.06	IN	.81
									AC-FT	21860	AC-FT	16850

## MINNESOTA RIVER BASIN

05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1960-62, 1967-69, 1974 to current year.

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1973 to September 1981, March to August 1982, March to August 1983.

SUSPENDED-SEDIMENT DISCHARGE: October 1973 to September 1981, March to August 1982, March to August 1983.

REMARKS.--During the winter period, daily sediment concentrations were estimated on the basis of water records and monthly sediment samples, October 1973 to September 1981. Water temperature was obtained when sediment samples were collected.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum daily (water years 1973-81, March to August 1982, March to August 1983), 34.0°C July 7, 1974; minimum daily, 0.0°C many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,540 mg/L Mar. 27, 1979; minimum daily mean, 0 mg/L on July 30, 31, Aug. 1-7, 24-26, 1976.

SEDIMENT LOADS: Maximum daily, 5,700 tons (5,170 tonnes) Mar. 31, 1982; minimum daily, 0 ton (0 tonne) on July 30, 31, Aug. 1-7, 24-26, 1976.

## EXTREMES FOR CURRENT PERIOD.--March to August 1983:

WATER TEMPERATURES: Maximum daily, 32.0°C July 9, Aug. 4; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 670 mg/L Apr. 2; minimum daily mean, 4 mg/L Aug. 19.

SEDIMENT LOADS: Maximum daily, 1,280 tons (1,160 tonnes) Apr. 2; minimum daily, 0.06 ton (0.05 tonne) Aug. 6-9, 19, 29.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	13.5	17.0	28.0	---	---
2	---	---	---	---	---	2.5	1.5	13.5	---	26.0	---	---
3	---	---	---	---	---	1.0	3.0	15.0	---	---	---	---
4	13.0	---	---	---	---	2.0	5.5	---	20.0	---	32.0	---
5	---	---	---	.5	---	3.0	4.5	17.0	---	---	---	23.5
6	---	---	---	---	---	2.0	---	---	21.0	---	---	---
7	---	---	---	---	---	.0	---	15.0	24.0	28.0	---	---
8	---	---	---	---	---	---	8.0	16.5	25.0	---	29.5	---
9	---	---	---	---	---	---	7.0	16.0	---	32.0	26.5	---
10	---	---	---	---	---	1.0	10.0	18.0	---	---	27.0	---
11	---	---	---	---	---	2.0	9.5	---	---	---	---	---
12	---	---	---	---	---	1.0	6.5	14.5	---	---	---	---
13	---	---	---	---	---	1.0	---	---	19.0	---	---	---
14	---	---	---	---	---	1.5	4.5	14.0	21.0	---	---	---
15	---	---	---	---	---	1.0	7.0	14.0	19.0	30.0	31.0	---
16	---	---	---	---	---	2.0	7.5	16.0	23.0	---	25.0	---
17	---	---	---	---	---	---	6.0	---	---	27.0	---	---
18	---	---	---	---	---	1.0	8.5	13.0	---	---	27.5	---
19	---	---	---	---	---	1.0	---	15.0	23.5	---	---	---
20	---	---	---	---	---	2.0	12.0	---	---	---	27.0	---
21	---	---	---	---	---	.5	13.0	20.0	27.5	---	---	---
22	---	---	---	---	---	.5	---	18.0	23.5	---	---	---
23	---	---	---	---	---	2.0	14.0	19.0	29.0	---	---	---
24	---	---	---	---	---	.5	16.0	---	---	27.0	---	---
25	---	---	---	---	.5	1.0	17.0	20.0	---	27.0	---	---
26	---	---	---	---	---	---	16.5	---	---	30.0	---	---
27	---	---	---	---	---	1.0	13.0	22.0	27.0	28.5	---	---
28	---	---	---	---	---	1.5	13.5	20.5	---	29.0	30.0	---
29	---	1.0	---	---	---	3.0	12.0	---	19.0	---	---	---
30	---	---	---	---	---	---	15.5	14.0	---	---	---	---
31	---	---	---	---	---	---	---	18.0	---	---	---	---
WTR YR 1983				MAX	32.0	MIN	.0					

## MINNESOTA RIVER BASIN

05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD--Continued

SUSPENDED-SEDIMENT, PERIOD MARCH 1983 TO AUGUST 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											10	.18
2											10	.20
3											9	.29
4											8	.16
5											11	.19
6											22	.89
7											106	33
8											233	79
9											99	9.4
10											46	3.1
11											92	7.5
12											34	2.8
13											32	3.9
14											40	11
15											55	30
16											60	45
17											53	37
18											42	24
19											36	18
20											46	20
21											44	19
22											23	9.8
23											23	9.1
24											12	4.0
25											11	3.3
26											10	2.8
27											9	2.4
28											8	2.1
29											8	1.8
30											8	1.8
31											10	2.6
TOTAL											---	384.31
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	260	487	82	4.2	53	.93	80	1.8	9	.11		
2	670	1280	69	3.4	53	.90	20	.37	7	.09		
3	180	176	81	3.5	55	.89	10	.17	7	.08		
4	114	62	64	2.6	60	.86	10	.18	7	.08		
5	44	16	32	1.2	55	.77	10	.18	7	.07		
6	26	8.3	26	1.1	40	.54	10	.16	6	.06		
7	20	6.7	24	1.7	52	.65	10	.15	6	.06		
8	19	5.7	17	1.1	43	.49	15	.21	6	.06		
9	16	5.0	59	3.8	36	.40	45	.61	6	.06		
10	14	5.0	53	3.6	34	.37	47	.58	8	.07		
11	27	8.2	35	2.2	32	.33	32	.35	15	.12		
12	15	3.6	32	1.8	32	.35	18	.17	22	.21		
13	15	3.6	74	3.6	38	.45	12	.11	28	.31		
14	28	6.1	106	4.9	38	.69	12	.10	34	.37		
15	37	6.8	105	5.1	40	.82	12	.09	39	.40		
16	38	6.2	30	1.3	121	2.0	13	.13	16	.26		
17	31	5.3	23	1.1	140	2.0	24	.30	12	.28		
18	23	4.4	72	3.3	138	1.9	78	14	6	.12		
19	28	5.6	88	4.0	135	1.8	48	5.5	4	.06		
20	58	9.9	82	4.0	130	1.8	47	3.3	5	.07		
21	70	11	65	3.2	114	1.4	55	4.8	7	.09		
22	56	8.5	69	3.5	122	1.4	27	1.5	7	.08		
23	34	4.8	76	3.3	62	.70	13	.42	8	.08		
24	69	8.6	77	2.9	33	.37	7	.17	8	.08		
25	56	5.9	77	2.7	30	.32	7	.14	8	.08		
26	49	4.6	70	2.1	25	.30	7	.12	8	.07		
27	26	2.2	60	1.6	20	.26	7	.11	9	.07		
28	28	2.0	55	1.2	18	.32	10	.14	9	.07		
29	63	4.1	55	1.1	15	.36	11	.15	9	.06		
30	93	5.3	54	1.1	17	.40	11	.15	9	.09		
31	---	---	53	1.0	---	---	10	.12	9	.08		
TOTAL	---	2168.4	---	81.2	---	24.77	---	36.28	---	3.79		



## MINNESOTA RIVER BASIN

05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD--Continued

## PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)
SEP 07...	1315	2.6	3	<1	<1	<1	6

DATE	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
SEP 07...	19	45	64	83	97	100

## MINNESOTA RIVER BASIN

05291500 BIG STONE LAKE AT ORTONVILLE, MN

LOCATION.--Lat 45°18'18", long 96°26'57", in NW¼SW¼ sec.9, T.121 N., R.46 W., Big Stone County, Hydrologic Unit 07020001, at powerplant intake at west edge of Ortonville, 0.5 mi (0.8 km) north of concrete dam at outlet, 0.5 mi (0.8 km) southwest of Ortonville.

PERIOD OF RECORD.--March 1937 to current year.

GAGE.--Nonrecording gage read once a day. Datum of gage is 957.69 ft (291.904 m) National Geodetic Vertical Datum of 1929. Prior to Sept. 17, 1947, nonrecording gage at site 0.5 mi (0.8 km) south at same datum. Sept. 18, 1947, to June 30, 1963, water-stage recorder at site 0.5 mi (0.8 km) south at same datum. Sept. 21, 1959, to June 30, 1963, supplementary nonrecording gage read once daily, at present site and datum.

REMARKS.--Natural lake with concrete dam at outlet. Fixed crest of dam is at 5.95 ft (1.814 m), with one 5 ft (1.5 m) and two 2.5 ft (0.76 m) gates with lowest sill at 0.71 ft (0.22 m).

Silt barrier dam 700 ft (213 m) upstream in outlet channel of lake completed July 7, 1958; crest at 5.9 ft (1.80 m). Supplementary nonrecording gage readings used for stages below crest of silt barrier to June 30, 1963. Water level subject to fluctuation caused by wind action.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 12.73 ft (3.880 m) Apr. 17, 1952; minimum observed, 3.53 ft (1.076 m) Mar. 2, 1957 (strong upstream wind in channel). Minimum observations of 3.10 ft (0.945 m) Mar. 2, 1940, and 2.20 ft (0.671 m) Nov. 20, 1940, at spillway site are the result of blockage of channel to spillway by ice and snow and do not represent lake elevations.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 8.10 ft (2.469 m) Apr. 14; minimum observed, 6.18 ft (1.884 m) Sept. 17.

## GAGE HEIGHT, IN FEET, OCTOBER 1982 TO SEPTEMBER 1983

Oct. 31 .....	6.63	Feb. 28 .....	6.82	June 30 .....	6.75
Nov. 30 .....	6.55	Mar. 31 .....	7.25	July 31 .....	6.70
Dec. 30 .....	6.65	Apr. 30 .....	7.23	Aug. 31 .....	6.45
Jan. 31 .....	6.70	May 31 .....	6.90	Sept. 30 .....	6.30

NOTE.--Gage-height record other than that shown above is available in the District office.

## MINNESOTA RIVER BASIN

05292000 MINNESOTA RIVER AT ORTONVILLE, MN

LOCATION.--Lat 45°17'44", long 96°26'38", in NE¼NW¼ sec.16, T.121 N., R.46 W., Big Stone County, Hydrologic Unit 07020001, on left bank 400 ft (122 m) downstream from bridge on U.S. Highway 12 and 1,300 ft (396 m) downstream from dam at outlet of Big Stone Lake, at Ortonville.

DRAINAGE AREA.--1,160 mi<sup>2</sup> (3,000 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--February 1938 to current year.

REVISED RECORDS.--WSP 895: 1939. WSP 1508: 1942 (yearly mean).

GAGE.--Water-stage recorder. Datum of gage is 956.38 ft (291.505 m) National Geodetic Vertical Datum of 1929. Prior to Mar. 31, 1939, nonrecording gage on downstream side of dam 1,300 ft (396 m) upstream at datum 1.31 ft (0.40 m) higher.

REMARKS.--Records good. Some regulation by Big Stone Lake (station 05291500).

AVERAGE DISCHARGE.--45 years, 105 ft<sup>3</sup>/s (2.974 m<sup>3</sup>/s), 76,070 acre-ft/yr (93.8 hm<sup>3</sup>/yr); median of yearly mean discharges, 73 ft<sup>3</sup>/s (2.07 m<sup>3</sup>/s), 52,900 acre-ft/yr (65 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,060 ft<sup>3</sup>/s (86.7 m<sup>3</sup>/s) Apr. 13, 1952, gage height, 12.92 ft (3.938 m); no flow Dec. 13, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 927 ft<sup>3</sup>/s (26.3 m<sup>3</sup>/s) Apr. 14, gage height, 7.99 ft (2.435 m); minimum, 0.34 ft<sup>3</sup>/s (0.010 m<sup>3</sup>/s) Nov. 13, 14, 15, 16, gage height, 0.97 ft (0.296 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1.0	2.9	4.0	3.7	5.0	4.2	257	74	1.6	3.0	6.9	3.3		
2	1.9	7.4	4.6	3.8	5.0	3.8	489	89	1.6	4.2	6.4	3.0		
3	2.5	1.5	4.4	3.9	4.7	3.0	433	95	1.7	9.3	6.6	2.6		
4	3.8	3.9	3.9	3.7	5.0	3.0	416	58	1.6	4.8	6.2	3.8		
5	3.4	4.8	3.8	3.7	5.0	2.8	410	29	18	2.2	6.0	4.0		
6	6.7	3.4	3.5	3.9	5.0	2.8	420	14	18	2.1	5.5	4.2		
7	3.7	3.1	3.3	3.7	5.0	35	402	37	1.3	3.7	5.0	3.1		
8	2.5	3.0	3.2	3.6	5.0	198	382	10	1.1	4.9	4.6	2.8		
9	6.3	2.5	3.0	3.6	5.0	158	388	2.8	.91	3.5	4.2	3.3		
10	4.3	1.9	2.9	4.2	5.0	126	406	4.3	.98	2.8	5.5	5.9		
11	3.7	3.5	2.3	4.5	5.0	131	348	7.7	1.0	3.3	4.2	2.8		
12	2.8	187	2.1	4.2	5.0	156	338	2.8	1.7	2.4	3.8	2.7		
13	2.6	.43	2.2	4.1	5.5	151	573	1.7	5.3	2.3	4.2	2.3		
14	2.3	.38	2.2	4.2	5.5	146	728	1.4	6.0	2.8	3.8	2.0		
15	2.1	.44	2.3	4.2	5.5	144	343	1.1	4.2	2.9	4.2	2.5		
16	1.7	7.2	2.3	4.1	5.5	154	343	2.1	3.8	3.3	11	2.7		
17	1.6	15	2.3	4.3	5.5	161	218	2.4	3.4	7.8	5.5	2.2		
18	1.7	14	3.3	4.8	5.5	188	88	2.4	2.1	13	4.3	2.3		
19	11	7.4	3.7	4.9	5.5	215	31	2.5	1.9	4.0	5.8	2.0		
20	2.9	2.2	4.0	5.0	5.5	240	32	2.4	2.3	3.0	6.3	2.0		
21	1.4	1.6	3.9	5.0	6.0	268	36	2.1	3.0	2.6	5.2	1.7		
22	.88	2.0	4.1	5.0	6.0	260	74	1.8	5.5	1.4	4.6	1.7		
23	2.0	3.5	4.3	5.0	6.0	202	99	1.6	5.0	2.8	4.5	2.6		
24	1.5	3.8	4.2	4.7	6.0	145	84	1.7	4.6	2.6	4.2	2.5		
25	1.1	3.7	4.6	4.6	6.0	40	72	1.6	4.2	2.2	4.4	2.1		
26	1.1	3.4	4.2	4.6	5.5	64	110	1.6	5.0	2.1	4.4	1.7		
27	6.4	3.2	4.0	5.0	5.0	138	94	1.5	3.4	2.0	4.1	1.3		
28	7.4	3.2	4.2	5.0	4.6	162	104	1.8	3.0	4.5	4.0	1.5		
29	6.4	3.4	4.3	5.0	---	176	86	1.5	5.5	8.7	5.5	1.6		
30	4.8	3.6	4.2	5.0	---	180	80	1.5	4.6	8.3	6.0	2.2		
31	2.9	---	3.9	5.0	---	192	---	1.4	---	7.9	3.8	---		
TOTAL	104.38	303.35	109.2	136.0	148.8	4049.6	7884	457.7	122.29	130.4	160.7	78.4		
MEAN	3.37	10.1	3.52	4.39	5.31	131	263	14.8	4.08	4.21	5.18	2.61		
MAX	11	187	4.6	5.0	6.0	268	728	95	18	13	11	5.9		
MIN	.88	.38	2.1	3.6	4.6	2.8	31	1.1	.91	1.4	3.8	1.3		
CFSM	.003	.009	.003	.004	.005	.11	.23	.01	.004	.004	.004	.002		
IN.	.00	.01	.00	.00	.00	.13	.25	.01	.00	.00	.01	.00		
AC-FT	207	602	217	270	295	8030	15640	908	243	259	319	156		
CAL YR 1982	TOTAL	16704.47	MEAN	45.8	MAX	372	MIN	.38	CFSM	.04	IN	.54	AC-FT	33130
WTR YR 1983	TOTAL	13684.82	MEAN	37.5	MAX	728	MIN	.38	CFSM	.03	IN	.44	AC-FT	27140

## MINNESOTA RIVER BASIN

450317096412102 LA BOLT IMPOUNDMENT INLET AT LA BOLT, SD

LOCATION.--Lat 45°02'58", long 96°41'45", in SW¼SW¼ sec.3, T.118 N., R.49 W., Grant County, Hydrologic Unit 07020001, 500 ft (152 m) north of county highway, 0.8 mi (1.3 km) west of La Bolt, S. Dak.

DRAINAGE AREA.--2.1 mi<sup>2</sup> (5.44 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February to November 1982, February to September 1983. Miscellaneous discharge measurements available for 1980 and 1981 water years.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Water-stage recorder operated only during open-water period. Records good except those for period Feb. 18 to Apr. 10, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 228 ft<sup>3</sup>/s (6.46 m<sup>3</sup>/s), revised, Mar. 29, 1982, gage height, 16.92 ft (5.157 m) (backwater from ice); no flow on many days.

EXTREMES FOR CURRENT PERIOD.--October 1982, February to September 1983: Maximum discharge during period, 134 ft<sup>3</sup>/s (3.79 m<sup>3</sup>/s) Mar. 31, gage height, 15.54 ft (4.737 m), from high-water mark; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	2.0	40	2.8	.51	.68	.00	.00
2	.00				---	2.0	19	2.4	.48	.65	.00	.00
3	.00				---	2.0	14	2.2	.44	.58	.00	.00
4	.00				---	2.0	10	2.0	.41	.46	.00	.00
5	.00				---	6.0	9.0	1.8	.36	.28	.00	.00
6	.00				---	22	8.4	3.8	.29	.18	.00	.00
7	.00				---	18	8.5	17	.23	.11	.00	.00
8	.00				---	4.0	13	9.9	.19	.04	.00	.00
9	.00				---	2.0	11	7.1	.16	.00	.00	.00
10	.00				---	2.0	8.7	4.4	.12	.00	.00	.00
11	.00				---	2.0	8.5	3.6	.10	.00	.00	.00
12	.00				---	2.0	9.4	3.4	.10	.00	.00	.00
13	.00				---	2.0	7.8	3.2	.12	.00	.00	.00
14	.00				---	2.0	4.1	2.7	.74	.00	.00	.00
15	.00				---	2.0	2.8	2.3	.86	.00	.00	.00
16	.00				---	2.0	8.6	2.1	.86	.00	.00	.00
17	.00				---	2.0	13	2.0	.62	.00	.00	.00
18	.00				---	2.0	10	1.9	.52	2.1	.00	.00
19	.00				---	2.0	11	1.9	.47	1.2	.00	.00
20	.00				---	2.0	11	2.1	.42	.36	.00	.00
21	.00				---	2.0	9.1	2.0	.31	.19	.00	.00
22	.00				---	2.0	7.3	1.8	.21	.12	.00	.00
23	.00				---	2.0	6.3	1.5	.14	.07	.00	.00
24	.00				2.0	2.0	5.2	1.3	.11	.00	.00	.00
25	.00				2.0	2.0	4.5	1.1	.08	.00	.00	.00
26	.00				2.0	2.0	4.0	.96	.07	.00	.00	.00
27	.00				3.0	2.0	3.7	.86	.05	.00	.00	.00
28	.00				3.0	2.0	3.6	.74	.00	.00	.00	.00
29	---				---	2.0	3.2	.63	.33	.00	.00	.00
30	---				---	3.0	3.0	.57	.63	.00	.00	.00
31	---				---	38	---	.55	---	.00	.00	---
TOTAL	---				---	141.0	277.7	90.61	9.93	7.02	.00	.00
MEAN	---				---	4.55	9.26	2.92	.33	.23	.000	.000
MAX	---				---	38	40	17	.86	2.1	.00	.00
MIN	---				---	2.0	2.8	.55	.00	.00	.00	.00
CFSM	---				---	2.17	4.41	1.39	.16	.11	.000	.000
IN.	---				---	2.50	4.92	1.60	.18	.12	.00	.00
AC-FT	---				---	280	551	180	20	14	.00	.00

## MINNESOTA RIVER BASIN

450317096412102 LA BOLT IMPOUNDMENT INLET AT LABOLT, SD--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980-83.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March to September 1983.

REMARKS.--Letter E indicates estimated value. Suspended-sediment discharge record is poor because it is based on a limited number of samples by observer and automatic sampler.

EXTREMES FOR CURRENT PERIOD.--March to September 1983:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 188 mg/L July 18; minimum daily mean, 0 mg/L on many days.

SEDIMENT LOADS: Maximum daily mean during period, 18 tons (16 tonnes) Mar. 31; minimum daily mean, 0 ton (0 tonne) on many days.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
MAR								
01...	1415	2.3	700	--	--	720	1.5	--
03...	1530	1.9	657	--	8.5	716	.0	10.9
23...	1330	2.0	763	--	8.4	E720	.0	12.3
APR								
01...	1400	28	340	--	7.2	E720	2.0	--
06-11	1500	9.9	--	--	--	--	--	--
06...	1519	8.2	628	--	8.2	726	3.0	14.6
11...	1500	7.9	668	--	8.2	725	9.0	13.3
11-14	2100	E7.5	--	--	--	--	--	--
20-21	1800	11	--	--	--	--	--	--
20...	1815	9.6	655	--	8.2	723	9.5	10.8
21...	0100	8.2	--	957	--	--	--	--
28...	1100	3.1	--	--	--	--	--	--
MAY								
26...	1150	.98	936	--	8.2	724	13.0	10.7

DATE	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, NON- VOLATILE, DIS- SOLVED (MG/L AS N) (00525)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
MAR								
01...	--	--	--	--	.370	1.5	.080	3
03...	--	--	--	--	--	--	--	2
23...	--	--	--	--	--	--	--	--
APR								
01...	--	--	--	--	--	--	--	92
06-11	--	--	--	--	.420	1.5	.190	--
06...	--	--	--	--	--	--	--	7
11...	--	--	--	--	--	--	--	--
11-14	--	--	--	--	--	--	.080	--
20-21	--	--	--	--	.240	.80	.070	--
20...	--	--	--	--	--	--	--	32
21...	--	--	4.8	581	--	--	--	--
28...	344	283	--	--	--	--	.020	36
MAY								
26...	--	--	--	--	--	--	--	33

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN (80164)	BED MAT. SIEVE DIAM. % FINER THAN (80165)	BED MAT. SIEVE DIAM. % FINER THAN (80166)	BED MAT. SIEVE DIAM. % FINER THAN (80167)	BED MAT. SIEVE DIAM. % FINER THAN (80168)	BED MAT. SIEVE DIAM. % FINER THAN (80169)	BED MAT. SIEVE DIAM. % FINER THAN (80170)	BED MAT. SIEVE DIAM. % FINER THAN (80171)	BED MAT. SIEVE DIAM. % FINER THAN (80172)	BED MAT. SIEVE DIAM. % FINER THAN (80173)
MAY											
26...	1150	1	1	3	6	14	26	42	59	88	100

## MINNESOTA RIVER BASIN

450317096412102 LA BOLT IMPOUNDMENT INLET AT LA BOLT, SD--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											3	.02
2											3	.02
3											2	.01
4											3	.02
5											18	.29
6											61	3.6
7											56	2.7
8											18	.19
9											3	.02
10											3	.02
11											3	.02
12											3	.02
13											3	.02
14											3	.02
15											3	.02
16											3	.02
17											3	.02
18											3	.02
19											3	.02
20											3	.02
21											3	.02
22											3	.02
23											3	.02
24											3	.02
25											3	.02
26											3	.02
27											3	.02
28											3	.02
29											3	.02
30											3	.02
31											76	18
TOTAL											---	25.29
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	100	11	33	.25	15	.02	19	.03				
2	49	2.5	31	.20	13	.02	19	.03				
3	28	1.1	28	.17	12	.01	19	.03				
4	17	.46	25	.14	10	.01	10	.01				
5	14	.34	22	.11	10	.00	8	.00				
6	7	.16	29	.30	10	.00	5	.00				
7	13	.30	92	4.2	10	.00	3	.00				
8	35	1.2	38	1.0	10	.00	3	.00				
9	24	.71	33	.63	10	.00	---	---				
10	23	.54	33	.39	10	.00	---	---				
11	23	.53	33	.32	10	.00	---	---				
12	35	.89	33	.30	10	.00	---	---				
13	21	.44	33	.29	47	.02	---	---				
14	14	.15	33	.24	88	.18	---	---				
15	15	.11	33	.20	100	.23	---	---				
16	23	.53	33	.19	44	.10	---	---				
17	39	1.4	33	.18	20	.03	---	---				
18	19	.51	33	.17	19	.03	188	2.1				
19	28	.83	33	.17	19	.02	34	.11				
20	37	1.1	33	.19	19	.02	20	.02				
21	30	.74	33	.18	15	.01	10	.00				
22	32	.63	33	.16	10	.00	5	.00				
23	33	.56	33	.13	5	.00	3	.00				
24	34	.48	33	.12	5	.00	---	---				
25	35	.43	33	.10	5	.00	---	---				
26	35	.38	33	.09	5	.00	---	---				
27	35	.35	29	.07	3	.00	---	---				
28	36	.35	26	.05	---	---	---	---				
29	35	.30	23	.04	19	.02	---	---				
30	35	.28	20	.03	20	.03	---	---				
31	---	---	18	.03	---	---	---	---				
TOTAL	---	29.30	---	10.64	---	0.75	---	---				

## MINNESOTA RIVER BASIN

450317096412100 LA BOLT IMPOUNDMENT AT LA BOLT, SD

LOCATION.--Lat 45°03'17", long 96°41'21", in NW¼SE¼ sec.3, T.118 N., R.49 W., Grant County, Hydrologic Unit 07020001, 1,000 ft (305 m) downstream of dam in County Park, 0.5 mi (0.8 km) northwest of La Bolt, S. Dak.

## RESERVOIR-STAGE RECORDS

PERIOD OF RECORD.--March to October 1982, February to September 1983 (discontinued). Miscellaneous gage heights available for 1980 and 1981 water years.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Water-stage recorder operated only during open-water period. Records good. Control is a broad crested weir and earthen dam; zero flow is at gage height 8.31 ft (2.533 m). September 20, dewatering of the impoundment began.

EXTREMES FOR CURRENT PERIOD.--October 1982, February to September 1983: Maximum gage height during period, 9.77 ft (2.978 m) Mar. 31; minimum gage height, 7.18 ft (2.188 m) Oct. 1.

## MONTHEND GAGE HEIGHT, IN FEET, OCTOBER 1982, FEBRUARY TO SEPTEMBER 1983

Oct. 28 .....	7.34	Apr. 30 .....	8.51	July 31 .....	8.14
Feb. 28 .....	8.46	May 31 .....	8.40	Aug. 31 .....	7.72
Mar. 31 .....	8.90	June 30 .....	8.41	Sept. 19 .....	7.54

## MINNESOTA RIVER BASIN

450317096412100 LA BOLT IMPOUNDMENT AT LA BOLT, SD--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980-83.

REMARKS.--Letter E indicates estimated value.

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT						
14...	1025	.5	535	8.2	8.5	11.2
14...	1030	3.0	535	8.2	8.5	11.3
14...	1033	6.0	534	8.2	8.5	11.3
14...	1035	9.0	533	8.2	8.5	11.3
28...	1015	.5	551	7.8	8.5	10.2
28...	1020	3.0	551	8.2	8.0	10.2
28...	1025	6.0	551	8.3	8.0	10.0
28...	1030	9.0	551	8.3	8.0	10.0
FEB						
11...	1228	1.3	792	7.5	1.0	10.7
11...	1231	3.0	791	7.5	2.0	9.7
11...	1233	6.0	791	7.5	3.0	9.8
11...	1236	9.0	812	7.4	3.5	8.1
11...	1240	10.0	817	7.4	3.5	7.4
MAR						
03...	1445	.5	716	8.4	1.5	10.8
03...	1447	3.0	746	8.3	2.5	9.8
03...	1448	4.0	792	7.8	3.5	5.6
03...	1449	5.0	799	7.8	3.5	4.6
03...	1450	6.0	799	7.9	3.5	4.6
03...	1453	7.0	819	7.7	3.5	4.2
03...	1456	8.0	853	7.7	3.0	4.6
03...	1459	9.0	810	7.6	3.0	4.3
03...	1502	10.0	913	7.6	3.0	3.9
APR						
20...	1642	.5	667	8.3	9.0	11.9
20...	1644	3.0	686	8.4	8.5	15.9
20...	1647	4.0	675	8.5	7.0	16.2
20...	1650	5.0	675	8.5	6.5	16.2
20...	1652	6.0	678	8.5	6.0	16.2
20...	1654	7.0	704	8.5	5.5	16.0
20...	1656	8.0	803	8.5	4.0	15.8
20...	1658	9.0	828	8.5	4.0	15.2
20...	1700	9.5	833	8.5	4.0	14.4
MAY						
26...	0958	.5	793	8.6	16.0	13.8
26...	1003	3.0	812	8.4	16.0	13.3
26...	1005	6.0	823	8.2	15.0	10.4
26...	1008	9.0	832	8.1	14.0	8.2
JUN						
09...	1012	.5	830	8.2	19.5	12.1
09...	1013	3.0	838	8.2	18.5	10.6
09...	1016	6.0	852	8.0	17.5	6.5
09...	1020	9.0	865	7.7	16.0	2.5
23...	1048	.5	826	8.0	24.5	8.7
23...	1053	3.0	845	8.0	24.0	7.2
23...	1056	4.0	842	7.8	23.5	6.0
23...	1059	5.0	845	7.8	23.5	5.7
23...	1100	6.0	870	7.5	20.0	1.7
23...	1102	7.0	874	7.5	17.5	1.6
23...	1104	8.0	882	7.5	17.0	1.6
23...	1106	9.0	890	7.5	16.5	1.5
23...	1107	10.0	905	7.4	16.0	1.5
JUL						
11...	1018	.5	802	8.0	24.5	9.3
11...	1021	3.0	804	8.0	24.5	9.0
11...	1022	6.0	804	8.0	24.5	9.0
11...	1024	9.0	863	7.4	20.0	2.9
11...	1025	10.0	880	7.3	18.0	2.7
27...	1000	.5	899	8.9	25.5	17.7
27...	1003	3.0	896	8.9	25.5	15.9
27...	1006	6.0	898	8.9	25.5	18.6
27...	1009	7.0	938	7.4	23.5	5.7
27...	1012	8.0	961	7.3	23.0	5.6
27...	1015	9.0	1020	7.3	21.0	6.2
27...	1020	10.0	1060	7.2	19.5	6.6



## MINNESOTA RIVER BASIN

450317096412100 LA BOLT IMPOUNDMENT AT LA BOLT, SD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
AUG						
10...	1014	.5	762	8.0	25.0	4.9
10...	1016	3.0	762	8.0	24.5	4.6
10...	1018	6.0	762	7.9	24.5	4.5
10...	1020	9.0	778	7.2	24.0	1.6
22...	1058	.5	750	8.2	24.0	6.1
22...	1105	3.0	742	8.0	24.0	4.3
22...	1110	6.0	743	8.0	24.0	3.4
22...	1115	9.4	765	7.1	23.0	1.2
SEP						
14...	0938	.5	697	8.8	17.0	11.4
14...	0941	3.0	701	8.7	17.0	9.4
14...	0942	6.0	710	8.2	16.5	5.2
26...	1005	.5	712	8.9	14.0	15.5
26...	1007	3.0	712	8.8	13.0	11.5
26...	1009	6.0	720	8.3	10.0	7.4
26...	1010	7.0	719	8.2	10.0	7.2
26...	1011	8.0	719	8.1	10.0	6.3
26...	1012	9.0	721	8.0	10.0	6.3
26...	1013	10.0	716	8.0	10.0	5.9

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	DEPTH TO BOT- TOM OF SAMPLE INTER- VAL (FT) (72016)	RESER- VOIR DEPTH (FEET) (72025)	RESER- VOIR STAGE (FT ABOVE DATUM) (00065)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)
OCT										
14...	1029	--	4.0	10.0	7.39	--	--	--	--	--
28...	1017	--	1.5	9.8	7.33	--	--	--	--	--
28...	1030	9.0	--	--	--	551	565	--	716	--
FEB										
11...	1230	--	3.4	10.4	7.90	--	812	--	729	.0
11...	1240	10.0	--	--	--	817	--	7.4	729	--
APR										
20...	1645	--	3.6	10.1	8.70	--	698	--	--	--
20...	1700	9.5	--	--	--	833	--	8.5	723	--
MAY										
26...	1000	--	3.1	11.0	8.44	--	--	--	--	--
26...	1010	10.5	--	--	--	845	--	7.9	724	--
JUN										
09...	1012	--	3.5	10.6	8.34	830	--	8.2	724	24.5
09...	1020	9.0	--	--	--	865	--	7.7	724	--
23...	1050	--	2.7	10.7	8.35	--	--	--	--	--
23...	1107	10.0	--	--	--	905	1270	7.4	725	--
JUL										
11...	1019	--	2.0	--	8.22	--	--	--	--	--
11...	1025	10.0	--	--	--	880	--	7.3	725	--
27...	1001	--	1.8	11.0	8.23	--	--	--	721	26.5
27...	1020	10.0	--	--	--	1060	--	7.2	721	--
AUG										
10...	1015	--	2.0	9.9	7.86	--	--	--	724	27.0
22...	1100	--	2.0	9.9	7.77	--	746	--	730	21.0
22...	1115	9.4	--	--	--	765	761	7.1	730	--
SEP										
14...	0940	--	2.0	10.0	7.60	--	--	--	732	17.0
26...	1006	--	1.5	10.4	6.74	--	--	--	730	--
26...	1013	10.0	--	--	--	716	--	8.0	730	--

## MINNESOTA RIVER BASIN

450317096412100 LA BOLT IMPOUNDMENT AT LA BOLT, SD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)	CALCIUM DIS- SOLVED (MG/L) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00925)	BICAR- BONATE IT-FLD (MG/L) AS (HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	SILICA, DIS- SOLVED (MG/L) AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 TOTAL (MG/L) AS N) (00630)
OCT										
14...	--	.30	--	--	--	--	--	--	--	--
28...	--	.30	--	--	--	--	--	--	--	--
28...	8.0	--	40	39	--	--	3.5	20	385	.100
FEB										
11...	--	.70	66	60	320	262	4.7	21	559	--
11...	3.5	--	--	--	--	--	--	--	--	--
APR										
20...	--	.70	87	37	298	244	10	22	535	--
20...	4.0	--	--	--	298	244	--	--	--	--
MAY										
26...	--	.70	--	--	358	294	--	--	--	--
26...	13.5	--	--	--	--	--	--	--	--	--
JUN										
09...	19.5	.60	--	--	--	--	--	--	--	--
09...	16.0	--	--	--	--	--	--	--	--	--
23...	--	.60	--	--	298	244	--	--	--	--
23...	16.0	--	99	54	--	--	5.6	16	636	--
JUL										
11...	--	.40	--	--	--	--	--	--	--	--
11...	18.0	--	--	--	--	--	--	--	--	--
27...	--	.40	--	--	--	--	--	--	--	--
27...	19.5	--	--	--	--	--	--	--	--	--
AUG										
10...	--	.40	--	--	--	--	--	--	--	--
22...	--	.40	63	54	218	179	5.3	20	518	--
22...	23.0	--	63	54	248	203	5.1	22	553	--
SEP										
14...	--	.40	--	--	--	--	--	--	--	--
26...	--	.30	--	--	--	--	--	--	--	--
26...	10.0	--	--	--	--	--	--	--	--	--

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L) AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L) AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L) AS N) (00623)	PHOS- PHORUS, TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L) AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L) AS P) (00671)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
OCT										
14...	--	--	--	--	--	--	.20	--	--	--
28...	--	--	--	--	--	--	--	--	180	.101
28...	<.10	.91	--	4.1	--	.16	--	--	--	--
FEB										
11...	.22	--	1.2	--	2.1	.23	.12	.12	66.0	<.100
11...	--	--	--	--	--	.30	--	--	--	--
APR										
20...	.18	--	.03	--	.60	.05	.04	.02	2.10	<.100
20...	--	--	--	--	--	.05	--	--	--	--
MAY										
26...	--	--	--	1.1	--	.05	--	--	9.40	.010
26...	--	--	--	1.9	--	.07	--	--	--	--
JUN										
09...	--	--	--	--	--	.06	--	--	6.80	<.100
09...	--	--	--	--	--	.07	--	--	--	--
23...	<.10	--	.06	--	.80	.07	.07	<.01	24.0	<.100
23...	<.10	--	.80	--	1.5	.14	.14	.12	--	--
JUL										
11...	--	--	--	--	--	.10	--	--	47.0	<.100
11...	--	--	--	--	--	.45	--	--	--	--
27...	<.10	--	.05	--	.80	.20	.10	.06	65.0	<.100
27...	<.10	--	6.1	--	6.7	1.7	.97	.96	--	--
AUG										
10...	<.10	--	.13	--	2.6	--	.17	.08	52.0	<.100
22...	<.10	--	.10	--	1.3	.19	.07	.03	--	--
22...	<.10	--	.57	--	2.5	.27	.25	.27	--	--
SEP										
14...	--	--	--	--	--	.17	--	--	130	<.100
26...	--	--	--	--	--	.18	--	--	150	<.100
26...	--	--	--	--	--	.15	--	--	--	--

## MINNESOTA RIVER BASIN

450317096412104 LA BOLT IMPOUNDMENT OUTLET AT LA BOLT, SD

LOCATION.--Lat 45°03'17", long 96°41'21", in NW¼SE¼ sec.3, T.118 N., R.49 W., Grant County, Hydrologic Unit 07020001, 1,000 ft (305 m) downstream of dam in County Park, 0.5 mi (0.8 km) northwest of La Bolt, S. Dak.

DRAINAGE AREA.--2.1 mi<sup>2</sup> (5.44 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February to October 1982, February to September 1983. Miscellaneous discharge measurements available for 1980 and 1981 water years.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Water-stage recorder operated only during open-water period. Records good except those for period Feb. 23 to Apr. 20, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 275 ft<sup>3</sup>/s (7.79 m<sup>3</sup>/s) Mar. 30, gage height, 4.26 ft (1.298 m); no flow on many days.

EXTREMES FOR CURRENT PERIOD.--October 1982, February to September 1983: Maximum discharge during period, 117 ft<sup>3</sup>/s (3.31 m<sup>3</sup>/s) Mar. 31, gage height, 3.42 ft (1.042 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	2.1	47	2.3	.44	.59	.00	.00
2	.00				---	2.2	19	2.1	.35	.54	.00	.00
3	.00				---	2.2	13	1.9	.35	.52	.00	.00
4	.00				---	2.1	11	1.7	.22	.21	.00	.00
5	.00				---	4.3	10	1.7	.11	.00	.00	.00
6	.00				---	16	9.0	3.1	.10	.00	.00	.00
7	.00				---	14	10	18	.10	.00	.00	.00
8	.00				---	3.0	13	11	.10	.00	.00	.00
9	.00				---	2.0	10	7.8	.00	.00	.00	.00
10	.00				---	2.0	8.5	4.4	.00	.00	.00	.00
11	.00				---	2.0	8.5	3.2	.00	.00	.00	.00
12	.00				---	2.0	11	2.8	.00	.00	.00	.00
13	.00				---	2.0	9.1	2.7	.00	.00	.00	.00
14	.00				---	2.0	2.5	2.2	.64	.00	.00	.00
15	.00				---	2.0	3.0	2.0	.75	.00	.00	.00
16	.00				---	2.0	8.8	1.9	.88	.00	.00	.00
17	.00				---	2.0	14	1.8	.74	.00	.00	.00
18	.00				---	2.0	12	1.7	.58	.49	.00	.00
19	.00				---	2.0	12	1.7	.48	1.5	.00	.00
20	.00				---	2.0	13	1.8	.43	.44	.00	.00
21	.00				---	2.0	11	1.8	.19	.02	.00	.00
22	.00				---	2.0	8.5	1.6	.03	.00	.00	.00
23	.00				1.6	2.0	7.1	1.4	.00	.00	.00	.00
24	.00				1.1	2.0	5.7	1.2	.00	.00	.00	.00
25	.00				1.0	2.0	4.7	1.0	.00	.00	.00	.00
26	.00				1.0	2.0	4.0	.99	.00	.00	.00	.00
27	.00				1.7	2.0	3.4	.94	.00	.00	.00	.00
28	.00				2.2	2.0	3.1	.78	.00	.00	.00	.00
29	---				---	2.0	2.8	.51	.14	.00	.00	.00
30	---				---	2.5	2.5	.50	.63	.00	.00	.00
31	---				---	29	---	.47	---	.00	.00	---
TOTAL	---				---	119.4	297.2	86.99	7.26	4.31	.00	.00
MEAN	---				---	3.85	9.91	2.81	.24	.14	.000	.000
MAX	---				---	29	47	18	.88	1.5	.00	.00
MIN	---				---	2.0	2.5	.47	.00	.00	.00	.00
CFSM	---				---	1.83	4.72	1.34	.11	.07	.000	.000
IN.	---				---	2.11	5.26	1.54	.13	.08	.00	.00
AC-FT	---				---	237	589	173	14	8.5	.00	.00

## MINNESOTA RIVER BASIN

450317096412104 LA BOLT IMPOUNDMENT OUTLET AT LA BOLT, SD--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980, 1982-83.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March to May 1983.

REMARKS.--Letter E indicates estimated value. Suspended-sediment discharge record is poor because it is based on a limited number of samples by automatic sampler.

EXTREMES FOR CURRENT PERIOD.--March to May 1983:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 59 mg/L Apr. 1; minimum daily mean, 3 mg/L on many days.

SEDIMENT LOADS: Maximum daily mean during period, 7.5 tons (6.8 tonnes) Apr. 1; minimum daily mean, 0.1 ton (.01 tonne) on many days.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE OF HG (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)
FEB							
23...	1215	1.5	517	8.0	723	1.5	1.0
MAR							
01...	1210	2.1	760	--	E720	--	2.0
03...	1405	2.0	660	8.6	716	--	1.0
APR							
01...	1148	41	--	7.3	E720	--	2.0
06...	1550	10	486	8.2	723	--	1.0
11...	1450	9.7	637	8.5	725	--	5.5
16...	0900	6.2	--	--	--	--	2.5
20...	1630	11	642	8.3	723	--	7.5
28...	1154	3.2	--	--	--	--	--
MAY							
26...	1120	.90	827	8.3	725	--	16.0

DATE	OXYGEN, DIS- SOLVED (MG/L) (00300)	BICAR- BONATE IT-FLD (MG/L HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
FEB							
23...	9.3	--	--	--	--	--	14
MAR							
01...	--	--	--	.360	1.3	.19	5
03...	10.6	--	--	--	--	--	3
APR							
01...	--	--	--	--	--	--	59
06...	12.8	--	--	--	--	--	14
11...	15.0	--	--	.310	.60	.06	--
16...	--	--	--	--	--	--	16
20...	12.4	--	--	.160	.60	.06	11
28...	--	334	274	--	--	.04	23
MAY							
26...	10.3	--	--	--	--	--	--

DATE	TIME	SED. SUSP. SIEVE DIAM. % FINER THAN (70331)	BED MAT. SIEVE DIAM. % FINER THAN (80164)	BED MAT. SIEVE DIAM. % FINER THAN (80165)	BED MAT. SIEVE DIAM. % FINER THAN (80166)	BED MAT. SIEVE DIAM. % FINER THAN (80167)	BED MAT. SIEVE DIAM. % FINER THAN (80168)	BED MAT. SIEVE DIAM. % FINER THAN (80169)	BED MAT. SIEVE DIAM. % FINER THAN (80170)	BED MAT. SIEVE DIAM. % FINER THAN (80171)	BED MAT. SIEVE DIAM. % FINER THAN (80172)	BED MAT. SIEVE DIAM. % FINER THAN (80173)
MAR												
01...	1210	79	--	--	--	--	--	--	--	--	--	--
MAY												
26...	1120	--	20	22	26	31	39	49	62	79	96	100

## MINNESOTA RIVER BASIN

450317096412104 LA BOLT IMPOUNDMENT OUTLET NEAR LA BOLT, SD--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											5	.03
2											4	.02
3											3	.02
4											4	.02
5											5	.06
6												
7											30	1.3
8											32	1.2
9											8	.06
10											3	.02
11											3	.02
12											3	.02
13											3	.02
14											3	.02
15											3	.02
16											3	.02
17											3	.02
18											3	.02
19											3	.02
20											3	.02
21											3	.02
22											3	.02
23											3	.02
24											3	.02
25											3	.02
26											3	.02
27											3	.02
28											3	.02
29											3	.02
30											3	.02
31											46	3.6
TOTAL											---	6.75
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	59	7.5	18	.11								
2	54	2.8	14	.08								
3	54	1.9	13	.07								
4	36	1.1	12	.06								
5	21	.57	10	.05								
6	15	.36	18	.15								
7	16	.43	56	2.7								
8	20	.70	18	.53								
9	15	.41	13	.27								
10	15	.34	15	.18								
11	15	.34	15	.13								
12	16	.48	15	.11								
13	24	.59	15	.11								
14	10	.07	15	.09								
15	10	.08	15	.08								
16	24	.57	10	.05								
17	36	1.4	10	.05								
18	23	.75	10	.05								
19	18	.58	10	.05								
20	11	.39	10	.05								
21	12	.36	10	.05								
22	14	.32	10	.04								
23	15	.29	10	.04								
24	15	.23	10	.03								
25	13	.16	10	.03								
26	11	.12	10	.03								
27	13	.12	10	.03								
28	23	.19	10	.02								
29	22	.17	10	.01								
30	19	.13	10	.01								
31	---	---	10	.01								
TOTAL	---	23.45	---	5.27								

## MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN

LOCATION.--Lat 45°13'35", long 96°21'12", in SE¼SE¼ sec.1, T.120 N., R.46 W., Lac qui Parle County, Hydrologic Unit 07020001, on left bank 150 ft (46 m) downstream from highway bridge, 2.5 mi (4.0 km) southwest of Odessa, and 4.5 mi (7.2 km) upstream from mouth.

DRAINAGE AREA.--398 mi<sup>2</sup> (1,031 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1939 to current year.

REVISED RECORDS.--WSP 1388: 1947(M), 1950.

GAGE.--Water-stage recorder. Datum of gage is 953.34 ft (290.578 m) National Geodetic Vertical Datum of 1929 (Corps of Engineers bench mark). Prior to Aug. 28, 1940, nonrecording gage at site 150 ft (46 m) upstream at same datum.

REMARKS.--Records good except those for winter periods, which are fair.

AVERAGE DISCHARGE.--44 years, 54.8 ft<sup>3</sup>/s (1.552 m<sup>3</sup>/s), 1.87 in/yr (47 mm/yr), 39,700 acre-ft/yr (49.0 hm<sup>3</sup>/yr); median of yearly mean discharges, 47 ft<sup>3</sup>/s (1.33 m<sup>3</sup>/s), 1.60 in/yr (41 mm/yr), 34,100 acre-ft/yr (42 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,970 ft<sup>3</sup>/s (197 m<sup>3</sup>/s) Apr. 9, 1969, gage height, 19.07 ft (5.813 m) from floodmark; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 495 ft<sup>3</sup>/s (14.0 m<sup>3</sup>/s) Apr. 2, gage height, 5.42 ft (1.652 m), no other peak above base of 300 ft<sup>3</sup>/s (8.50 m<sup>3</sup>/s); minimum discharge, 0.50 ft<sup>3</sup>/s (0.014 m<sup>3</sup>/s) Sept. 28; minimum gage height, 1.54 ft (0.469 m) Aug. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1.0	1.6	7.0	2.5	2.1	10	33	31	6.5	19	3.2	1.4		
2	1.0	1.6	7.5	2.5	2.1	7.5	321	28	5.8	16	3.0	1.2		
3	1.0	1.6	7.0	2.1	2.1	8.0	392	25	5.5	19	2.6	1.0		
4	1.3	1.5	7.0	2.1	2.1	10	224	23	4.9	16	2.4	1.3		
5	.94	1.5	7.0	2.1	2.1	12	164	20	4.3	12	2.6	2.1		
6	2.6	1.5	6.8	2.1	2.1	16	158	20	4.2	10	2.4	1.9		
7	2.1	1.4	6.5	2.1	2.1	19	153	27	3.8	8.2	2.1	1.5		
8	1.7	1.3	6.0	2.1	2.1	19	143	33	3.4	6.4	1.6	1.0		
9	2.6	1.3	5.5	2.1	2.2	44	136	72	3.2	5.6	1.4	1.0		
10	3.0	1.5	5.5	2.1	2.5	32	138	82	2.8	4.5	1.3	1.7		
11	2.9	1.6	5.5	2.1	3.0	22	128	82	2.6	3.7	1.2	1.6		
12	2.9	1.6	5.5	2.1	3.0	18	109	71	2.5	3.5	1.1	1.6		
13	2.7	1.4	5.0	2.1	3.5	16	103	60	2.5	3.0	1.2	1.5		
14	2.7	1.4	5.0	2.1	4.0	14	107	48	4.9	2.7	1.1	1.3		
15	2.6	1.4	5.0	2.1	9.5	12	88	41	5.6	2.6	1.1	1.9		
16	2.6	1.5	5.0	2.1	28	17	75	35	4.4	2.7	2.1	2.3		
17	2.6	3.5	4.5	2.1	43	46	68	30	3.7	3.2	2.7	2.0		
18	2.4	5.5	4.5	2.1	43	40	69	27	4.8	7.2	1.9	2.0		
19	2.4	8.5	5.0	2.1	36	34	74	24	5.0	17	1.6	1.7		
20	2.4	8.8	4.5	2.1	30	30	73	22	4.5	13	1.7	1.9		
21	2.4	8.5	4.0	2.1	27	29	76	20	4.1	32	1.7	1.7		
22	1.9	8.2	4.0	2.1	22	34	84	18	3.9	27	1.4	1.6		
23	1.7	8.2	4.0	2.1	19	39	106	17	3.3	17	1.2	1.6		
24	1.7	8.0	3.5	2.1	16	25	90	15	2.8	12	1.1	1.5		
25	1.7	8.0	3.5	2.1	12	30	77	13	2.6	9.2	1.3	1.4		
26	1.7	7.5	3.0	2.1	10	24	67	12	4.4	7.0	1.2	1.3		
27	1.7	7.5	3.0	2.1	11	18	56	10	4.6	5.4	.99	1.2		
28	1.7	7.5	3.0	2.1	11	13	48	8.4	4.7	4.7	.95	1.2		
29	1.6	7.5	3.0	2.1	---	16	41	7.8	27	4.1	1.1	1.1		
30	1.6	7.0	2.5	2.1	---	16	36	7.2	26	3.7	2.3	1.1		
31	1.6	---	2.5	2.1	---	19	---	7.0	---	3.4	1.6	---		
TOTAL	62.74	127.9	151.3	65.9	352.5	689.5	3437	936.4	168.3	300.8	53.14	45.6		
MEAN	2.02	4.26	4.88	2.13	12.6	22.2	115	30.2	5.61	9.70	1.71	1.52		
MAX	3.0	8.8	7.5	2.5	43	46	392	82	27	32	3.2	2.3		
MIN	.94	1.3	2.5	2.1	2.1	7.5	33	7.0	2.5	2.6	.95	1.0		
CFSM	.005	.01	.01	.005	.03	.06	.29	.08	.01	.02	.004	.004		
IN.	.01	.01	.01	.01	.03	.06	.32	.09	.02	.03	.00	.00		
AC-FT	124	254	300	131	699	1370	6820	1860	334	597	105	90		
CAL YR 1982	TOTAL	7385.29	MEAN	20.2	MAX	1010	MIN	.50	CFSM	.05	IN	.69	AC-FT	14650
WTR YR 1983	TOTAL	6391.08	MEAN	17.5	MAX	392	MIN	.94	CFSM	.04	IN	.60	AC-FT	12680

## MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1961-62, 1974 to 1981, March 1982 to August 1982, March 1983 to August 1983.

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1973 to September 1981, March 1982 to August 1982, March 1983 to August 1983.

SUSPENDED-SEDIMENT DISCHARGE: October 1973 to September 1981, March 1982 to August 1982, March 1983 to August 1983.

REMARKS.--During the winter period, suspended-sediment samples were collected monthly and daily sediment concentration was estimated on the basis of water records and monthly sediment samples. Water temperature was obtained once daily during open water period and monthly for the winter period.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum daily, 29.0°C July 10, 1974, July 17, 1975; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 731 mg/L Apr. 13, 1979; minimum daily mean, no flow for several days during 1976, 1977, 1980.

SEDIMENT LOADS: Maximum daily, 4,880 tons (4,430 tonnes) Apr. 13, 1979; minimum daily, no flow for several days during 1976, 1977, 1980.

## EXTREMES FOR CURRENT PERIOD.--March to August 1983:

WATER TEMPERATURES: Maximum daily, 28.0°C Aug. 7; minimum daily, 0.0°C on several days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 244 mg/L Aug. 26; minimum daily mean, 5 mg/L Mar. 2.

SEDIMENT LOADS: Maximum daily, 180 tons (163 tonnes) Apr. 3; minimum daily, 0.10 ton (0.09 tonne) Mar. 2.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	2.0	4.5	13.0	---	25.0	25.0	
2	---	---	---	---	---	2.0	2.0	11.0	---	24.0	26.0	
3	---	---	---	---	---	2.0	2.0	11.0	---	23.0	25.0	
4	15.0	---	---	---	---	2.0	3.0	11.0	---	---	27.0	
5	---	---	---	.5	---	3.0	4.0	13.0	---	---	27.0	
6	---	---	---	---	---	3.0	5.0	15.0	15.0	---	27.0	
7	---	---	---	---	---	3.0	3.5	12.0	---	---	28.0	
8	---	---	---	---	---	---	4.0	17.0	---	---	26.0	
9	---	---	---	---	---	---	6.0	12.5	---	27.0	23.5	
10	---	4.0	---	---	---	---	6.0	14.0	---	25.0	24.0	
11	---	---	---	---	---	---	6.0	16.0	---	25.0	22.0	
12	---	---	---	---	---	---	8.0	15.0	---	22.0	21.0	
13	---	---	---	---	---	1.5	6.0	12.0	---	24.0	24.0	
14	---	---	---	---	---	1.0	2.0	14.0	---	27.0	23.0	
15	---	---	---	---	---	1.0	2.0	13.0	16.0	26.0	23.0	
16	---	---	---	---	---	1.5	7.0	---	16.0	25.0	25.0	
17	---	---	---	---	---	2.0	5.0	---	17.0	26.0	23.0	
18	---	---	---	---	---	1.0	4.5	---	19.0	24.0	24.0	
19	---	---	---	---	---	1.5	5.0	---	19.0	25.0	25.0	
20	---	---	---	---	---	1.0	7.0	---	21.0	26.0	24.0	
21	---	---	---	---	---	.0	9.0	---	24.0	27.0	24.0	
22	---	---	---	---	---	2.0	11.0	---	25.0	27.0	23.0	
23	---	---	---	---	---	2.0	11.5	---	25.0	25.0	27.0	
24	---	---	---	---	---	2.0	11.0	---	25.0	27.0	26.0	
25	---	---	---	---	.5	1.0	12.0	---	25.0	24.0	25.0	
26	---	---	---	---	---	3.0	13.5	---	20.0	24.0	26.0	
27	---	---	---	---	---	3.0	12.0	---	22.0	23.0	26.0	
28	---	---	---	---	---	2.0	13.0	18.0	20.0	26.0	24.0	
29	---	---	---	---	---	2.0	9.0	15.0	19.0	25.0	24.0	
30	---	---	---	---	---	2.0	11.0	13.5	19.0	25.0	22.0	
31	---	---	---	---	---	3.0	---	---	---	26.0	22.0	
MEAN	---	---	---	---	---	---	7.0	---	---	---	24.5	
MAX	---	---	---	---	---	---	13.5	---	---	---	28.0	
MIN	---	---	---	---	---	.0	2.0	---	---	---	21.0	
WTR YR 1983				MAX	28.0	MIN	.0					

## MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO AUGUST 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											8	.22
2											5	.10
3											6	.13
4											7	.19
5											6	.19
6											7	.30
7											8	.41
8											8	.41
9											8	.95
10											8	.69
11											7	.42
12											7	.34
13											7	.30
14											7	.26
15											8	.26
16											8	.37
17											14	1.7
18											10	1.1
19											7	.64
20											7	.57
21											19	1.5
22											11	1.0
23											8	.84
24											6	.41
25											8	.65
26											10	.65
27											11	.53
28											13	.46
29											18	.78
30											18	.78
31											17	.87
TOTAL											---	18.02
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	18	1.6	50	4.2	98	1.7	38	1.9	174	1.5		
2	131	132	52	3.9	96	1.5	43	1.9	190	1.5		
3	170	180	46	3.1	94	1.4	19	.97	180	1.3		
4	90	54	74	4.6	91	1.2	27	1.2	140	.91		
5	60	27	45	2.4	88	1.0	45	1.5	146	1.0		
6	57	24	73	3.9	87	.99	65	1.8	148	.96		
7	72	30	70	5.1	87	.89	82	1.8	181	1.0		
8	63	24	46	4.1	87	.80	94	1.6	152	.66		
9	57	21	70	14	87	.75	106	1.6	181	.68		
10	51	19	28	6.2	87	.66	122	1.5	155	.54		
11	42	15	63	14	87	.61	142	1.4	170	.55		
12	40	12	56	11	87	.59	132	1.2	154	.46		
13	42	12	16	2.6	90	.61	123	1.0	181	.59		
14	57	16	20	2.6	157	2.1	133	.97	179	.53		
15	56	13	43	4.8	183	2.8	113	.79	168	.50		
16	43	8.7	45	4.3	156	1.9	108	.79	152	.86		
17	48	8.8	48	3.9	115	1.1	121	1.0	138	1.0		
18	48	8.9	50	3.6	159	2.1	60	1.2	128	.66		
19	57	11	53	3.4	184	2.5	48	2.2	175	.76		
20	59	12	56	3.3	148	1.8	87	3.1	172	.79		
21	63	13	58	3.1	135	1.5	89	7.7	95	.44		
22	59	13	61	3.0	138	1.5	66	4.8	124	.47		
23	58	17	63	2.9	103	.92	47	2.2	206	.67		
24	41	10	66	2.7	94	.71	72	2.3	152	.45		
25	38	7.9	68	2.4	106	.74	130	3.2	106	.37		
26	57	10	71	2.3	83	.99	157	3.0	244	.79		
27	60	9.1	74	2.0	95	1.2	141	2.1	152	.41		
28	52	6.7	79	1.8	76	.96	178	2.3	144	.37		
29	71	7.9	106	2.2	55	4.0	159	1.8	113	.34		
30	60	5.8	103	2.0	22	1.5	141	1.4	115	.71		
31	---	---	100	1.9	---	---	140	1.3	125	.54		
TOTAL	---	730.4	---	131.3	---	41.02	---	61.52	---	22.31		



## MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN--Continued

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)
SEP 07...	1345	1.7	3	<1	<1	3	12

DATE	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
SEP 07...	30	51	72	88	98	100

## MINNESOTA RIVER BASIN

## 05294000 POMME DE TERRE RIVER AT APPLETON, MN

LOCATION.--Lat 45°12'10", long 96°01'20", in SW¼NW¼ sec.14, T.120 N., R.43 W., Swift County, Hydrologic Unit 07020002, on left bank 60 ft (18 m) upstream from bridge on U.S. Highway 59 and State Highway 119 at Appleton and 8 mi (13 km) upstream from mouth.

DRAINAGE AREA.--905 mi<sup>2</sup> (2,344 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--March 1931 to September 1935 (no winter records), October 1935 to current year. Prior to October 1953, published as "near Appleton."

REVISED RECORDS.--WSP 1308: 1931(M), 1937(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 978.00 ft (298.094 m) National Geodetic Vertical Datum of 1929. Prior to Dec. 22, 1952, nonrecording gage at site 4 mi (6 km) upstream at datum 25.17 ft (7.672 m) higher.

REMARKS.--Records good except those for winter period, which are fair. Flow affected by lakes above station. Occasional regulation at low flow by old milldam 500 ft (152 m) upstream.

AVERAGE DISCHARGE.--48 years (water years 1936-83), 104 ft<sup>3</sup>/s (2.945 m<sup>3</sup>/s), 1.56 in/yr (40 mm/yr), 75,350 acre-ft/yr (92.9 hm<sup>3</sup>/yr); median of yearly mean discharge, 91 ft<sup>3</sup>/s (2.58 m<sup>3</sup>/s), 1.37 in/yr (35 mm/yr), 65,900 acre-ft/yr (81 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,520 ft<sup>3</sup>/s (156 m<sup>3</sup>/s) Apr. 11, 1969, gage height, 13.78 ft (4.200 m); maximum gage height, 14.58 ft (4.444 m) Apr. 9, 1969 (backwater from ice); no flow for several periods.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft<sup>3</sup>/s (5.66 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Mar. 7	0645	229 6.49	5.39 1.643	Mar. 21	1700	*264 7.48	*5.50 1.676
Mar. 15	0045	240 6.80	5.42 1.652	Apr. 2	0230	226 6.40	5.39 1.643

Minimum discharge, 12 ft<sup>3</sup>/s (0.340 m<sup>3</sup>/s) Aug. 16, 17, gage height, 3.96 ft (1.207 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	76	86	66	47	98	197	105	58	67	38	84
2	31	75	104	65	44	107	211	101	55	66	36	58
3	36	75	119	64	47	116	193	97	53	62	33	49
4	45	75	113	65	46	130	184	95	53	64	24	49
5	50	57	104	63	40	148	179	94	53	84	20	50
6	50	63	92	65	40	178	189	104	53	78	19	48
7	65	91	71	64	42	219	199	109	51	66	18	47
8	68	83	55	64	39	164	205	111	49	61	17	48
9	72	74	66	65	42	124	199	101	46	56	16	45
10	93	78	74	64	48	93	192	92	42	51	15	46
11	113	82	70	61	54	131	185	86	40	49	15	40
12	108	47	66	63	52	197	181	84	38	47	14	38
13	105	42	64	58	55	201	182	88	42	43	14	36
14	102	54	66	60	55	216	183	105	52	39	13	35
15	99	67	66	65	53	231	174	103	55	36	13	35
16	97	58	65	60	55	229	167	95	60	35	13	36
17	95	54	63	54	55	215	159	90	59	43	21	36
18	94	73	64	60	65	200	147	88	55	60	40	33
19	94	93	67	62	75	197	142	82	51	64	30	32
20	93	114	68	58	81	196	139	80	49	75	24	30
21	94	95	67	54	81	207	135	77	54	56	24	28
22	93	87	67	51	86	208	134	75	47	49	24	28
23	90	68	67	48	83	206	126	72	44	45	22	29
24	86	78	67	50	79	189	123	70	43	43	21	27
25	84	95	67	48	82	175	123	69	42	42	23	26
26	83	93	61	48	80	172	118	66	62	40	22	25
27	81	87	55	46	82	173	114	63	48	40	18	23
28	79	80	67	50	88	168	110	60	45	43	17	24
29	79	79	60	50	---	169	111	57	52	44	15	23
30	77	82	51	50	---	168	108	57	60	41	32	22
31	76	---	60	48	---	171	---	58	---	37	132	---
TOTAL	2462	2275	2232	1789	1696	5396	4809	2634	1511	1626	783	1130
MEAN	79.4	75.8	72.0	57.7	60.6	174	160	85.0	50.4	52.5	25.3	37.7
MAX	113	114	119	66	88	231	211	111	62	84	132	84
MIN	30	42	51	46	39	93	108	57	38	35	13	22
CFSM	.09	.08	.08	.06	.07	.19	.18	.09	.06	.06	.03	.04
IN.	.10	.09	.09	.07	.07	.22	.20	.11	.06	.07	.03	.05
AC-FT	4880	4510	4430	3550	3360	10700	9540	5220	3000	3230	1550	2240

CAL YR 1982	TOTAL	45448.0	MEAN	125	MAX	1380	MIN	1.7	CFSM	.14	IN	1.87	AC-FT	90150
WTR YR 1983	TOTAL	28343.0	MEAN	77.7	MAX	231	MIN	13	CFSM	.09	IN	1.17	AC-FT	56220

## MINNESOTA RIVER BASIN

105

443916096174801 LAC QUI PARLE RIVER NEAR CANBY, MN

LOCATION.--Lat 44°39'16", long 96°17'48", in NW¼SE¼ sec.29, T.114 N., R.45 W., Yellow Medicine County, Hydrologic Unit 07020003, 4 mi (6.4 km) southwest of Canby, on township road, 1 mi (1.6 km) west of U.S. Highway 75 and 0.25 mi (0.40 km) south of County Highway 36.

DRAINAGE AREA.--186 mi<sup>2</sup> (482 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to October 1982, February to September 1983.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Records fair except those for Oct. 1 to 31, Feb. 10 to Mar. 24, and July 30 to Sept. 30, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 389 ft<sup>3</sup>/s (11.0 m<sup>3</sup>/s) Apr. 21, 1983, gage height, 4.48 ft (1.366 m); no flow on many days.

EXTREMES FOR CURRENT PERIOD.--October 1982, and February to September 1983: Maximum discharge during period, 389 ft<sup>3</sup>/s (11.0 m<sup>3</sup>/s) Apr. 21, gage height, 4.48 ft (1.366 m); no flow Aug. 13-29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.10				---	34	155	97	31	38	2.1	1.5
2	.10				---	38	109	122	29	59	2.0	1.5
3	.20				---	43	96	110	28	54	1.5	1.0
4	.20				---	40	111	96	26	44	1.0	1.0
5	.20				---	48	122	86	24	37	.80	1.0
6	.80				---	91	126	129	22	31	.60	1.0
7	1.0				---	102	133	306	21	24	.40	.80
8	.90				---	54	131	224	19	19	.20	.60
9	1.2				---	34	126	169	19	15	.20	.40
10	1.3				.50	31	120	138	18	14	.20	.20
11	1.0				.50	27	113	116	16	12	.20	.20
12	.80				1.0	29	106	103	15	10	.20	.20
13	.60				1.0	47	105	101	19	8.5	.00	.20
14	.60				1.0	58	105	92	45	7.1	.00	.20
15	.50				1.5	53	100	85	45	6.8	.00	.80
16	.40				2.0	42	138	80	38	5.8	.00	1.5
17	.40				2.0	38	135	75	32	6.1	.00	1.0
18	.30				3.5	35	126	71	29	8.2	.00	.50
19	.30				4.5	32	149	72	26	7.1	.00	.50
20	.40				5.0	29	191	69	26	6.8	.00	.50
21	.40				5.0	27	283	65	25	5.5	.00	.50
22	.40				5.0	31	244	62	23	4.4	.00	.20
23	.40				6.5	34	210	58	20	3.7	.00	.20
24	.40				8.0	27	185	54	19	3.4	.00	.20
25	.40				8.0	25	168	52	17	3.0	.00	.20
26	.40				17	22	150	47	14	2.6	.00	.20
27	.40				31	17	124	43	13	2.6	.00	.20
28	.20				37	18	113	40	17	2.6	.00	.20
29	.20				---	20	110	36	33	2.6	.00	.20
30	.20				---	30	105	35	41	2.4	1.5	.50
31	.20				---	63	---	32	---	2.3	1.5	---
TOTAL	14.90				---	1219	4189	2865	750	448.5	12.40	17.20
MEAN	.48				---	39.3	140	92.4	25.0	14.5	.40	.57
MAX	1.3				---	102	283	306	45	59	2.1	1.5
MIN	.10				---	17	96	32	13	2.3	.00	.20
CFSM	.003				---	.21	.75	.50	.13	.08	.002	.003
IN.	.00				---	.24	.84	.57	.15	.09	.00	.00
AC-FT	30				---	2420	8310	5680	1490	890	25	34

443916096174801 LAC OUI PARLE RIVER NEAR CANBY, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-83.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE.--February 'to July 1983.

REMARKS.--Letter E indicates estimated value. Letter K indicates non-ideal colony count. Sporadic samples by observer during periods of low-high flows, daily samples collected by automatic sampler during periods of low-medium flows, 1-7 samples collected by automatic sampler during runoff events.

**EXTREMES FOR CURRENT PERIOD.--February to July 1983:**

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 566 mg/L July 1; minimum daily mean during period, 20 mg/L Mar. 1.

SEDIMENT LOADS: Maximum daily mean during period, 353 tons (320 tonnes) May 7; minimum daily mean, 0.54 ton (0.49 tonne) Feb. 25.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

[illegible]

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

[illegible]

## MINNESOTA RIVER BASIN

443916096174801 LAC QUI PARLE RIVER NEAR CANBY, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SILICA, DIS- SOLVED (MG/L AS SI02) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)
OCT									
14...	--	--	--	--	--	--	--	.01	--
27...	19	1200	<.10	<.10	.15	.40	.03	--	8
FEB									
10...	21	1300	--	.40	--	.50	.04	--	--
24...	--	--	--	--	--	1.1	.10	--	4
28...	--	--	--	--	--	--	--	--	38
MAR									
01...	--	--	--	1.2	--	1.4	.13	--	16
01-04	15	507	--	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	20
04...	--	--	--	--	--	--	--	--	13
31...	--	--	--	2.2	--	1.7	.21	--	--
31-31	10	632	--	--	--	--	--	--	--
APR									
01-05	10	632	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	124
04...	--	--	--	--	--	--	--	--	55
05...	--	--	--	1.9	--	1.5	.18	--	--
05-08	17	688	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	56
08...	--	--	--	--	--	--	--	--	146
08-11	--	--	--	1.4	--	1.1	.13	--	--
11...	--	--	--	--	--	--	--	--	--
21...	16	600	--	1.5	--	2.7	.51	--	437
22-26	--	--	--	1.1	--	.90	.18	--	--
26...	--	--	--	--	--	--	--	--	89
26-29	--	--	--	.40	--	--	.09	--	--
29...	--	--	--	--	--	--	--	--	51
29-30	--	--	--	--	--	--	.09	--	--
MAY									
01-04	--	--	--	--	--	--	.09	--	--
06-10	--	--	--	--	--	--	<.01	--	--
25...	--	--	--	--	--	--	--	--	47
JUN									
09...	--	--	--	--	--	--	--	--	28
22...	16	920	--	.73	--	1.1	.08	--	--
29-30	--	--	--	--	--	--	.14	--	--
JUL									
01-01	--	--	--	--	--	--	.14	--	--

## MINNESOTA RIVER BASIN

443916096174801 LAC QUI PARLE RIVER NEAR CANBY, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
JUL 02-05	0800	52	--	--	--	--	--	--	--	--	--
12...	1110	11	1160	--	8.2	730	24.0	21.0	8.4	720	730
26...	1250	2.7	1140	1200	8.3	727	25.5	24.5	9.8	--	--
SEP 15...	1200	.81	1210	--	7.8	721	15.5	14.0	8.3	--	--

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L AS CAC03) (99430)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
JUL 02-05	--	--	--	--	--	--	--	--	13	--
12...	--	--	--	--	--	--	--	--	--	--
26...	160	65	17	8.2	333	273	264	380	30	.40
SEP 15...	--	--	--	--	--	--	--	--	--	--

DATE	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)
JUL 02-05	--	--	--	--	--	--	--	.19	--	--
12...	--	--	--	--	--	--	--	--	--	--
26...	21	777	--	--	--	--	--	--	--	--
SEP 15...	--	--	--	--	--	--	--	--	--	38

DATE	TIME	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
APR 01...	1745	46	54	59	70	86	89	95	100

## MINNESOTA RIVER BASIN

443916096174801 LAC QUI PARLE RIVER NEAR CANBY, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1									---	---	20	1.8
2									---	---	24	2.5
3									---	---	33	3.8
4									---	---	23	2.5
5									---	---	26	3.4
6									---	---	169	44
7									---	---	104	30
8									---	---	33	4.8
9									---	---	34	3.1
10									---	---	39	3.3
11									---	---	39	2.8
12									---	---	47	3.7
13									---	---	103	13
14									---	---	92	14
15									---	---	71	10
16									---	---	49	5.6
17									---	---	48	4.9
18									---	---	46	4.3
19									---	---	55	4.8
20									---	---	64	5.0
21									---	---	64	4.7
22									---	---	54	4.5
23									---	---	64	5.9
24									---	---	60	4.4
25									25	.54	55	3.7
26									56	2.6	60	3.6
27									63	5.3	55	2.5
28									47	4.7	53	2.6
29									---	---	57	3.1
30									---	---	63	5.1
31									---	---	212	51
TOTAL									---	---	---	258.4

	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	334	142	38	10	50	4.2	566	106				
2	130	38	185	61	50	3.9	376	55				
3	74	19	104	31	50	3.8	380	56				
4	93	28	62	16	50	3.5	283	34				
5	83	27	50	12	48	3.1	258	26				
6	84	29	69	31	46	2.7	---	---				
7	117	42	446	368	44	2.5	---	---				
8	148	52	259	157	41	2.1	---	---				
9	54	18	144	66	41	2.1	---	---				
10	39	13	71	26	---	---	---	---				
11	34	10	263	82	---	---	---	---				
12	39	11	187	52	---	---	---	---				
13	94	27	136	37	---	---	---	---				
14	291	82	102	25	---	---	---	---				
15	107	29	68	16	---	---	---	---				
16	82	31	62	13	---	---	---	---				
17	76	28	60	12	---	---	---	---				
18	74	25	59	11	---	---	---	---				
19	102	41	58	11	---	---	---	---				
20	209	108	56	10	---	---	---	---				
21	462	353	55	9.7	---	---	---	---				
22	278	183	53	8.9	---	---	---	---				
23	207	117	52	8.1	---	---	---	---				
24	201	100	50	7.3	---	---	---	---				
25	131	59	49	6.9	---	---	---	---				
26	90	36	46	5.8	---	---	---	---				
27	76	25	47	5.5	---	---	---	---				
28	64	20	48	5.2	50	2.3	---	---				
29	53	16	49	4.8	198	18	---	---				
30	35	9.9	50	4.7	194	21	---	---				
31	---	---	50	4.3	---	---	---	---				
TOTAL	---	1718.9	---	1118.2	---	---	---	---				



## MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN

LOCATION.--Lat 44°49'00", long 96°25'10", sec. 01, in SE¼SE¼ sec.29, T.115 N., R.46 W., Yellow Medicine County, Hydrologic Unit 07020003, at culvert on County Road 15, 2.2 miles west of Burr and 6 miles northwest of Canby.

DRAINAGE AREA.--50 mi<sup>2</sup> (130 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to September 1982 (annual maximum). October 1982 to September 1983 (no winter record).

GAGE.--Water-stage recorder and crest-stage gage. Prior to Oct. 1, 1982, crest-stage only.

REMARKS.--Records fair except those below 5.0 ft<sup>3</sup>/s (0.14 m<sup>3</sup>/s), which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 189 ft<sup>3</sup>/s (5.35 m<sup>3</sup>/s) Mar. 30, 1982, gage-height, 15.76 ft (4.804 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 154 ft<sup>3</sup>/s (4.36 m<sup>3</sup>/s) Apr. 1, gage height, 15.44 ft (4.706 m); maximum gage height, 15.56 ft (4.743 m) Apr. 6; minimum observed discharge, 0.56 ft<sup>3</sup>/s (0.016 m<sup>3</sup>/s) Aug. 23, but may have been less during period of no gage-height record, July 5-17, 21-25, 28, 29, Aug. 7 to Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---				---	18	139	21	3.9	5.6	1.8	.60
2	---				---	39	101	20	4.2	3.7	1.9	.60
3	---				---	45	85	18	4.2	3.0	1.7	.60
4	---				---	38	115	16	4.1	2.4	1.8	.60
5	---				---	43	129	13	4.1	2.1	2.0	.60
6	---				---	71	133	20	4.2	2.0	2.2	.60
7	---				---	98	118	70	3.9	1.9	1.0	.60
8	---				---	43	126	48	4.0	1.7	1.0	.60
9	---				---	18	107	32	4.0	1.6	.90	.70
10	---				1.6	7.5	80	28	4.0	1.4	.90	1.0
11	---				1.6	6.6	75	24	4.0	1.3	.90	1.2
12	---				1.6	49	70	19	4.2	1.2	.90	1.5
13	---				2.0	51	58	21	5.5	1.2	.80	1.6
14	---				5.0	57	10	21	11	1.2	.80	1.9
15	---				8.0	48	7.5	19	14	1.2	.80	2.1
16	---				4.0	38	29	16	7.4	1.2	.70	2.1
17	---				8.0	38	87	12	5.7	1.2	.70	2.1
18	2.6				8.0	42	63	10	5.3	3.1	.70	2.0
19	2.9				10	40	71	10	5.2	3.2	.70	1.9
20	3.1				5.0	35	122	10	5.5	2.1	.70	1.8
21	2.9				5.0	29	128	9.3	5.0	1.3	.60	1.7
22	3.1				8.0	26	128	8.4	3.9	1.3	.60	1.6
23	3.1				21	23	119	7.2	3.4	1.3	.60	1.5
24	2.9				12	28	92	5.1	3.1	1.3	.60	1.4
25	2.9				14	26	73	4.2	2.8	1.3	.60	1.3
26	2.6				11	21	59	3.7	2.0	1.3	.60	1.2
27	2.6				13	26	44	3.8	1.8	1.3	.60	1.2
28	---				27	10	33	3.8	2.0	1.2	.60	1.2
29	---				---	12	27	3.9	4.3	1.2	.60	1.2
30	---				---	14	24	3.9	7.2	1.2	.60	1.2
31	---				---	38	---	3.9	---	1.7	.60	---
TOTAL	---				---	1078.1	2452.5	505.2	143.9	56.7	29.50	38.20
MEAN	---				---	34.8	81.8	16.3	4.80	1.83	.95	1.27
MAX	---				---	98	139	70	14	5.6	2.2	2.1
MIN	---				---	6.6	7.5	3.7	1.8	1.2	.60	.60
CFSM	---				---	.70	1.64	.33	.10	.04	.02	.03
IN.	---				---	.80	1.82	.38	.11	.04	.02	.03
AC-FT	---				---	2140	4860	1000	285	112	59	76

## MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-83.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: February to June 1983.

REMARKS.--Letter E indicates estimated value. Letter K indicates non-ideal colony count. Once weekly samples collected by observer during periods of base flow, twice daily samples collected during periods of high-medium flow and 1-7 samples collected during runoff events by automatic sampler.

EXTREMES FOR CURRENT PERIOD.--February to June 1983:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 435 mg/L Apr. 1; minimum daily mean, 13 mg/L May 21, 22.

SEDIMENT LOADS: Maximum daily mean during period, 163 tons (148 tonnes) Apr. 1; minimum daily mean, 0.29 ton (0.26 tonne) May 22.

## WATER QUALITY DATA. WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOC- CI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT											
14...	1300	4.0	--	--	--	--	--	--	--	--	--
27...	1305	2.5	770	789	--	715	--	9.0	11.7	150	420
FEB											
10...	1415	1.6	859	885	--	720	-1.0	.0	12.1	61	K3400
24...	1448	E13	440	--	8.0	727	--	.0	13.0	--	--
28...	1220	32	420	--	--	--	--	1.0	--	--	--
MAR											
02...	1430	56	470	--	7.9	--	4.5	.5	--	--	--
02-04	1430	46	--	487	--	--	--	--	--	--	--
03...	1810	43	444	--	8.5	713	--	.5	11.2	--	--
04...	1435	38	437	--	8.0	710	12.5	1.0	10.0	--	--
31...	1230	31	--	--	--	--	--	--	--	--	--
APR											
01-05	0030	100	--	--	--	--	--	--	--	--	--
04...	1430	112	--	--	--	--	--	2.5	--	--	--
05...	1245	128	550	--	8.4	E720	--	2.0	17.0	--	--
05-08	1830	125	--	572	--	--	--	--	--	--	--
06...	1248	138	540	--	7.8	724	--	1.5	13.0	120	2100
07...	1240	118	550	--	8.2	725	8.5	4.0	12.3	--	--
08...	1145	128	554	--	8.2	727	--	4.5	12.0	--	--
08-11	1230	98	--	--	--	--	--	--	--	--	--
11...	1230	77	626	--	8.2	E725	--	7.5	13.0	--	--
16...	1030	11	--	--	--	--	--	--	--	--	--
16-21	1030	134	--	--	--	--	--	--	--	--	--
21...	1630	134	628	--	7.9	E725	--	10.0	10.2	--	--
21-26	1630	99	--	693	--	--	--	--	--	--	--
26...	1412	60	770	--	--	--	--	--	--	--	--
26-28	1745	42	--	718	--	--	--	--	--	--	--
28...	1414	33	--	--	--	--	--	--	--	--	--
28-30	1800	22	--	--	--	--	--	--	--	--	--
MAY											
01-04	1800	22	--	--	--	--	--	--	--	--	--
06-09	1630	48	--	725	--	--	--	--	--	--	--
25...	1500	4.2	832	--	8.3	727	--	17.5	12.6	1000	540
JUN											
22...	1400	4.0	798	811	8.0	725	--	27.0	8.3	--	--
JUL											
12...	1215	1.2	867	--	8.0	728	--	22.0	7.9	780	520
26...	1345	1.3	865	--	8.1	724	25.5	25.5	8.7	--	--
AUG											
23...	1055	.50	850	857	8.0	727	22.0	20.5	7.7	470	710
SEP											
15...	1310	2.2	734	--	8.0	721	15.5	14.0	8.3	--	--
26...	1235	1.2	856	--	8.2	E720	25.0	13.5	10.5	--	--

## MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - AS CAC03) (99430)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)
OCT											
14...	--	--	--	--	--	--	--	--	--	--	--
27...	100	35	7.8	4.5	370	304	292	150	3.2	.30	21
FEB											
10...	120	41	8.6	3.6	402	330	334	180	3.1	.20	29
24...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
MAR											
02...	--	--	--	--	225	185	--	--	--	--	--
02-04	61	20	5.1	7.6	--	--	161	81	5.9	.20	17
03...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--	--
APR											
01-05	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	229	188	--	--	--	--	--
05-08	71	27	7.5	5.2	--	--	164	130	6.8	.20	16
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	--	--	--	--	--	--	--	--
08-11	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--	--
16-21	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
21-26	86	34	9.3	5.2	--	--	192	170	8.1	.20	8.2
26...	--	--	--	--	--	--	--	--	--	--	--
26-28	89	37	10	4.9	--	--	209	170	8.2	.20	5.8
28...	--	--	--	--	--	--	--	--	--	--	--
28-30	--	--	--	--	--	--	--	--	--	--	--
MAY											
01-04	--	--	--	--	--	--	--	--	--	--	--
06-09	--	--	--	--	--	--	--	--	8.0	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
JUN											
22...	100	42	9.4	5.1	--	--	237	170	5.8	.40	18
JUL											
12...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
AUG											
23...	110	45	10	6.0	364	298	198	200	4.0	.20	28
SEP											
15...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--

DATE	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
MAR							
04...	--	--	--	--	--	--	--
APR							
06...	12	18	28	39	57	74	100

## MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L) AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L) AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS- SOLVED (MG/L) AS N) (00623)	PHOS- PHORUS, TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L) AS P) (00666)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT									
14...	--	--	--	--	--	--	--	.050	83
27...	556	<.100	.090	--	.50	--	<.010	--	18
FEB									
10...	590	.410	--	--	.50	--	.030	--	--
24...	--	--	--	--	2.2	--	.300	--	26
28...	--	--	--	--	--	--	--	--	--
MAR									
02...	--	.370	--	--	2.0	--	.140	--	186
02-04	320	--	--	--	--	--	--	--	--
03...	--	--	--	--	--	--	--	--	58
04...	--	--	--	--	--	--	--	--	72
31...	--	.760	--	--	1.6	--	.280	--	--
APR									
01-05	--	1.00	--	--	1.4	--	.250	--	--
04...	--	--	--	--	--	--	--	--	96
05...	--	--	--	--	--	--	--	--	142
05-08	418	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	138
07...	--	--	--	--	--	--	--	--	78
08...	--	--	--	--	--	--	--	--	99
08-11	--	.790	--	--	1.4	--	.290	--	--
11...	--	--	--	--	--	--	--	--	--
16...	--	.460	--	--	1.1	--	.130	--	--
16-21	--	.120	--	.070	.60	.60	.110	.030	--
21...	--	--	--	--	--	--	--	--	143
21-26	484	--	--	--	--	--	--	--	--
26...	--	.110	--	--	.80	--	.080	--	86
26-28	493	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	35
28-30	--	--	--	--	--	--	.060	--	--
MAY									
01-04	--	--	--	--	--	--	.060	--	--
06-09	456	--	--	--	--	--	<.010	--	--
25...	--	--	--	--	--	--	--	--	--
JUN									
22...	555	.810	--	--	.70	--	.030	--	26
JUL									
12...	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--
AUG									
23...	622	.310	--	--	.60	--	.080	--	--
SEP									
15...	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	7

DATE	TIME	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)
MAR								
04...	1435	92	93	95	100	--	--	--
APR								
06...	1248	93	96	99	100	1	1	4

## MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1									---	---	18	.87
2									---	---	114	12
3									---	---	82	10
4									---	---	50	5.1
5									---	---	58	6.7
6									---	---	179	34
7									---	---	211	56
8									---	---	48	5.6
9									---	---	15	.73
10									---	---	20	.41
11									---	---	27	.48
12									---	---	23	3.0
13									---	---	52	7.2
14									---	---	97	15
15									---	---	73	9.5
16									---	---	50	5.1
17									---	---	24	2.5
18									---	---	24	2.7
19									---	---	24	2.6
20									---	---	25	2.4
21									---	---	43	3.4
22									---	---	45	3.2
23									68	4.0	40	2.5
24									37	1.2	36	2.7
25									34	1.3	30	2.1
26									34	1.0	25	1.4
27									48	1.7	72	5.1
28									80	5.8	23	.62
29									---	---	30	.97
30									---	---	40	1.5
31									---	---	18	56
TOTAL									---	---	---	261.38
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	435	163	53	3.0	---	---					---	---
2	148	40	50	2.7	---	---					---	---
3	90	21	53	2.6	---	---					---	---
4	103	32	57	2.5	---	---					---	---
5	141	49	55	1.9	---	---					---	---
6	135	48	57	3.1	---	---					---	---
7	78	25	139	26	---	---					---	---
8	91	31	50	6.5	---	---					---	---
9	65	19	27	2.3	---	---					---	---
10	56	12	24	1.8	---	---					---	---
11	64	13	26	1.7	---	---					---	---
12	58	11	30	1.5	---	---					---	---
13	43	6.7	58	3.3	---	---					---	---
14	28	.76	73	4.1	---	---					---	---
15	30	.61	68	3.5	---	---					49	.29
16	61	4.8	58	2.5	---	---					---	---
17	89	21	50	1.6	---	---					---	---
18	45	7.7	43	1.2	---	---					---	---
19	66	13	33	.89	---	---					---	---
20	242	80	20	.54	46	.68					---	---
21	158	55	13	.33	26	.35					---	---
22	116	40	13	.29	---	---					---	---
23	85	27	19	.37	---	---					---	---
24	84	21	22	.30	---	---					---	---
25	85	17	27	.31	---	---					---	---
26	84	13	33	.33	---	---					---	---
27	78	9.3	33	.34	---	---					---	---
28	68	6.1	33	.34	---	---					---	---
29	60	4.4	33	.35	---	---					---	---
30	55	3.6	40	.42	---	---					---	---
31	---	---	38	.40	---	---					---	---
TOTAL	---	794.97	---	77.01	---	---					---	---

## MINNESOTA RIVER BASIN

05300000 LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MN

LOCATION.--Lat 44°59'42", long 95°55'09", in SW¼SW¼ sec.27, T.118 N., R.42 W., Lac qui Parle County, Hydrologic Unit 07020003, on right bank 40 ft (12 m) downstream from highway bridge and 0.5 mi (0.8 km) southwest of village of Lac qui Parle.

DRAINAGE AREA.--983 mi<sup>2</sup> (2,546 km<sup>2</sup>).

PERIOD OF RECORD.--April 1910 to November 1914; March 1931 to current year (winter records incomplete prior to 1934). Published as "at Lac qui Parle," 1910-14.

REVISED RECORDS.--WSP 1308: 1912(M), 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 951.98 ft (290.164 m) National Geodetic Vertical Datum of 1929 (Minnesota Department of Transportation benchmark). Apr. 27, 1910, to Nov. 15, 1914, nonrecording gage at site 2 mi (3 km) downstream at different datum. Mar. 17, 1931, to Mar. 9, 1937, nonrecording gage at site 40 ft (12 m) upstream at present datum.

REMARKS.--Records good except those for winter periods, which are fair.

AVERAGE DISCHARGE.--52 years (water years 1913, 1932, 1934-83), 120 ft<sup>3</sup>/s (3.398 m<sup>3</sup>/s), 1.66 in/yr (42 mm/yr), 86,940 acre-ft/yr (107 hm<sup>3</sup>/yr); median of yearly mean discharges, 101 ft<sup>3</sup>/s (2.86 m<sup>3</sup>/s), 1.40 in/yr (36 mm/yr), 73,200 acre-ft/yr (90 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,100 ft<sup>3</sup>/s (484 m<sup>3</sup>/s) Apr. 10, 1969, gage height, 18.94 ft (5.773 m), from floodmark; maximum gage height, 19.37 ft (5.904 m) Apr. 9, 1965, from floodmark (backwater from ice); no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 885 ft<sup>3</sup>/s (25.1 m<sup>3</sup>/s) May 9, 10, gage height, 4.17 ft (1.271 m); minimum, 0.02 ft<sup>3</sup>/s (0.001 m<sup>3</sup>/s) Sept. 22; minimum gage height, 0.28 ft (0.085 m) Aug. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	2.3	14	32	10	6.5	170	234	329	108	84	10	5.6		
2	3.2	15	30	9.3	6.5	186	358	309	104	105	9.0	3.0		
3	3.2	14	35	8.8	6.5	200	735	290	105	117	7.9	2.5		
4	2.7	20	41	9.3	6.5	212	839	281	99	115	7.3	2.5		
5	2.5	19	46	8.8	6.5	250	703	279	94	124	6.7	2.3		
6	4.3	18	53	9.3	6.5	300	608	269	88	117	6.2	2.3		
7	4.0	16	44	9.3	6.5	350	615	303	85	100	6.5	2.1		
8	4.0	15	41	8.8	6.5	390	647	439	79	86	6.8	1.1		
9	5.3	15	38	9.8	6.8	360	655	788	74	71	6.0	1.1		
10	4.6	18	32	9.4	7.1	335	629	871	69	62	5.0	2.0		
11	4.6	21	28	9.2	7.8	320	603	729	65	49	4.3	5.0		
12	4.6	22	24	8.9	8.8	300	559	560	60	40	3.7	6.2		
13	4.3	21	21	8.7	10	278	544	456	61	32	4.0	3.2		
14	3.7	19	19	8.4	12	276	539	401	97	27	4.3	4.2		
15	3.7	18	18	8.0	14	316	548	363	106	25	3.2	4.2		
16	4.0	18	16	7.7	16	359	477	331	118	23	3.7	3.1		
17	4.3	18	15	7.3	20	393	414	300	159	21	5.6	2.2		
18	4.3	17	16	6.8	24	416	476	273	167	35	5.6	1.6		
19	5.3	18	16	6.8	28	389	524	254	146	45	5.6	1.1		
20	6.0	23	16	6.8	33	343	544	240	131	54	5.6	.38		
21	6.7	28	15	6.8	40	308	542	234	123	56	5.0	.11		
22	8.4	27	15	6.8	54	277	596	221	115	58	3.7	.10		
23	8.8	27	16	6.7	64	264	659	206	106	45	3.4	.72		
24	7.5	28	16	6.6	74	251	722	187	98	35	3.0	.69		
25	7.1	29	15	6.5	87	237	696	173	89	29	2.7	.46		
26	7.5	30	14	6.5	110	222	610	159	79	23	2.1	.23		
27	7.9	31	13	6.5	120	193	536	144	71	19	1.5	.09		
28	8.4	32	12	6.5	150	160	471	134	67	19	1.1	.16		
29	10	35	12	6.5	---	171	412	126	73	15	.60	.30		
30	12	34	11	6.5	---	176	365	119	79	14	1.7	1.1		
31	14	---	11	6.5	---	172	---	114	---	12	3.0	---		
TOTAL	179.2	660	731	243.8	938.5	8574	16860	9882	2915	1657	144.80	59.64		
MEAN	5.78	22.0	23.6	7.86	33.5	277	562	319	97.2	53.5	4.67	1.99		
MAX	14	35	53	10	150	416	839	871	167	124	10	6.2		
MIN	2.3	14	11	6.5	6.5	160	234	114	60	12	.60	.09		
CFSM	.006	.02	.02	.008	.03	.28	.57	.33	.10	.05	.005	.002		
IN.	.01	.02	.03	.01	.04	.32	.64	.37	.11	.06	.01	.00		
AC-FT	355	1310	1450	484	1860	17010	33440	19600	5780	3290	287	118		
CAL YR 1982	TOTAL	16118.24	MEAN	44.2	MAX	1260	MIN	.60	CFSM	.05	IN	.61	AC-FT	31970
WTR YR 1983	TOTAL	42844.94	MEAN	117	MAX	871	MIN	.09	CFSM	.12	IN	1.62	AC-FT	84980

## MINNESOTA RIVER BASIN

05301000 MINNESOTA RIVER NEAR LAC QUI PARLE, MN

LOCATION.--Lat 45°01'17", long 95°52'05", in NW¼NE¼ sec.24, T.118 N., R.42 W., Chippewa County, Hydrologic Unit 07020004, on left bank 200 ft (61 m) downstream from dam at Lac qui Parle Outlet, 2.4 mi (3.9 km) northeast of village of Lac qui Parle, and 3.5 mi (5.6 km) west of Watson.

DRAINAGE AREA.--4,050 mi<sup>2</sup> (10,500 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--October 1942 to current year.

GAGE.--Water-stage recorder. Datum of gage is 900.00 ft (274.320 m) National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Nov. 10, 1944, at datum 0.20 ft (0.061 m) lower.

REMARKS.--Records good. Part of flow from 2,050 mi<sup>2</sup> (5,310 km<sup>2</sup>) of Chippewa River basin at times diverted into Minnesota River above station. Some regulation by Big Stone Lake since Apr. 17, 1937, Lac qui Parle since January 1938, Marsh Lake since Nov. 1, 1939, and Odessa Dam since May 1974.

AVERAGE DISCHARGE.--41 years, 615 ft<sup>3</sup>/s (17.42 m<sup>3</sup>/s), 445,600 acre-ft/yr (549 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,400 ft<sup>3</sup>/s (833 m<sup>3</sup>/s) Apr. 12, 1969, gage height, 39.75 ft (12.116 m); no flow Nov. 17, 1942, Sept. 29, 1947, Oct. 19 to Nov. 18, 1951, Nov. 24, 1952, Dec. 9-11, 1976, Feb. 28 to Mar. 5, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,670 ft<sup>3</sup>/s (47.3 m<sup>3</sup>/s) Apr. 14, gage height, 26.85 ft (8.184 m); minimum, 36 ft<sup>3</sup>/s (1.02 m<sup>3</sup>/s) July 19, gage height, 20.51 ft (6.251 m), due to regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	160	226	382	216	248	329	1020	1310	262	571	178	173
2	184	227	384	217	290	401	1140	1190	264	964	175	274
3	182	217	381	219	350	547	1150	860	261	976	172	319
4	180	217	384	218	345	630	1200	853	252	960	171	323
5	181	211	383	219	340	764	1390	850	252	950	172	318
6	221	213	385	214	339	773	1460	860	254	903	176	369
7	292	213	387	214	335	934	1470	874	258	769	178	409
8	285	213	388	219	329	1230	1480	885	257	717	175	407
9	293	218	394	217	331	1330	1480	898	258	653	173	429
10	311	218	387	215	328	1310	1480	910	262	650	171	497
11	329	221	389	213	325	1300	1490	921	262	646	175	488
12	399	219	394	213	326	1290	1490	970	259	531	160	523
13	624	218	389	213	324	1280	1510	1130	226	358	122	604
14	663	216	371	212	323	1280	1600	1220	247	180	122	607
15	697	214	332	215	322	1280	1520	1190	423	173	89	540
16	734	214	308	217	321	1280	1510	1180	576	134	48	366
17	724	214	270	217	321	1280	1500	1180	576	87	47	364
18	739	218	250	220	324	1280	1480	1180	580	169	48	366
19	810	220	250	222	320	1280	1380	1170	583	93	48	366
20	822	219	251	221	320	1280	1330	1120	542	308	49	367
21	782	220	242	221	319	1270	1320	1030	345	315	48	369
22	687	274	224	221	317	1260	1320	1030	344	316	48	368
23	555	330	223	221	322	1250	1330	912	349	314	48	333
24	552	353	222	219	320	1230	1330	746	353	315	48	267
25	402	382	215	219	324	1080	1330	702	353	180	48	267
26	226	379	218	219	325	852	1330	446	354	173	48	269
27	225	383	216	219	324	848	1330	253	356	164	48	237
28	227	380	216	219	327	846	1330	249	363	160	50	195
29	222	381	216	218	---	855	1330	245	372	163	53	195
30	223	382	216	220	---	891	1320	248	374	182	63	196
31	226	---	216	221	---	974	---	254	---	178	152	---
TOTAL	13157	7810	9483	6748	9039	32434	41350	26866	10417	13252	3303	10805
MEAN	424	260	306	218	323	1046	1378	867	347	427	107	360
MAX	822	383	394	222	350	1330	1600	1310	583	976	178	607
MIN	160	211	215	212	248	329	1020	245	226	87	47	173
CFSM	.11	.06	.08	.05	.08	.26	.34	.21	.09	.11	.03	.09
IN.	.12	.07	.09	.06	.08	.30	.38	.25	.10	.12	.03	.10
AC-FT	26100	15490	18810	13380	17930	64330	82020	53290	20660	26290	6550	21430
CAL YR 1982	TOTAL	191530	MEAN 525	MAX 3340	MIN 14	CFSM .13	IN 1.76	AC-FT 379900				
WTR YR 1983	TOTAL	184664	MEAN 506	MAX 1600	MIN 47	CFSM .13	IN 1.70	AC-FT 366300				

## MINNESOTA RIVER BASIN

## 05304500 CHIPPEWA RIVER NEAR MILAN, MN

LOCATION.--Lat 45°06'39", long 95°47'57", in SE¼SE¼ sec.16, T.119 N., R.41 W., Chippewa County, Hydrologic Unit 07020005, on right bank 800 ft (240 m) upstream from bridge on State Highway 40, 2.0 mi (3.2 km) upstream from small tributary, and 5.5 mi (8.8 km) east of Milan.

DRAINAGE AREA.--1,870 mi<sup>2</sup> (4,840 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--March 1937 to current year.

REVISED RECORDS.--WSP 1145: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 959.69 ft (292.514 m) National Geodetic Vertical Datum of 1929.

Prior to June 15, 1942, nonrecording gage on bridge 800 ft (240 m) downstream at same datum.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by several small lakes above gage.

AVERAGE DISCHARGE.--46 years, 269 ft<sup>3</sup>/s (7.618 m<sup>3</sup>/s), 1.95 in/yr (50 mm/yr), 194,900 acre-ft/yr (240 hm<sup>3</sup>/yr); median of yearly mean discharges, 223 ft<sup>3</sup>/s (6.32 m<sup>3</sup>/s), 1.62 in/yr (41 mm/yr), 162,000 acre-ft/yr (200 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,400 ft<sup>3</sup>/s (323 m<sup>3</sup>/s) Apr. 9, 1969, gage height, 15.45 ft (4.709 m); no flow at times during 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 400 ft<sup>3</sup>/s (11.3 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Oct. 11	0015	739 20.9	3.41 1.039	June 15	1745	776 22.0	3.49 1.064
Nov. 21	1130	440 12.5	a3.42 1.042	June 22	1545	830 23.5	3.57 1.088
Dec. 6	1100	432 12.2	a3.18 0.969	June 27	1530	1,230 34.8	4.28 1.305
Mar. 7	0500	636 18.0	a5.70 1.737	July 1	0845	*1,440 40.8	4.66 1.420
Mar. 12	1715	1,210 34.3	*a7.95 2.423	July 19	1815	525 14.9	2.97 0.905
Apr. 14	1030	782 22.1	3.57 1.088	Aug. 31	0230	541 15.3	3.05 0.930
May 8	1000	641 18.2	3.31 1.009	Sept.11	1415	541 15.3	3.00 0.914

a Backwater from ice.

Minimum discharge, 87 ft<sup>3</sup>/s (2.46 m<sup>3</sup>/s) Nov. 13, gage height, 1.72 ft (0.524 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	164	291	335	165	137	300	633	402	229	1400	255	451
2	173	287	320	165	137	390	656	385	223	1220	239	401
3	196	279	320	160	137	410	671	377	232	1110	231	349
4	214	270	320	160	137	440	674	366	225	1040	216	321
5	216	245	320	155	137	470	671	354	215	992	206	320
6	237	260	340	150	137	500	676	354	206	933	195	340
7	284	250	330	150	137	525	707	437	198	855	185	334
8	336	246	300	150	137	390	712	610	196	785	176	318
9	384	246	280	145	137	370	694	541	192	704	168	305
10	651	250	260	145	137	660	682	489	187	623	160	347
11	729	258	250	140	137	810	671	460	178	548	156	512
12	682	215	240	140	137	880	659	438	172	483	149	517
13	655	115	225	140	138	920	706	448	170	429	144	463
14	631	315	215	140	140	921	774	447	249	378	144	435
15	599	380	210	139	142	913	746	424	640	344	143	416
16	559	370	200	138	145	867	707	408	707	321	143	416
17	520	320	195	138	148	816	703	389	592	316	193	418
18	486	285	190	137	150	781	687	367	536	377	224	417
19	448	265	190	137	155	751	662	358	509	508	200	396
20	418	310	190	137	160	718	650	346	480	497	184	366
21	404	390	185	137	170	671	615	336	458	438	186	340
22	384	310	180	137	180	616	588	323	733	396	182	319
23	364	260	180	137	185	577	567	312	770	364	178	302
24	353	270	175	137	195	546	541	304	585	342	174	287
25	342	305	175	137	210	527	530	289	472	326	173	274
26	329	300	170	137	230	507	510	278	418	310	171	260
27	322	305	170	137	240	493	479	267	1010	294	170	251
28	313	320	170	137	270	481	451	259	947	283	178	243
29	308	330	170	137	---	495	432	253	823	273	186	244
30	306	350	170	137	---	499	415	247	1160	270	345	256
31	298	---	165	137	---	519	---	237	---	268	521	---
TOTAL	12305	8597	7140	4438	4502	18763	18869	11505	13712	17427	6175	10618
MEAN	397	287	230	143	161	605	629	371	457	562	199	354
MAX	729	390	340	165	270	921	774	610	1160	1400	521	517
MIN	164	115	165	137	137	300	415	237	170	268	143	243
CFSM	.21	.15	.12	.08	.09	.32	.34	.20	.24	.30	.11	.19
IN.	.24	.17	.14	.09	.09	.37	.38	.23	.27	.35	.12	.21
AC-FT	24410	17050	14160	8800	8930	37220	37430	22820	27200	34570	12250	21060
CAL YR 1982	TOTAL	153065	MEAN 419	MAX 2820	MIN 21	CFSM .22	IN 3.04	AC-FT 303600				
WTR YR 1983	TOTAL	134051	MEAN 367	MAX 1400	MIN 115	CFSM .20	IN 2.67	AC-FT 265900				



## MINNESOTA RIVER BASIN

05311000 MINNESOTA RIVER AT MONTEVIDEO, MN

LOCATION.--Lat 44°56'00", long 95°44'00", in NW¼NW¼ sec.19, T.117 N., R.40 W., Yellow Medicine County, Hydrologic Unit 07020004, on right bank 100 ft (30 m) upstream from bridge on U.S. Highway 212, at Montevideo, and 400 ft (122 m) downstream from Chippewa River.

DRAINAGE AREA.--6,180 mi<sup>2</sup> (16,000 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--July 1909 to September 1917, October 1917 to September 1929 (no winter records), October 1929 to current year. Prior to October 1939, published as "near Montevideo." Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1035: 1919(M). WSP 1085: 1935-36. WSP 1508: 1912, 1925(M), 1929(M).

GAGE.--Water-stage recorder. Datum of gage is 909.12 ft (277.100 m) National Geodetic Vertical Datum of 1929. July 22, 1909, to Feb. 4, 1932, nonrecording gage at bridge 600 ft (183 m) downstream at present datum. Feb. 5, 1932, to Nov. 26, 1934, nonrecording gage at bridge 100 ft (30 m) downstream at present datum.

REMARKS.--Records good except those for winter period, which are fair. Flow regulated by Big Stone Lake since Apr. 17, 1937, Lac qui Parle since January 1938, and Marsh Lake since Nov. 1, 1939.

AVERAGE DISCHARGE.--62 years (water years 1910-17, 1930-83), 678 ft<sup>3</sup>/s (19.20 m<sup>3</sup>/s), 491,200 acre-ft/yr (606 hm<sup>3</sup>/yr); median of yearly mean discharges, 560 ft<sup>3</sup>/s (15.9 m<sup>3</sup>/s), 405,700 acre-ft/yr (500 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,100 ft<sup>3</sup>/s (994 m<sup>3</sup>/s) Apr. 12, 1969, gage height, 21.68 ft (6.608 m), from high-water mark; no flow for several days in 1933-34, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,210 ft<sup>3</sup>/s (62.6 m<sup>3</sup>/s) Apr. 14, gage height, 8.81 ft (2.685 m); minimum, 96 ft<sup>3</sup>/s (2.72 m<sup>3</sup>/s) Aug. 22, 23, 24, gage height, 1.66 ft (0.506 m) result of regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	192	457	517	293	256	320	1320	1610	369	907	237	232
2	220	457	517	293	290	330	1450	1580	369	1340	260	336
3	250	451	517	293	340	520	1440	1270	374	1440	258	413
4	250	443	517	292	400	570	1460	1100	368	1430	255	435
5	250	441	515	290	420	770	1670	1070	368	1420	249	434
6	257	426	508	290	420	870	1840	1100	365	1410	250	434
7	368	433	500	288	420	1080	1930	1170	368	1280	255	500
8	403	437	493	288	420	1510	1980	1180	368	1220	255	510
9	431	442	486	288	415	1690	1950	1190	361	1030	255	523
10	430	455	482	286	415	1540	2000	1190	360	911	254	574
11	443	448	477	282	415	1490	1990	1190	361	829	251	577
12	460	448	475	280	415	1600	2000	1200	360	788	256	574
13	673	448	473	280	410	1670	2030	1310	369	749	214	662
14	778	415	464	280	410	1690	2140	1430	329	441	190	682
15	781	372	443	278	405	1770	2160	1430	459	396	189	683
16	807	360	419	278	405	1710	2110	1410	877	286	129	527
17	810	356	417	278	370	1700	2100	1400	1000	275	107	479
18	804	356	393	274	350	1660	2070	1390	933	283	101	476
19	989	351	360	270	340	1670	1900	1380	904	273	99	477
20	1080	361	342	268	330	1670	1770	1360	908	212	100	475
21	1070	332	338	268	325	1650	1770	1230	743	246	99	475
22	1040	312	312	268	320	1650	1770	1200	675	169	97	473
23	863	437	300	268	320	1630	1760	1160	681	381	96	471
24	836	493	297	268	315	1530	1760	931	675	412	97	389
25	797	535	295	266	315	1460	1750	882	660	417	108	369
26	574	529	295	260	315	1220	1560	723	658	419	104	364
27	530	520	295	258	315	1170	1490	444	659	416	103	364
28	475	517	295	256	320	1170	1560	386	782	295	113	281
29	463	517	293	256	---	1170	1570	372	861	255	113	265
30	457	517	293	256	---	1180	1620	365	870	245	124	268
31	457	---	293	256	---	1280	---	371	---	238	185	---
TOTAL	18238	13066	12621	8549	10191	40940	53920	34024	17434	20413	5403	13722
MEAN	588	436	407	276	364	1321	1797	1098	581	658	174	457
MAX	1080	535	517	293	420	1770	2160	1610	1000	1440	260	683
MIN	192	312	293	256	256	320	1320	365	329	169	96	232
CFSM	.10	.07	.07	.05	.06	.21	.29	.18	.09	.11	.03	.07
IN.	.11	.08	.08	.05	.06	.25	.32	.20	.10	.12	.03	.08
AC-FT	36180	25920	25030	16960	20210	81200	107000	67490	34580	40490	10720	27220
CAL YR 1982	TOTAL	248237	MEAN 680	MAX 4260	MIN 34	CFSM .11	IN 1.49	AC-FT	492400			
WTR YR 1983	TOTAL	248521	MEAN 681	MAX 2160	MIN 96	CFSM .11	IN 1.50	AC-FT	492900			

## MINNESOTA RIVER BASIN

443636096095402 DILLON-SYLTIE IMPOUNDMENT INLET NEAR PORTER, MN

LOCATION.--Lat 44°36'05", long 96°10'22", in NW¼NW¼ sec.16, T.113 N., R.44 W., Lincoln County, Hydrologic Unit 07020004, 0.15 mi (0.24 km) downstream of bridge on County Highway 7, 2.2 mi (3.5 km) south of Porter.

DRAINAGE AREA.--4.78 mi<sup>2</sup> (12.37 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January to November 1980, March to September 1981, March to October 1982, and March to September 1983.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Water-stage recorder operated only during open-water period. Records good except those for period of no gage-height record, Feb. 9 to Mar. 14, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 193 ft<sup>3</sup>/s (5.47 m<sup>3</sup>/s) June 5, 1980, gage height, 30.73 ft (9.367 m); no flow on many days each year.

EXTREMES FOR CURRENT PERIOD.--October 1982, March to September 1983: Maximum discharge during period, 117 ft<sup>3</sup>/s (3.313 m<sup>3</sup>/s) July 2, gage height, 30.58 ft (9.321 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	7.0	22	1.8	.40	2.6	.00	.00
2	.00				---	6.0	7.6	6.3	.38	14	.00	.00
3	.00				---	4.0	5.2	2.9	.53	7.4	.00	.00
4	.00				---	5.0	6.1	2.1	.54	2.2	.00	.00
5	.00				---	7.0	4.3	1.7	.35	1.6	.00	.00
6	.00				---	22	5.0	22	.27	1.1	.00	.00
7	.00				---	21	6.7	37	.20	.81	.00	.00
8	.00				---	5.0	5.5	5.5	.17	.50	.00	.00
9	.00				.20	2.0	3.7	3.1	.06	.33	.00	.00
10	.00				.20	2.0	3.5	2.2	.00	.17	.00	.00
11	.00				.20	3.0	2.8	2.2	.00	.07	.00	.00
12	.03				.20	4.0	2.6	2.2	.00	.02	.00	.00
13	.08				.20	11	3.3	2.2	.81	.00	.00	.00
14	.14				.40	12	2.4	2.1	8.5	.00	.00	.00
15	.14				.60	8.2	2.3	2.1	4.0	.00	.00	.00
16	.06				.40	5.5	9.0	1.9	1.5	.00	.00	.00
17	.01				.60	4.4	13	1.7	1.1	.00	.00	.00
18	.00				.60	4.1	8.2	1.6	.99	.34	.00	.00
19	.00				.60	3.7	11	1.8	1.0	.02	.00	.00
20	.00				.60	3.2	11	1.8	.95	.05	.00	.00
21	.00				.60	2.8	9.0	1.6	.99	.00	.00	.00
22	.49				.60	2.6	6.3	1.2	.70	.00	.00	.00
23	.81				1.0	2.4	4.3	.93	.41	.00	.00	.00
24	.85				1.0	2.6	3.1	.81	.26	.00	.00	.00
25	.70				.40	2.8	2.6	.65	.14	.00	.00	.00
26	.58				.40	2.5	2.5	.65	.05	.00	.00	.00
27	.50				1.0	2.7	2.4	.55	.02	.00	.00	.00
28	---				3.0	2.6	1.8	.50	.60	.00	.00	.00
29	---				---	2.9	2.1	.37	12	.00	.00	.00
30	---				---	3.5	2.0	.37	9.5	.00	.00	.00
31	---				---	25	---	.40	---	.00	.00	---
TOTAL	---				---	192.5	171.3	112.23	46.42	31.21	.00	.00
MEAN	---				---	6.21	5.71	3.62	1.55	1.01	.000	.000
MAX	---				---	25	22	37	12	14	.00	.00
MIN	---				---	2.0	1.8	.37	.00	.00	.00	.00
AC-FT	---				---	382	340	223	92	62	.00	.00

## MINNESOTA RIVER BASIN

443636096095402 DILLON-SYLTIE IMPOUNDMENT INLET NEAR PORTER, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980, 1982-83.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March to July 1983.

REMARKS.--Letter E indicates estimated value. Letter K indicates non-ideal colony count. Daily suspended-sediment concentration was estimated using a limited number of samples collected by USGS personnel during periods of low flow. During periods of higher flows, March 31-April 1, May 6-7, and July 2, daily suspended-sediment concentrations were defined by samples from an automatic sampler; records are fair.

EXTREMES FOR CURRENT PERIOD.--March to July 1983:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 278 mg/L July 2; minimum daily mean, 4 mg/L July 4.

SEDIMENT LOADS: Maximum daily mean during period, 39 tons (35 tonnes) July 2; minimum daily mean, 0.02 ton (0.02 tonne) July 4.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT											
14...	1500	.14	--	--	--	--	--	--	--	--	--
27...	0930	.50	1220	1250	7.6	721	--	7.5	8.5	240	540
FEB											
10...	1230	E.20	1280	--	7.8	726	-1.0	.5	15.0	--	--
MAR											
01...	1400	6.4	930	--	--	724	4.5	1.5	--	--	--
01-03	1400	E6.0	--	913	--	--	--	--	--	--	--
02...	1218	6.0	885	--	--	722	5.0	1.5	--	--	--
04...	1008	6.4	990	--	7.8	717	9.5	3.5	9.3	--	--
31-31	1330	55	--	578	--	--	--	--	--	--	--
APR											
01-01	1330	55	--	578	--	--	--	--	--	--	--
MAR											
31...	1915	101	527	578	8.5	720	--	4.0	9.2	--	--
APR											
01...	1306	15	723	--	8.2	724	2.5	2.5	12.0	--	--
04...	1220	5.5	--	--	--	--	--	--	--	--	--
07...	1501	5.7	1110	--	8.0	730	11.0	8.0	10.9	K2	320
08...	1006	5.5	1090	1150	8.3	E734	--	5.5	12.0	--	--
16...	1000	9.0	--	--	--	--	--	--	--	--	--
21...	1140	8.1	837	--	8.5	728	18.0	9.0	12.0	--	--
29...	0914	2.2	--	--	--	--	--	--	--	--	--
MAY											
06-07	1715	66	--	721	--	--	--	--	--	--	--
25...	1200	.69	1150	--	8.1	E735	--	11.5	10.3	--	--
JUN											
08...	1250	.12	1170	--	8.1	E727	--	16.0	9.0	--	--
21...	1245	1.1	1240	1270	8.0	728	--	21.5	8.5	--	--
JUL											
02-02	0800	48	--	--	--	--	--	--	--	--	--

DATE	TIME	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)
MAR					
31...	1915	73	87	97	98

## MINNESOTA RIVER BASIN

443636096095402 DILLON-SYLTE IMPOUNDMENT INLET NEAR PORTER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	CAR- BONATE IT-FLD (MG/L AS CO3) (99445)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - AS CAC03) (99430)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
OCT										
14...	--	--	--	--	--	--	--	--	--	--
27...	160	58	18	5.6	429	--	352	361	370	6.2
FEB										
10...	--	--	--	--	419	--	344	--	--	--
MAR										
01...	--	--	--	--	292	--	239	--	--	--
01-03	--	--	--	--	--	--	--	--	--	5.9
02...	--	--	--	--	300	--	246	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
31-31	66	28	12	4.9	--	--	--	123	160	4.3
APR										
01-01	66	28	12	4.9	--	--	--	123	160	4.3
MAR										
31...	66	28	12	4.9	--	--	--	123	160	4.3
APR										
01...	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	277	4.0	227	--	--	--
08...	140	62	24	4.4	--	--	--	--	--	7.1
16...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
MAY										
06-07	--	--	--	--	--	--	--	--	--	5.1
25...	--	--	--	--	--	--	--	--	--	--
JUN										
08...	--	--	--	--	--	--	--	--	--	--
21...	170	70	22	3.0	--	--	--	320	410	5.4
JUL										
02-02	--	--	--	--	--	--	--	--	--	7.8

DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) (70300)	SOLIDS, NON- VOLA- TILE, DIS- SOLVED (MG/L) (00525)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT										
14...	--	--	--	--	--	--	--	--	.08	--
27...	.40	23	937	--	<.10	<.10	.15	.70	.13	19
FEB										
10...	--	--	--	--	--	--	--	--	.04	--
MAR										
01...	--	--	--	--	--	1.5	--	.80	.11	10
01-03	--	--	--	615	--	--	--	--	--	--
02...	--	--	--	--	--	--	--	--	--	8
04...	--	--	--	--	--	--	--	--	--	15
31-31	.20	13	395	--	--	2.2	--	1.6	.23	--
APR										
01-01	.20	13	395	--	--	2.2	--	1.6	.23	--
MAR										
31...	.20	13	395	--	--	2.2	--	1.6	.23	184
APR										
01...	--	--	--	--	--	--	--	--	--	34
04...	--	--	--	--	--	--	--	--	--	20
07...	--	--	--	--	--	--	--	--	--	20
08...	--	--	--	--	--	2.2	--	.60	.05	--
16...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	16
29...	--	--	--	--	--	--	--	--	.02	54
MAY										
06-07	--	--	--	472	--	--	--	--	<.01	--
25...	--	--	--	--	--	--	--	--	--	--
JUN										
08...	--	--	--	--	--	--	--	--	--	--
21...	.50	23	978	--	--	1.0	--	1.0	.07	--
JUL										
02-02	--	--	--	507	--	--	--	--	.16	--

## MINNESOTA RIVER BASIN

443636096095402 DILLON-SYLTE IMPOUNDMENT INLET NEAR PORTER, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											8	.15
2											7	.11
3											8	.09
4											14	.19
5											---	---
6											---	---
7											---	---
8											---	---
9											---	---
10											---	---
11											---	---
12											---	---
13											---	---
14											---	---
15											---	---
16											---	---
17											---	---
18											---	---
19											---	---
20											---	---
21											---	---
22											---	---
23											---	---
24											---	---
25											---	---
26											---	---
27											---	---
28											---	---
29											---	---
30											---	---
31											96	16
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	53	4.1	53	.26	---	---	15	.11				
2	20	.41	80	1.4	---	---	278	39				
3	20	.28	49	.38	---	---	5	.10				
4	23	.38	45	.26	---	---	4	.02				
5	20	.23	44	.20	---	---	---	---				
6	21	.28	193	25	---	---	---	---				
7	28	.51	215	30	---	---	---	---				
8	21	.31	56	.83	---	---	---	---				
9	21	.21	55	.46	---	---	---	---				
10	21	.20	55	.33	---	---	---	---				
11	21	.16	---	---	---	---	---	---				
12	20	.14	---	---	---	---	---	---				
13	21	.19	---	---	---	---	---	---				
14	20	.13	---	---	---	---	---	---				
15	21	.13	---	---	---	---	---	---				
16	23	.56	---	---	---	---	---	---				
17	23	.81	---	---	---	---	---	---				
18	13	.29	---	---	---	---	---	---				
19	23	.68	---	---	---	---	---	---				
20	18	.53	---	---	---	---	---	---				
21	20	.49	---	---	---	---	---	---				
22	23	.39	---	---	---	---	---	---				
23	27	.31	---	---	---	---	---	---				
24	32	.27	---	---	---	---	---	---				
25	36	.25	---	---	---	---	---	---				
26	40	.27	---	---	---	---	---	---				
27	48	.31	---	---	---	---	---	---				
28	49	.24	---	---	---	---	---	---				
29	53	.30	---	---	145	9.5	---	---				
30	54	.29	---	---	43	1.1	---	---				
31	---	---	---	---	---	---	---	---				
TOTAL	---	13.65	---	---	---	---	---	---				

## MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTIE IMPOUNDMENT NEAR PORTER, MN

LOCATION.--Lat 44°36'36", long 96°09'54", in center of sec.9, T.113 N., R.44 W., Lincoln County, Hydrologic Unit 07020004, 0.5 mi (0.8 km) east of County Highway 7, 1.6 mi (2.6 km) south of Porter.

DRAINAGE AREA.--4.8 mi<sup>2</sup> (12.4 km<sup>2</sup>).

## RESERVOIR-STAGE RECORDS

PERIOD OF RECORD.--May to November 1980, March to September 1981, March to October 1982, and March to September 1983.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Water-stage recorder operated only during open-water period. Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 19.46 ft (5.931 m) July 2, 1983, minimum recorded, 16.20 ft (4.938 m) Nov. 3, 1980.

EXTREMES FOR CURRENT PERIOD.--October 1982, February to September 30, 1983: Maximum gage height during period, 19.46 ft (5.931 m) July 2; minimum, 16.42 ft (5.005 m) Sept. 28.

Date	Gage height (feet)	Date	Gage height (feet)	Date	Gage height (feet)	Date	Gage height (feet)
Oct. 27	16.88	Apr. 30	17.99	June 30	18.96	Aug. 31	16.85
Mar. 31	18.40	May 31	17.80	July 31	17.50	Sept. 30	16.52

## MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTIE IMPOUNDMENT NEAR PORTER, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980-83.

REMARKS.--Letter E indicates estimated value.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT						
14...	1408	.50	869	7.7	10.5	9.3
14...	1410	3.00	867	7.9	10.5	9.2
14...	1412	6.00	867	7.9	10.5	9.2
14...	1414	9.00	868	7.9	10.0	9.2
14...	1416	11.0	869	7.9	10.0	9.2
27...	1004	.50	885	7.6	8.0	9.5
27...	1007	3.00	884	7.8	8.0	9.4
27...	1010	6.00	884	7.8	8.0	9.3
27...	1013	9.00	884	7.8	8.0	9.3
27...	1015	12.5	885	7.8	8.0	9.3
FEB						
09...	1450	2.00	1220	7.5	1.0	9.9
09...	1455	3.00	1220	7.5	2.5	10.2
09...	1500	6.00	1220	7.4	3.0	9.3
09...	1505	9.00	1220	7.4	3.0	8.8
09...	1510	12.0	1250	7.2	4.0	5.7
09...	1512	13.0	1270	--	4.0	4.6
25...	1503	2.00	633	--	1.0	11.8
25...	1506	3.00	--	--	2.0	10.7
25...	1509	6.00	1200	--	3.5	7.6
25...	1512	9.00	1200	--	4.0	7.8
25...	1515	12.0	1210	--	4.0	5.4
25...	1518	15.0	1260	--	4.5	3.1
APR						
07...	1405	.50	898	7.9	4.0	12.6
07...	1408	3.00	898	8.0	4.0	12.6
07...	1410	6.00	900	8.0	4.0	12.6
07...	1415	9.00	900	8.0	3.5	12.6
07...	1418	12.0	903	8.1	3.5	12.6
21...	1300	.50	1000	8.3	7.5	14.1
21...	1303	3.00	1000	8.3	7.0	14.0
21...	1306	6.00	1010	8.3	7.0	14.0
21...	1309	9.00	1030	8.3	6.0	14.1
21...	1312	12.0	1030	8.3	5.5	13.8
21...	1315	13.5	1040	8.2	5.5	12.7
JUN						
08...	1158	.50	972	8.3	17.5	10.6
08...	1200	3.00	971	8.3	17.5	10.2
08...	1202	6.00	969	8.2	17.0	10.1
08...	1204	9.00	975	8.1	16.5	8.6
08...	1205	12.0	975	8.0	16.0	8.2
21...	1000	.50	1020	8.2	22.0	9.8
21...	1015	3.00	1010	8.2	22.0	9.5
21...	1030	6.00	1020	8.0	20.5	8.6
21...	1040	9.00	1020	7.9	20.0	7.5
21...	1045	12.0	1040	7.8	19.0	5.5
JUL						
12...	0955	.50	963	8.1	24.0	10.8
12...	1000	3.00	967	--	23.5	10.7
12...	1002	6.00	967	--	23.5	10.3
12...	1004	9.00	968	--	23.5	10.1
12...	1005	12.0	1000	7.7	22.5	2.8
26...	1055	.50	943	8.1	26.5	8.2
26...	1100	3.00	948	8.1	26.5	7.7
26...	1105	6.00	948	8.1	26.5	7.7
26...	1115	9.00	955	7.9	26.0	5.8
26...	1130	10.5	961	7.5	25.5	2.1
AUG						
10...	1317	.50	954	7.6	26.0	7.0
10...	1321	3.00	956	8.1	25.5	6.9
10...	1322	6.00	958	8.0	25.5	6.8
10...	1323	9.00	956	8.0	25.5	6.6
10...	1325	11.0	956	8.0	25.5	6.4
25...	1010	.50	959	8.3	24.5	7.2
25...	1015	3.00	959	8.3	24.5	7.2
25...	1018	6.00	963	8.2	24.5	4.8
25...	1020	9.00	967	7.9	24.0	3.7
25...	1025	11.3	968	7.8	24.0	2.3

## MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTE IMPOUNDMENT NEAR PORTER, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)				
SEP										
15...	0915	.50	938	8.4	17.0	8.1				
15...	0918	3.00	940	8.3	16.5	8.0				
15...	0925	6.00	941	8.3	16.5	8.0				
15...	0928	9.00	942	8.3	16.5	7.8				
15...	0930	10.5	942	8.3	16.5	7.6				
26...	1345	.50	935	8.9	16.5	13.7				
26...	1348	3.00	938	8.9	14.0	11.4				
26...	1353	6.00	943	8.8	12.5	10.5				
26...	1355	9.00	940	8.8	12.0	9.6				
DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	DEPTH TO BOT- TOM OF SAMPLE INTER- VAL (FT) (72016)	RESER- VOIR DEPTH (FEET) (72025)	RESER- VOIR STAGE (FT ABOVE DATUM) (00065)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)
OCT										
14...	1411	--	4.5	11.9	16.93	--	--	--	--	--
27...	1006	--	6.0	--	16.93	--	--	--	--	--
27...	1015	12.5	--	--	--	885	904	--	721	--
FEB										
09...	1458	--	6.0	13.6	16.93	--	1250	--	727	-2.0
09...	1512	13.0	--	--	--	1270	--	--	727	--
APR										
07...	1407	--	4.0	13.1	18.18	--	--	--	--	11.0
07...	1418	12.0	--	--	--	903	--	8.1	731	--
21...	1304	--	4.5	13.9	18.29	--	--	--	--	--
MAY										
25...	1135	14.0	--	--	--	--	--	--	--	--
JUN										
08...	1201	--	7.2	12.6	17.77	--	--	--	--	--
08...	1205	12.0	--	--	--	975	--	8.0	727	--
21...	1018	--	6.0	13.0	17.94	1010	1060	--	730	--
JUL										
12...	0957	--	5.2	--	17.78	--	--	--	733	23.0
12...	1005	12.0	--	--	--	1000	--	7.7	733	--
26...	1058	--	7.2	13.0	17.60	--	--	--	730	24.5
26...	1130	10.5	--	--	--	961	--	7.5	730	24.5
AUG										
10...	1320	--	3.4	11.0	17.20	--	--	--	726	29.5
25...	1014	--	5.7	12.0	16.92	--	969	--	732	26.0
25...	1025	11.3	--	--	--	968	968	7.8	732	--
SEP										
15...	0920	--	4.8	10.7	16.67	--	--	--	725	15.5
15...	0930	10.5	--	--	--	942	--	8.3	725	--
26...	1350	--	4.8	11.2	16.47	--	--	--	733	27.0
26...	1400	10.8	--	--	--	946	--	8.6	733	--



## MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTE IMPOUNDMENT NEAR PORTER, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT									
14...	--	.90	--	--	--	--	--	--	--
27...	--	1.20	--	--	--	--	--	--	--
27...	8.0	--	86	53	--	--	--	5.5	--
FEB									
09...	--	1.20	160	71	--	--	--	6.8	--
09...	4.0	--	--	--	--	--	--	--	--
APR									
07...	--	.70	--	--	--	--	--	--	--
07...	3.5	--	--	--	--	--	--	--	--
21...	--	1.00	--	--	--	--	--	--	--
MAY									
25...	--	--	--	--	--	--	--	--	--
JUN									
08...	--	1.50	--	--	--	--	--	--	--
08...	16.0	--	--	--	--	--	--	--	--
21...	22.0	1.20	130	57	20	4.6	380	1.6	.50
JUL									
12...	--	--	--	--	--	--	--	--	--
12...	22.5	1.10	--	--	--	--	--	--	--
26...	--	1.50	--	--	--	--	--	--	--
26...	25.5	--	--	--	--	--	--	--	--
AUG									
10...	--	.70	--	--	--	--	--	--	--
25...	--	1.20	100	60	--	--	--	7.3	--
25...	24.0	--	100	59	--	--	--	7.3	--
SEP									
15...	--	1.00	--	--	--	--	--	--	--
15...	16.5	--	--	--	--	--	--	--	--
26...	--	1.00	--	--	--	--	--	--	--
26...	11.5	--	--	--	--	--	--	--	--

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
OCT								
14...	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--
27...	6.7	--	--	682	<.10	<.10	.09	--
FEB								
09...	18	404	331	904	--	<.10	--	.39
09...	--	--	--	--	--	--	--	--
APR								
07...	--	235	193	--	--	2.5	--	.03
07...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
MAY								
25...	--	--	--	--	--	--	--	--
JUN								
08...	--	--	--	--	--	--	--	--
08...	--	--	--	--	--	--	--	--
21...	11	282	231	800	--	--	--	--
JUL								
12...	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	.63	--	.14
26...	--	--	--	--	--	.48	--	.49
AUG								
10...	--	--	--	--	--	<.10	--	<.01
25...	9.1	207	252	746	--	.25	--	.37
25...	9.1	210	256	741	--	.14	--	.20
SEP								
15...	--	--	--	--	--	<.10	--	.02
15...	--	--	--	--	--	<.10	--	.03
26...	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--

## MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTE IMPOUNDMENT NEAR PORTER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)	PHYTO- PLANK- TON, TOTAL (CELLS PER ML) (60050)
OCT								
14...	--	--	--	.05	--	--	--	--
27...	--	--	--	--	--	--	--	3100
27...	1.1	--	.13	--	--	--	--	--
FEB								
09...	--	.60	--	.01	<.01	5.90	<.100	1500
09...	--	--	.04	--	--	--	--	--
APR								
07...	--	.40	.06	.04	.03	4.10	.110	7100
07...	.70	--	.05	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
MAY								
25...	.90	--	.04	--	--	--	--	--
JUN								
08...	--	--	.03	--	--	18.0	<.010	--
08...	--	--	.03	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	.04	--	--	--	--	26000
JUL								
12...	--	--	.06	--	--	29.0	<.100	--
12...	--	--	.05	--	--	--	--	--
26...	--	.90	.05	.04	<.01	8.80	<.100	51000
26...	--	1.2	.07	.07	.04	--	--	--
AUG								
10...	--	1.8	--	.11	.05	30.0	<.100	--
25...	--	3.0	.10	.05	.05	--	--	--
25...	--	2.3	.11	.09	.07	--	--	--
SEP								
15...	--	1.5	.12	.03	<.01	<35.0	<.100	28000
15...	--	1.6	.09	.03	<.01	--	--	--
26...	--	--	.10	--	--	43.0	<.100	--
26...	--	--	.08	--	--	--	--	--

## MINNESOTA RIVER BASIN

443636096095404 DILLON-SYLTIE IMPOUNDMENT OUTLET NEAR PORTER, MN

LOCATION.--Lat 44°36'36", long 96°09'54", in center of sec.9, T.113 N., R.44 W., Lincoln County, Hydrologic Unit 07020004, 0.5 mi (0.8 km) east of County Highway 7, 1.6 mi (2.6 km) south of Porter.

DRAINAGE AREA.--4.8 mi<sup>2</sup> (12.4 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January to November 1980, March to September 1981, March to October 1982, and March to September 1983.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Water-stage recorder operated only during open-water period. Records good except those for periods of no gage-height record, Feb. 9 to 28, May 8-24, and June 23 to July 12.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 107 ft<sup>3</sup>/s (3.03 m<sup>3</sup>/s) July 2, 1983, gage height, 19.46 ft (5.931 m); no flow on many days each year.

EXTREMES FOR CURRENT PERIOD.--October 1982, February 9 to September 30, 1983: Maximum discharge during period, 109 ft<sup>3</sup>/s (3.03 m<sup>3</sup>/s) July 2, gage height, 19.46 ft (5.93 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	6.7	28	2.5	.31	2.0	.00	.00
2	.00				---	5.9	10	7.0	.33	17	.00	.00
3	.00				---	4.4	7.0	6.2	.36	11	.00	.00
4	.00				---	4.8	7.6	3.2	.42	2.7	.00	.00
5	.00				---	7.3	6.2	2.3	.40	1.0	.00	.00
6	.00				---	22	5.9	16	.31	.72	.00	.00
7	.00				---	21	7.9	39	.23	.72	.00	.00
8	.00				---	5.6	7.0	7.6	.14	.57	.00	.00
9	.00				.20	2.5	5.4	4.0	.11	.50	.00	.00
10	.00				.20	2.5	4.8	3.0	.10	.40	.00	.00
11	.00				.20	3.0	4.2	2.0	.09	.20	.00	.00
12	.00				.20	4.0	4.0	2.0	.08	.11	.00	.00
13	.00				.20	11	4.8	2.0	.18	.09	.00	.00
14	.00				.40	12	2.1	2.0	5.6	.07	.00	.00
15	.00				.60	7.5	1.8	2.0	6.9	.06	.00	.00
16	.00				.40	5.2	8.2	2.0	2.6	.04	.00	.00
17	.00				.60	4.7	14	2.0	1.4	.05	.00	.00
18	.00				.60	4.4	9.6	1.5	1.0	.10	.00	.00
19	.00				.60	3.9	12	1.5	.82	.10	.00	.00
20	.00				.60	3.3	12	1.5	.98	.09	.00	.00
21	.00				.60	2.8	12	1.5	.98	.08	.00	.00
22	.00				.60	2.5	8.9	1.0	.60	.06	.00	.00
23	.00				1.0	2.3	6.4	1.0	.33	.05	.00	.00
24	.00				1.0	2.6	5.1	1.0	.18	.04	.00	.00
25	.00				.40	3.1	3.7	.66	.10	.02	.00	.00
26	.00				.40	3.3	3.4	.59	.07	.01	.00	.00
27	.00				1.0	2.5	2.7	.51	.06	.00	.00	.00
28	---				3.0	2.4	2.3	.42	.08	.00	.00	.00
29	---				---	3.5	2.5	.32	7.9	.00	.00	.00
30	---				---	4.1	2.7	.29	12	.00	.00	.00
31	---				---	25	---	.29	---	.00	.00	---
TOTAL	---				---	195.8	212.2	116.88	44.66	37.78	.00	.00
MEAN	---				---	6.32	7.07	3.77	1.49	1.22	.000	.000
MAX	---				---	25	28	39	12	17	.00	.00
MIN	---				---	2.3	1.8	.29	.06	.00	.00	.00
CFSM	---				---	1.32	1.47	.79	.31	.25	.000	.000
IN.	---				---	1.52	1.64	.91	.35	.29	.00	.00
AC-FT	---				---	388	421	232	89	75	.00	.00

## MINNESOTA RIVER BASIN

443636096095404 DILLON-SYLTIE IMPOUNDMENT OUTLET NEAR PORTER, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980, 1982-83.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March to May 1983.

REMARKS.--Letter E indicates estimated value. Letter K indicates non-ideal colony count. Daily suspended-sediment concentrations were estimated using a limited number of samples collected by USGS personnel and an automatic sampler; records are poor.

EXTREMES FOR CURRENT PERIOD.--March to May 1983:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 37 mg/L Apr. 1; minimum daily mean, 4 mg/L Mar. 4.

SEDIMENT LOADS: Maximum daily mean during period, 2.8 tons (2.5 tonnes) Apr. 1; minimum daily mean, 0.05 ton (0.05 tonne) Mar. 4.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
FEB									
10...	1200	E.20	--	--	--	726	-1.0	1.0	--
MAR									
01-04	1200	5.5	--	--	--	--	--	--	--
01...	1600	7.3	620	--	--	724	4.5	1.0	--
02...	1300	6.7	770	--	--	722	4.0	1.0	--
04...	1110	5.4	--	--	--	--	--	--	--
31-31	1600	16	--	984	--	--	--	--	--
APR									
01-05	1600	16	--	984	--	--	--	--	--
01...	1430	20	1100	--	--	724	--	3.0	13.6
04...	1140	8.2	--	--	--	--	--	--	--
05-08	1400	7.1	--	--	--	--	--	--	--
07...	1445	7.9	918	--	7.8	731	11.0	4.0	13.0
08...	0940	7.6	913	--	8.4	734	--	4.0	13.4
08-11	1600	5.2	--	--	--	--	--	--	--
11...	1100	4.6	984	--	8.2	E730	--	6.0	14.6
11-16	1600	7.9	--	--	--	--	--	--	--
16...	1215	7.9	--	--	--	--	--	--	--
21...	1245	12	988	--	8.4	728	--	7.5	13.5
29...	1009	2.5	--	--	--	--	--	--	--
MAY									
25...	1110	.79	1100	--	8.4	735	--	15.0	10.2
JUN									
08...	1240	.30	963	--	8.3	727	--	18.5	12.2
21...	1100	.97	1020	1040	8.1	728	--	22.5	10.7
JUL									
12...	1055	E.10	--	--	--	--	23.0	--	--
26...	1025	E.02	--	--	--	--	24.5	--	--
AUG									
25...	1005	.00	--	--	--	--	26.0	--	--

DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. FALL DIAM. % FINER THAN .062 MM (80158)	BED MAT. FALL DIAM. % FINER THAN .125 MM (80159)	BED MAT. FALL DIAM. % FINER THAN .250 MM (80160)	BED MAT. FALL DIAM. % FINER THAN .500 MM (80161)	BED MAT. FALL DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. FALL DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. FALL DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. FALL DIAM. % FINER THAN 8.00 MM (80171)
MAY										
25...	1110	14	23	28	40	64	72	87	98	100

[illegible]

## MINNESOTA RIVER BASIN

443636096095404 DILLON-SYLTE IMPOUNDMENT OUTLET NEAR PORTER, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1											5	.09
2											5	.08
3											5	.06
4											4	.05
5											9	.18
6											33	2.0
7											15	.85
8											5	.08
9											---	---
10											---	---
11											---	---
12											---	---
13											---	---
14											---	---
15											---	---
16											---	---
17											---	---
18											---	---
19											---	---
20											---	---
21											---	---
22											---	---
23											---	---
24											---	---
25											---	---
26											---	---
27											---	---
28											---	---
29											---	---
30											---	---
31											33	2.2
TOTAL											---	---
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	37	2.8	---	---								
2	24	.65	---	---								
3	19	.36	---	---								
4	14	.29	---	---								
5	12	.20	---	---								
6	9	.14	35	1.5								
7	8	.17	24	2.5								
8	8	.15	5	.10								
9	14	.20	---	---								
10	18	.23	---	---								
11	20	.20	---	---								
12	21	.19	---	---								
13	23	.26	---	---								
14	21	.10	---	---								
15	20	.08	---	---								
16	28	.57	---	---								
17	17	.60	---	---								
18	17	.41	---	---								
19	17	.19	---	---								
20	17	.18	---	---								
21	---	---	---	---								
22	---	---	---	---								
23	---	---	---	---								
24	---	---	---	---								
25	---	---	---	---								
26	---	---	---	---								
27	---	---	---	---								
28	---	---	---	---								
29	---	---	---	---								
30	---	---	---	---								
31	---	---	---	---								
TOTAL	---	---	---	---								

## MINNESOTA RIVER BASIN

05311400 SOUTH BRANCH YELLOW MEDICINE RIVER AT MINNEOTA, MN

LOCATION.--Lat 44°33'50", long 95°59'50", in SE¼ sec.26, T.113 N., R.43 W., Lyon County, Hydrologic Unit 07020004, on downstream side of bridge on State Highway 68, 0.5 mi (0.8 km) northwest of Minneota and 6 mi (9.7 km) upstream from mouth.

DRAINAGE AREA.--111 mi<sup>2</sup> (287 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--April 1960 to September 1981 and October 1982 to current year. Monthly and daily discharge for the period Apr. 1, 1960, to June 30, 1960, published in WSP 1914. Operated as high-flow partial-record station October 1981 to September 1982.

GAGE.--Nonrecording gage and crest-stage gage. Datum of gage is 1,150.00 ft (350.520 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--22 years (water years 1961-1981, 1983), 22.1 ft<sup>3</sup>/s (0.626 m<sup>3</sup>/s), 2,70 in/yr (69 mm/yr), 16,010 acre-ft/yr (19.7 hm<sup>3</sup>/yr); median of yearly mean discharges, 15 ft<sup>3</sup>/s (0.42 m<sup>3</sup>/s), 1.84 in/yr (47 mm/yr), 10,900 acre-ft/yr (13 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,430 ft<sup>3</sup>/s (125 m<sup>3</sup>/s) Apr. 8, 1969, gage height, 13.41 ft (4.087 m); no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 82 ft<sup>3</sup>/s (2.32 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Nov. 22	0700	155 4.39	a5.82 1.774	Apr. 21	1400	496 14.0	7.32 2.231
Mar. 3	0700	480 13.6	a9.42 2.871	May 3	1300	187 5.30	5.73 1.747
Mar. 7	0700	578 16.4	a8.00 2.438	May 7	0200	*1,240 35.1	*9.99 3.045
Mar. 14	1200	219 6.20	6.02 1.835	June 15	0700	164 4.64	5.57 1.698
Apr. 2	0700	426 12.1	7.10 2.164	June 30	1200	342 9.69	6.70 2.042

a Backwater from ice.

Minimum discharge, no flow Jan. 16 to Feb. 9, Aug. 8-12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.73	35	.26	.00	110	274	84	13	167	.23	.83
2	.03	.52	40	.24	.00	243	397	99	12	130	.15	1.1
3	.04	.68	42	.22	.00	450	310	183	14	111	.14	.68
4	.08	.78	42	.18	.00	363	243	156	11	93	.14	.45
5	.10	.52	17	.14	.00	262	231	106	9.9	71	.12	1.0
6	.17	.40	10	.10	.00	388	228	144	8.5	51	.08	1.2
7	.17	.40	7.0	.08	.00	542	216	1040	7.7	36	.02	.73
8	.19	.45	8.0	.07	.00	355	206	766	8.8	30	.00	.36
9	.32	.40	7.3	.06	.00	198	187	515	6.8	20	.00	.26
10	.32	1.7	7.4	.05	.01	147	179	285	5.9	15	.00	.23
11	.32	1.8	6.0	.04	.02	166	162	195	4.7	11	.00	.12
12	.29	.65	4.0	.03	.04	183	147	154	4.5	8.8	.00	.08
13	.36	.46	3.8	.02	.12	183	158	145	5.6	6.8	.06	.19
14	.29	.19	3.5	.01	.26	210	114	120	78	5.2	.32	.60
15	.29	.21	2.5	.01	.35	179	48	102	156	4.1	.84	2.1
16	.29	.14	2.1	.00	.60	140	82	83	136	3.3	.68	3.0
17	.29	.25	2.0	.00	.90	118	166	72	95	2.9	.64	2.7
18	.96	.20	1.9	.00	1.4	111	177	59	67	4.3	.88	1.9
19	.84	.33	1.7	.00	2.3	95	278	57	46	4.3	2.2	1.6
20	.90	.51	1.3	.00	4.0	84	317	54	41	3.6	.64	1.3
21	.52	.99	1.0	.00	7.0	74	494	52	37	2.9	.60	1.1
22	.48	146	.86	.00	10	53	492	46	32	2.2	.56	1.0
23	.40	.98	.80	.00	13	44	448	39	29	1.7	.52	1.3
24	.52	.77	.66	.00	16	59	312	35	24	1.2	.36	2.3
25	.56	.84	.58	.00	25	50	231	31	19	.90	.78	1.8
26	1.1	.72	.50	.00	33	47	181	27	16	.68	.78	1.0
27	1.1	.38	.40	.00	45	42	144	24	13	.56	.60	.60
28	1.2	.64	.37	.00	63	27	116	20	18	.56	.17	.29
29	1.1	.51	.34	.00	---	39	99	18	64	.56	.06	.17
30	.96	.36	.31	.00	---	38	93	16	252	.45	.14	1.3
31	.84	---	.29	.00	---	87	---	13	---	.32	.14	---
TOTAL	15.04	1067.38	250.61	1.51	222.00	5087	6730	4740	1235.4	790.33	11.85	31.29
MEAN	.49	35.6	8.08	.049	7.93	164	224	153	41.2	25.5	.38	1.04
MAX	1.2	146	42	.26	63	542	494	1040	252	167	2.2	3.0
MIN	.01	.40	.29	.00	.00	27	48	13	4.5	.32	.00	.08
CFSM	.004	.32	.07	.000	.07	1.48	2.02	1.38	.37	.23	.003	.009
IN.	.01	.36	.08	.00	.07	1.70	2.26	1.59	.41	.26	.00	.01
AC-FT	30	2120	497	3.0	440	10090	13350	9400	2450	1570	24	62

WTR YR 1983 TOTAL 20182.41 MEAN 55.3 MAX 1040 MIN .00 CFSM .50 IN 6.76 AC-FT 40030

## MINNESOTA RIVER BASIN

## 05313500 YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MN

LOCATION.--Lat 44°43'18", long 95°31'07", in SW¼ sec.35, T.115 N., R.39 W., Yellow Medicine County, Hydrologic Unit 07020004, on right bank 50 ft (15 m) downstream from highway bridge, 6 mi (9.7 km) upstream from mouth, and 8 mi (13 km) south of town of Granite Falls.

DRAINAGE AREA.--653 mi<sup>2</sup> (1,691 km<sup>2</sup>).

PERIOD OF RECORD.--March 1931 to September 1935 (no winter records), October 1935 to September 1938, October 1939 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1508: 1931, 1934(M), 1937(M), 1946(M), 1950(M).

GAGE.--Water-stage recorder. Datum of gage is 960.64 ft (292.803 m) National Geodetic Vertical Datum of 1929.

Mar. 16, 1931, to June 13, 1938, nonrecording gage, on bridge 50 ft (15 m) upstream at present datum. Oct.

12, 1939, to Nov. 30, 1952, nonrecording gage 500 ft (152 m) downstream at present datum.

REMARKS.--Records good except those for winter period, which are fair. Natural discharge affected by unknown amount of interbasin flow between Yellow Medicine, Redwood, and Cottonwood River basins during extreme floods.

AVERAGE DISCHARGE.--47 years (water years 1936-38, 1940-83), 107 ft<sup>3</sup>/s (3.030 m<sup>3</sup>/s), 2.23 in/yr (57 mm/yr), 77,520 acre-ft/yr (95.6 hm<sup>3</sup>/yr); median of yearly mean discharges, 78 ft<sup>3</sup>/s (2.21 m<sup>3</sup>/s), 1.62 in/yr (41 mm/yr), 56,500 acre-ft/yr (70 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,200 ft<sup>3</sup>/s (487 m<sup>3</sup>/s) Apr. 10, 1969, gage height, 14.90 ft (4.542 m); no flow at times in 1931, 1933, 1948, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1919 reached a stage of 17.5 (5.3 m), from information by local residents, discharge, 25,200 ft<sup>3</sup>/s (714 m<sup>3</sup>/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 300 ft<sup>3</sup>/s (8.50 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Dec. 6	1415	314 8.89	3.47 1.058	Apr. 23	2245	1,210 34.3	5.06 1.542
Mar. 6	2015	1,590 45.0	5.60 1.707	May 10	0845	*2,140 60.6	*6.32 1.926
Apr. 3	2245	1,280 36.2	5.15 1.570	June 16	2000	622 17.6	4.12 1.256
				July 2	2000	954 27.0	4.66 1.420

Minimum discharge, 3.0 ft<sup>3</sup>/s (0.085 m<sup>3</sup>/s) Sept. 28, gage height, 2.21 ft (0.674 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	7.3	29	157	31	26	400	625	543	211	585	59	11		
2	8.3	29	191	30	26	490	932	531	206	861	55	9.7		
3	7.8	28	206	30	26	640	1220	524	200	914	51	9.8		
4	7.3	27	233	30	26	740	1260	596	194	868	46	12		
5	7.3	24	276	30	26	930	1200	622	190	882	43	12		
6	7.7	24	286	30	26	1370	1130	577	183	832	40	10		
7	7.3	23	263	30	26	1500	1060	752	179	735	37	9.5		
8	8.4	23	197	29	26	1500	1020	1260	168	612	33	8.6		
9	12	26	195	28	26	1480	999	1800	160	502	31	8.6		
10	11	30	220	28	27	1280	977	2110	152	417	28	8.6		
11	15	32	190	28	28	1010	917	1880	143	355	26	8.3		
12	18	34	175	27	28	858	864	1410	135	300	24	7.3		
13	9.8	39	140	27	29	868	931	1060	136	260	22	7.0		
14	12	40	115	26	30	925	1030	880	255	228	22	8.1		
15	14	38	92	26	31	1020	993	778	415	200	21	7.8		
16	19	37	85	26	32	1060	903	681	582	176	20	8.0		
17	17	39	80	26	35	1000	905	598	596	163	19	7.3		
18	15	41	76	26	41	914	944	541	525	171	18	7.1		
19	17	49	73	26	55	833	1010	497	463	189	16	6.3		
20	20	72	70	26	66	756	1030	462	404	201	16	6.4		
21	20	87	67	26	77	684	1050	436	366	192	16	5.5		
22	31	98	65	26	78	608	1120	408	333	161	15	5.3		
23	29	145	62	26	80	546	1190	378	303	139	14	5.0		
24	29	188	58	26	88	502	1200	348	273	122	13	4.8		
25	28	209	54	26	114	474	1110	317	249	107	14	4.3		
26	25	209	49	26	236	454	954	291	226	94	13	4.1		
27	30	205	45	26	285	431	809	273	208	86	13	4.0		
28	27	190	40	26	360	401	719	256	205	81	12	3.4		
29	27	159	37	26	---	371	634	239	222	75	12	5.5		
30	27	149	34	26	---	369	576	228	339	69	15	6.2		
31	28	---	32	26	---	421	---	219	---	64	16	---		
TOTAL	542.2	2323	3863	846	1954	24835	29312	21495	8221	10641	780	221.5		
MEAN	17.5	77.4	125	27.3	69.8	801	977	693	274	343	25.2	7.38		
MAX	31	209	286	31	360	1500	1260	2110	596	914	59	12		
MIN	7.3	23	32	26	26	369	576	219	135	64	12	3.4		
CFSM	.03	.12	.19	.04	.11	1.23	1.50	1.06	.42	.53	.04	.01		
IN.	.03	.13	.22	.05	.11	1.41	1.67	1.22	.47	.61	.04	.01		
AC-FT	1080	4610	7660	1680	3880	49260	58140	42640	16310	21110	1550	439		
CAL YR 1982	TOTAL	31078.7	MEAN	85.1	MAX	960	MIN	4.1	CFSM	.13	IN	1.77	AC-FT	61640
WTR YR 1983	TOTAL	105033.7	MEAN	288	MAX	2110	MIN	3.4	CFSM	.44	IN	5.98	AC-FT	208300



## MINNESOTA RIVER BASIN

05315000 REDWOOD RIVER NEAR MARSHALL, MN

LOCATION.--Lat 44°25'49", long 95°50'43", in SE¼SW¼ sec.12, T.111 N., R.42 W., Lyon County, Hydrologic Unit 07020006, on right bank 2.0 mi (3.2 km) upstream from Redwood River diversion structure on southwest edge of town of Marshall, MN. Prior to Apr. 10, 1980, at site 5 mi (8.0 km) downstream.

DRAINAGE AREA.--303 mi<sup>2</sup> (785 km<sup>2</sup>).

PERIOD OF RECORD.--March 1940 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is 1,188.23 ft (362.172 m) National Geodetic Vertical Datum of 1929. March 1940 to April 9, 1980, nonrecording gage 5.0 mi (8.0 km) downstream from present site at datum 43.35 ft lower (crest-stage gage added June 12, 1968). Since March 1964, nonrecording gage and crest-stage gage on diversion channel 1.5 mi (2.4 km) downstream at datum 1,100.00 ft (335.280 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period, which are fair. Water diverted at medium and high stages into diversion channel 2.0 mi (3.2 km) below station. Diversion began Mar. 18, 1964. Unknown amount of natural diversion into Cottonwood River basin occurs at extremely high stages 0.8 mi (1.3 km) below station.

AVERAGE DISCHARGE.--43 years, 49.4 ft<sup>3</sup>/s (1.399 m<sup>3</sup>/s), 2.21 in/yr (56 mm/yr) 35,790 acre-ft (44.1 hm<sup>3</sup>/yr); median of yearly mean discharges, 38 ft<sup>3</sup>/s (1.08 m<sup>3</sup>/s), 1.70 in/yr (43 mm/yr), 27,500 acre-ft/yr (34 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--River only, maximum discharge, 5,370 ft<sup>3</sup>/s (152 m<sup>3</sup>/s) June 17, 1957, gage height, 10.14 ft (3.091 m); maximum gage height, 11.05 ft (3.368 m) Apr. 6, 1951, from floodmark; no flow at times.

Diversion only, maximum discharge, 4,440 ft<sup>3</sup>/s (126 m<sup>3</sup>/s) Apr. 10, 1969, gage height, 78.45 ft (23.912 m); no flow on many days.

Combined flow, maximum discharge, 5,590 ft<sup>3</sup>/s (158 m<sup>3</sup>/s) Apr. 10, 1969; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,270 ft<sup>3</sup>/s (92.6 m<sup>3</sup>/s) May 7, gage height, 14.70 ft (4.481 m); minimum, 4.3 ft<sup>3</sup>/s (0.12 m<sup>3</sup>/s) Aug. 26, gage height, 5.95 ft (1.814 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	27	55	150	28	24	495	595	326	145	736	36	8.4		
2	31	52	230	27	24	855	725	568	139	1000	33	8.0		
3	32	49	250	27	24	1290	798	678	135	1060	30	8.0		
4	30	46	240	26	24	1170	755	710	128	880	27	7.6		
5	29	41	220	26	24	1080	706	547	121	658	24	7.4		
6	31	43	170	26	24	1160	691	580	113	482	21	6.4		
7	33	43	130	26	24	1200	679	2220	107	351	20	5.8		
8	35	42	110	26	24	1040	681	1910	100	268	17	5.4		
9	44	41	89	25	24	670	653	1670	94	219	15	5.2		
10	58	60	75	25	24	515	627	1220	88	189	13	5.0		
11	62	85	68	25	24	525	604	989	82	165	12	5.0		
12	63	75	62	25	24	495	566	821	79	150	11	5.0		
13	64	55	56	25	25	562	562	708	85	136	11	5.0		
14	67	90	53	24	45	573	427	600	157	123	9.3	5.6		
15	80	80	50	24	55	576	361	526	182	112	9.0	8.0		
16	79	80	47	24	60	530	507	475	163	102	8.6	15		
17	71	95	45	24	75	491	616	428	154	96	10	12		
18	62	95	43	24	110	470	644	390	142	107	9.7	10		
19	58	155	41	24	145	443	704	370	129	104	8.6	8.0		
20	60	340	39	24	180	402	765	345	144	95	7.2	6.8		
21	57	350	38	24	170	368	795	317	202	88	6.9	6.0		
22	61	395	37	24	150	339	788	290	224	80	6.2	5.6		
23	70	380	36	24	205	323	711	260	241	74	5.6	5.8		
24	76	370	35	24	205	301	604	236	214	69	5.2	7.0		
25	77	350	34	24	165	283	518	216	189	65	5.9	6.0		
26	76	295	33	24	170	269	449	204	168	60	5.2	5.5		
27	71	240	32	24	265	229	393	193	160	55	5.9	5.2		
28	67	225	31	24	520	228	349	182	195	52	5.9	5.1		
29	63	185	30	24	---	229	335	169	417	49	5.6	5.6		
30	60	151	30	24	---	223	328	161	546	44	7.9	8.0		
31	59	---	29	24	---	353	---	154	---	41	7.4	---		
TOTAL	1753	4563	2533	769	2833	17687	17936	18463	5043	7710	400.1	207.0		
MEAN	56.5	152	81.7	24.8	101	571	598	596	168	249	12.9	6.90		
MAX	80	395	250	28	520	1290	798	2220	546	1060	36	15		
MIN	27	41	29	24	24	223	328	154	79	41	5.2	5.0		
CFSM	.19	.50	.27	.08	.33	1.88	1.97	1.97	.55	.82	.04	.02		
IN.	.22	.56	.31	.09	.35	2.17	2.20	2.27	.62	.95	.05	.03		
AC-FT	3480	9050	5020	1530	5620	35080	35580	36620	10000	15290	794	411		
CAL YR 1982	TOTAL	22028.2	MEAN	60.4	MAX	395	MIN	2.6	CFSM	.20	IN	2.70	AC-FT	43690
WTR YR 1983	TOTAL	79897.1	MEAN	219	MAX	2220	MIN	5.0	CFSM	.72	IN	9.81	AC-FT	158500

## MINNESOTA RIVER BASIN

05316500 REDWOOD RIVER NEAR REDWOOD FALLS, MN

LOCATION.--Lat 44°31'25", long 95°10'20", in SE¼NE¼ sec.9, T.112 N., R.36 W., Redwood County, Hydrologic Unit 07020006, on right bank 4 ft (1.2 m) upstream from highway bridge, 3 mi (4.8 km) west of town of Redwood Falls, and 8.5 mi (13.7 km) upstream from mouth.

DRAINAGE AREA.--697 mi<sup>2</sup> (1,805 km<sup>2</sup>).

PERIOD OF RECORD.--July 1909 to September 1914 (no winter records except 1911-12). August 1930 to September 1935 (no winter records), October 1935 to current year.

GAGE.--Water-stage recorder. Datum of gage is 972.33 ft (296.366 m) National Geodetic Vertical Datum of 1929. July 1909 to September 1914, nonrecording gage at bridge 20 ft (6 m) downstream at datum 0.22 ft (0.067 m) lower. August 1930 to Oct. 25, 1949, nonrecording gage, at bridge 20 ft (6 m) downstream at present datum.

REMARKS.--Records good except those for winter periods, which are fair. Natural discharge affected by unknown amount of interbasin flow between Yellow Medicine, Redwood, and Cottonwood River basins during extreme floods.

AVERAGE DISCHARGE.--49 years (water years 1912, 1936-83), 111 ft<sup>3</sup>/s (3.144 m<sup>3</sup>/s), 2.16 in/yr (55 mm/yr), 80,420 acre-ft/yr (99.2 hm<sup>3</sup>/yr); median of yearly mean discharges, 74 ft<sup>3</sup>/s (2.10 m<sup>3</sup>/s), 1.44 in/yr (37 mm/yr) 53,600 acre-ft/yr (66 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,700 ft<sup>3</sup>/s (558 m<sup>3</sup>/s) June 18, 1957, gage height, 15.92 ft (4.852 m), from floodmark; no flow for several days in January 1940 and for part of each day Aug. 19, 20, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft<sup>3</sup>/s (11.3 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Nov. 24	1600	1,110 31.4	a8.62 2.627	Apr. 13	1930	1,970 55.8	5.67 1.728
Mar. 4	1145	Ice Jam	a*8.96 2.731	May 9	1615	*4,760 135	8.72 2.658
Mar. 7	0645	2,280 64.6	a6.81 2.076	June 14	1400	702 19.9	3.73 1.137
Mar. 10	0945	4,160 118	a8.81 2.685	July 7	0015	1,070 30.3	4.23 1.289

a Backwater from ice.

Minimum discharge, 12 ft<sup>3</sup>/s (0.34 m<sup>3</sup>/s) Sept. 10, 11, 12, 14, 28, gage height, 1.50 ft (0.457 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	128	490	67	59	590	1310	686	309	711	85	24
2	77	120	480	66	59	700	1460	839	288	761	79	21
3	111	116	530	66	59	850	1460	939	279	820	72	20
4	113	110	520	66	59	1500	1510	962	259	906	68	19
5	102	101	495	66	59	1700	1570	1030	244	982	63	19
6	100	103	470	66	59	2110	1560	1120	231	1040	61	16
7	105	97	417	66	59	2210	1550	1500	213	1060	56	16
8	121	96	412	66	59	1760	1440	1640	204	925	50	14
9	173	95	321	66	59	1860	1350	3720	183	662	48	14
10	212	132	309	65	59	3210	1360	4150	173	479	44	14
11	206	220	273	64	59	3110	1370	3280	157	393	43	12
12	193	218	220	62	59	2600	1300	2550	150	338	39	16
13	183	172	215	62	60	1900	1790	2060	204	294	36	15
14	184	241	209	62	66	1460	1850	1690	645	262	36	13
15	167	237	205	61	76	1360	1630	1440	641	227	32	16
16	154	242	180	61	86	1360	1520	1270	560	198	32	19
17	157	264	175	60	100	1290	1310	1130	519	181	33	37
18	156	258	170	59	130	1200	1210	1000	483	210	35	30
19	146	379	165	59	180	1090	1220	911	433	273	36	23
20	171	670	160	59	250	997	1260	826	391	255	37	20
21	192	705	160	59	290	914	1280	763	368	215	32	18
22	197	673	155	59	310	859	1300	704	378	188	27	16
23	192	689	150	59	340	805	1320	630	386	161	23	15
24	192	936	145	59	350	700	1310	570	392	142	25	15
25	186	774	120	59	370	606	1240	507	377	128	33	15
26	184	715	86	59	410	566	1130	464	346	119	26	14
27	178	638	82	59	450	533	1000	429	312	112	23	13
28	173	590	80	59	510	513	884	397	296	108	21	14
29	157	590	72	59	---	490	795	372	324	106	19	17
30	142	535	71	59	---	492	726	346	526	98	21	20
31	133	---	68	59	---	631	---	329	---	90	20	---
TOTAL	4815	10844	7605	1918	4686	39966	40015	38254	10271	12444	1255	535
MEAN	155	361	245	61.9	167	1289	1334	1234	342	401	40.5	17.8
MAX	212	936	530	67	510	3210	1850	4150	645	1060	85	37
MIN	58	95	68	59	59	490	726	329	150	90	19	12
CFSM	.22	.52	.35	.09	.24	1.85	1.91	1.77	.49	.58	.06	.03
IN.	.26	.58	.41	.10	.25	2.13	2.14	2.04	.55	.66	.07	.03
AC-FT	9550	21510	15080	3800	9290	79270	79370	75880	20370	24680	2490	1060
CAL YR 1982	TOTAL	73064.1	MEAN 200	MAX 1470	MIN 5.8	CFSM .29	IN 3.90	AC-FT 144900				
WTR YR 1983	TOTAL	172608.0	MEAN 473	MAX 4150	MIN 12	CFSM .68	IN 9.21	AC-FT 342400				

## MINNESOTA RIVER BASIN

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN

LOCATION.--Lat 44°12'18", long 95°30'17", sec. 01, SE¼NW¼ sec. 35, T.109 N., R.39 W., Redwood County, Hydrologic Unit 07020008, 0.4 mi (0.6 km) east of County Road 75, 0.65 mi (1.05 km) north of Redwood County line, 2.1 mi (3.4 km) southwest of Walnut Grove.

DRAINAGE AREA.--5.00 mi<sup>2</sup> (13.0 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May to September 1983.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Records poor.

EXTREMES FOR CURRENT PERIOD.--May to September: Maximum discharge during period, 87 ft<sup>3</sup>/s (2.46 m<sup>3</sup>/s) July 1, gage height, 12.47 ft (3.801 m); minimum discharge, 0.18 ft<sup>3</sup>/s (0.005 m<sup>3</sup>/s) Aug. 26, Sept. 26, 28; minimum gage height, 8.42 ft (2.566 m) Sept. 26, 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								---	2.6	44	1.2	.22
2								---	2.7	21	1.0	.20
3								---	2.7	11	.88	.20
4								---	2.4	7.4	.77	.24
5								---	2.2	5.8	.73	.26
6								---	2.2	4.9	.62	.26
7								---	2.1	4.1	.60	.24
8								35	2.1	3.6	.51	.22
9								23	1.9	3.1	.47	.23
10								11	1.8	2.9	.44	.23
11								8.0	1.9	2.6	.40	.24
12								7.0	2.0	2.4	.36	.27
13								6.2	15	2.2	.33	.27
14								5.3	33	2.1	.29	.28
15								4.7	18	1.9	.31	.34
16								4.2	9.5	1.8	.28	.30
17								3.8	6.9	8.0	.28	.27
18								4.0	6.1	24	.27	.26
19								3.9	5.2	12	.24	.24
20								3.8	8.9	6.9	.23	.23
21								3.8	7.7	4.9	.28	.25
22								3.7	5.8	3.8	.23	.22
23								3.4	4.7	3.3	.22	.22
24								3.4	4.1	2.8	.24	.22
25								3.1	3.8	2.6	.22	.22
26								3.1	3.4	2.2	.18	.20
27								3.1	3.1	2.2	.35	.20
28								2.8	3.6	2.0	.22	.20
29								2.7	27	1.9	.20	.57
30								2.8	20	1.7	.32	.32
31								2.8	---	1.4	.22	---
TOTAL								---	212.4	200.5	12.89	7.62
MEAN								---	7.08	6.47	.42	.25
MAX								---	33	44	1.2	.57
MIN								---	1.8	1.4	.18	.20
AC-FT								---	421	398	26	15

## MINNESOTA RIVER BASIN

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--May to September 1983.

REMARKS.--Letter E indicates estimated value.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BAPO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
MAY									
09...	1500	10	--	--	--	E730	15.5	11.5	--
11...	1753	--	--	1330	--	--	--	--	--
12...	1500	6.8	--	--	--	--	--	--	--
17...	1220	3.9	1440	--	8.1	E730	--	10.0	11.8
JUN									
03...	1250	2.7	1580	--	8.0	725	--	14.0	13.0
27...	1215	3.1	1610	1650	8.0	728	--	14.5	8.2
JUL									
13...	1110	2.4	1590	--	8.1	731	--	17.0	8.3
28...	1126	2.0	1660	1720	7.9	729	30.0	18.0	8.1
AUG									
24...	1105	.20	1980	2000	--	734	24.0	18.5	--
SEP									
13...	1110	.28	2050	--	7.7	740	--	12.0	9.1
27...	1004	.24	2040	--	7.8	730	21.0	12.5	9.5

[illegible]

## MINNESOTA RIVER BASIN

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441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)
MAY									
09...	--	--	--	--	--	--	--	<.01	122
11...	490	13	.90	23	1070	7.4	.80	<.01	--
12...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	94
JUN									
03...	--	--	--	--	--	--	--	--	18
27...	670	16	1.2	24	1360	2.5	.70	.02	100
JUL									
13...	--	--	--	--	--	--	--	--	46
28...	680	16	.90	29	1400	9.2	.80	.09	59
AUG									
24...	980	5.6	.80	20	1840	.71	--	.02	--
SEP									
13...	--	--	--	--	--	--	--	--	19
27...	--	--	--	--	--	--	--	--	9

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
MAY									
12...	1500	1	3	10	31	61	88	98	100

## MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN

LOCATION.--Lat 44°12'38", long 95°29'50", in SW¼SE¼ sec.26, T.109 N., R.39 W., Redwood County, Hydrologic Unit 07020008, 0.25 mi (0.48 km) west of County Road 78, 1.55 mi (2.49 km) southwest of Walnut Grove.

DRAINAGE AREA.--7.0 mi<sup>2</sup> (18.1 km<sup>2</sup>).

## LAKE-STAGE RECORDS

PERIOD OF RECORD.--May to September 1983.

GAGE.--Nonrecording gage.

REMARKS.--Staff gage read periodically. Records are fair. Control is a drop-inlet structure in pond formed by an earthen dam.

EXTREMES FOR PERIOD OF RECORD.--May to September: Maximum gage height during period, 46.94 ft (14.307 m) May 8-9; minimum gage height, 34.74 ft (10.589 m) Sept. 13-28.

## MONTHEND GAGE HEIGHT, IN FEET, MAY TO SEPTEMBER 1983

May .....	35.30	July 31 .....	35.05	Sept. 30 .....	34.91
June .....	37.40	Aug. 31 .....	34.82		

## MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--May to September 1983.

REMARKS.--Letter E indicates estimated value.

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
MAY						
10...	1638	.5	739	8.2	12.0	10.6
10...	1639	3.0	746	8.1	11.5	10.5
10...	1642	6.0	746	7.9	11.5	10.3
10...	1644	9.0	747	7.9	11.5	10.2
10...	1648	12.0	748	7.8	11.5	10.2
10...	1650	15.0	750	7.8	11.5	10.1
10...	1651	18.0	751	7.8	11.0	10.1
10...	1652	21.0	751	7.8	11.0	10.0
10...	1654	24.0	752	7.7	11.0	10.0
10...	1656	27.0	754	7.7	11.0	9.9
10...	1658	30.0	755	7.7	11.0	9.8
10...	1700	33.0	761	7.7	11.0	9.8
11...	1425	.5	763	8.0	14.0	13.6
11...	1429	3.0	766	8.0	14.0	12.5
11...	1433	6.0	770	7.9	14.0	12.0
11...	1436	9.0	769	7.9	13.5	11.6
11...	1439	12.0	774	7.9	11.5	10.9
11...	1442	15.0	776	7.8	11.0	10.4
11...	1445	18.0	797	7.7	11.0	10.1
11...	1448	21.0	918	7.7	11.0	9.6
11...	1451	24.0	979	7.6	11.0	9.1
11...	1454	27.0	1020	7.6	11.0	8.6
11...	1456	30.0	1000	7.6	10.0	8.5
JUN						
03...	1443	.5	1140	7.8	16.5	13.5
03...	1446	3.0	1140	8.3	16.5	13.5
03...	1448	6.0	1140	8.3	16.0	13.4
03...	1451	9.0	1160	8.2	14.5	9.8
03...	1454	12.0	1240	7.9	13.0	6.3
03...	1457	15.0	1270	7.8	13.0	5.0
03...	1500	18.0	1270	7.7	11.5	2.6
03...	1503	21.0	1280	7.6	10.5	2.0
27...	1405	.5	1310	7.8	22.0	8.6
27...	1409	3.0	1300	7.9	22.0	8.8
27...	1412	6.0	1400	7.8	21.0	8.9
27...	1416	9.0	1400	7.8	19.0	7.9
27...	1418	12.0	1380	7.6	16.0	3.4
27...	1421	15.0	1390	7.4	14.0	1.3
27...	1425	18.0	1380	7.4	13.0	1.2
27...	1430	20.0	1360	7.3	12.0	1.1
JUL						
13...	1208	.5	1130	8.4	24.5	12.0
13...	1211	3.0	1190	8.3	24.5	12.2
13...	1216	6.0	1190	8.3	24.5	11.8
13...	1218	9.0	1190	8.2	24.0	10.7
13...	1221	10.0	1300	7.9	20.0	6.8
13...	1225	11.0	1390	7.7	19.0	2.6
13...	1228	12.0	1380	7.7	18.0	2.0
13...	1231	13.0	1390	7.6	17.0	1.7
13...	1235	14.0	1380	7.6	16.5	1.2
13...	1238	15.0	1370	7.6	15.5	1.1
13...	1241	16.0	1380	7.6	14.5	1.1
13...	1245	17.0	1370	7.6	14.0	1.1
13...	1248	18.0	1380	7.6	13.5	1.0
13...	1251	19.0	1380	7.6	13.0	1.0
13...	1255	21.0	1380	7.4	12.5	1.1
13...	1258	22.0	1380	7.4	12.5	1.1
28...	1221	.5	1220	8.1	25.5	10.7
28...	1226	3.0	1230	8.0	24.5	9.8
28...	1228	6.0	1340	7.5	22.0	2.8
28...	1231	7.0	1360	7.4	21.5	2.1
28...	1235	8.0	1380	7.3	20.5	1.9
28...	1238	9.0	1380	7.4	20.0	1.6
28...	1241	10.0	1380	7.5	20.0	1.6
28...	1245	11.0	1390	7.5	19.0	1.1
28...	1248	12.0	1390	7.5	18.5	1.1
28...	1251	13.0	1400	7.5	17.5	1.1
28...	1255	14.0	1400	7.1	16.5	1.5

## MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
JUL						
28...	1258	15.0	1400	6.8	15.0	1.3
28...	1301	16.0	1390	7.2	14.5	1.2
28...	1305	17.0	1390	7.2	14.0	1.1
28...	1308	18.0	1390	7.2	13.5	1.1
28...	1311	19.0	1390	7.3	13.0	1.1
28...	1314	20.0	1400	7.4	13.0	1.1
28...	1318	21.0	1390	7.4	12.5	1.0
AUG						
11...	1030	.5	1320	8.0	24.5	8.2
11...	1033	3.0	1320	8.0	24.5	8.1
11...	1036	6.0	1320	8.0	24.5	7.9
11...	1038	9.0	1360	7.6	23.5	3.8
11...	1043	11.0	1380	7.4	22.5	1.3
11...	1045	12.0	1420	7.5	19.5	1.3
11...	1048	13.0	1410	7.5	18.0	1.3
11...	1050	14.0	1400	7.5	17.0	1.2
11...	1053	15.0	1400	7.5	15.5	1.2
11...	1055	16.0	1390	7.4	15.0	1.2
11...	1058	17.0	1390	7.4	14.5	1.2
11...	1100	18.0	1400	7.4	14.0	1.2
11...	1103	19.0	1400	7.4	13.5	1.2
11...	1105	20.0	1410	7.4	13.0	1.2
24...	1155	.5	1320	8.0	25.0	8.0
24...	1158	3.0	1320	8.0	25.0	--
24...	1201	6.0	1320	--	25.0	--
24...	1203	9.0	1320	--	25.0	--
24...	1206	12.0	1390	--	21.5	--
24...	1208	13.0	1400	--	20.0	--
24...	1210	14.0	1420	--	18.5	--
24...	1212	15.0	1430	--	17.5	--
24...	1215	16.0	1430	--	16.0	--
24...	1218	17.0	1420	--	15.5	--
24...	1220	18.0	1420	--	14.5	--
24...	1223	19.0	1420	--	14.0	--
24...	1225	20.0	1420	--	13.5	--
24...	1228	21.0	1420	--	13.5	--
24...	1230	21.6	1430	--	13.5	--
SEP						
13...	1155	.5	1300	8.1	19.5	7.6
13...	1201	3.0	1310	8.1	18.5	7.4
13...	1205	6.0	1310	8.1	18.5	6.7
13...	1208	9.0	1310	8.0	18.5	6.8
13...	1210	12.0	1310	8.0	18.5	6.2
13...	1213	15.0	1310	7.9	18.0	6.4
13...	1215	18.0	1320	7.9	18.0	5.7
13...	1218	20.0	1380	7.3	17.0	1.0
27...	1025	.5	1310	8.3	16.0	13.4
27...	1029	3.0	1310	8.3	16.0	13.2
27...	1035	6.0	1310	8.3	15.5	13.1
27...	1038	9.0	1320	8.3	14.5	12.2
27...	1040	12.0	1320	8.2	13.0	8.8
27...	1043	15.0	1330	8.1	12.0	8.5
27...	1046	18.0	1350	8.0	12.0	7.0
27...	1050	21.0	1390	7.7	12.0	6.7



## MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAMPLING DEPTH (FEET) (00003)	DEPTH TO BOTTOM OF SAMPLE INTER- VAL (FT) (72016)	RESERVOIR DEPTH (FEET) (72025)	LAKE STAGE (FT ABOVE DATUM) (00065)	SPECIFIC CON- DUCTANCE (UMHOS) (00095)	SPECIFIC CON- DUCTANCE (UMHOS) (90095)	PH (STANDARD ARD UNITS) (00400)	BAROMETRIC PRESSURE (MM OF HG) (00025)	TEMPERATURE, AIR (DEG C) (00020)
MAY										
10...	1640	--	2.0	33.0	46.08	--	--	--	--	21.0
10...	1700	32.0	--	--	--	761	--	7.7	732	--
11...	1430	--	4.5	31.0	44.98	--	776	--	--	--
JUN										
03...	1445	--	4.5	21.5	35.28	--	--	--	--	--
03...	1503	21.0	--	--	--	1280	--	7.6	730	--
27...	1415	--	--	--	35.38	--	--	--	730	21.0
27...	1430	20.0	--	--	--	1360	--	7.3	730	--
JUL										
13...	1215	--	6.0	22.9	35.35	--	--	--	730	29.0
13...	1258	22.0	--	--	--	1380	--	7.4	730	--
28...	1225	--	3.3	21.5	35.18	--	--	--	729	32.0
28...	1318	21.0	--	--	--	1390	--	7.4	729	--
AUG										
11...	1035	--	6.3	20.5	34.82	--	--	--	734	21.0
11...	1105	20.0	--	--	--	1410	--	7.4	734	--
24...	1200	--	6.4	22.0	34.80	--	1350	--	734	24.0
24...	1230	21.6	--	--	--	1430	1440	--	734	--
SEP										
13...	1200	--	4.6	20.7	34.74	--	--	--	741	22.0
27...	1030	--	5.1	21.8	34.74	--	--	--	731	22.0
27...	1050	21.0	--	--	--	1390	--	7.7	731	--

DATE	TEMPERATURE (DEG C) (00010)	TRANSPAR- ENCY (SECCHI DISK) (M) (00078)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	LINITY, CARBON- ATE IT-FLD (MG/L AS CAC03) (99430)	RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
MAY										
10...	--	.30	--	--	--	--	--	167	137	--
10...	11.0	--	9.8	--	--	--	--	169	138	--
11...	--	.90	--	100	36	9.3	13	--	--	571
JUN										
03...	--	.90	--	--	--	--	--	--	--	--
03...	10.5	--	2.0	--	--	--	--	--	--	--
27...	--	1.80	--	--	--	--	--	384	315	--
27...	12.0	--	1.1	--	--	--	--	--	--	--
JUL										
13...	--	1.20	--	--	--	--	--	--	--	--
13...	12.5	--	1.1	--	--	--	--	--	--	--
28...	--	.70	--	--	--	--	--	--	--	--
28...	12.5	--	1.0	--	--	--	--	--	--	--
AUG										
11...	--	1.30	7.9	--	--	--	--	--	--	--
11...	13.0	--	1.2	--	--	--	--	--	--	--
24...	--	1.30	--	170	78	15	22	221	182	1040
24...	13.5	--	--	200	75	15	32	--	--	1130
SEP										
13...	--	1.00	--	--	--	--	--	--	--	--
27...	--	1.00	--	--	--	--	--	--	--	--
27...	12.0	--	6.7	--	--	--	--	--	--	--

## MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)	PHYTO- PLANK- TON, TOTAL (CELLS PER ML) (60050)		
MAY											
10...	--	--	--	--	--	--	--	--	--		
10...	--	--	--	<.01	--	--	--	--	--		
11...	4.8	.12	.90	.14	.11	.11	--	--	8500		
JUN											
03...	--	--	--	--	--	--	28.0	<.100	--		
03...	--	--	--	.05	--	--	--	--	--		
27...	--	--	--	<.01	--	--	17.0	<.100	3800		
27...	1.6	1.9	2.7	.04	.03	.03	--	--	--		
JUL											
13...	--	--	--	.35	--	--	24.0	<.100	--		
13...	--	--	--	.04	--	--	--	--	--		
28...	5.8	.26	1.0	.05	.03	<.01	49.0	<.100	180000		
28...	1.0	3.9	4.6	.39	.38	.36	--	--	--		
AUG											
11...	5.1	.22	2.2	<.02	.02	<.01	12.0	1.90	--		
11...	.14	3.7	4.8	--	.11	.06	--	--	--		
24...	2.5	.25	.80	.26	.04	<.01	--	--	12000		
24...	.14	6.5	6.5	.95	.85	.85	--	--	--		
SEP											
13...	<.10	.07	--	.08	--	.03	25.0	<.100	41000		
27...	--	--	--	.07	--	--	22.0	<.100	--		
27...	--	--	--	.08	--	--	--	--	--		
DATE	TIME	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN,NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	NITRO- GEN,NH4 + ORG. TOT IN BOT MAT (MG/KG AS N) (00626)	PHOS- PHORUS, TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	BARIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS BA) (01008)	BERYL- LIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01013)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)		
AUG											
* 11...	1108	<2.0	15	14000	1100	0	1	1	10		
* 11...	1130	--	95	18000	920	0	1	1	10		
† 11...	1200	--	92	17000	1000	0	1	1	10		
DATE	TIME	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/L AS HG) (71921)	NICKEL, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS NI) (01068)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)	CARBON, ORGANIC TOT. IN BOTTOM MAT. (G/KG AS C) (00687)	CARBON, INOR- GANIC, TOT IN BOT MA- TERIAL (G/KG AS C) (00686)	CYANIDE TOTAL IN BOT- TOM MA- TERIAL (UG/G AS CN) (00721)
AUG											
11...	20	13000	30	600	.04	20	50	59	5.0	<1.0	
11...	20	13000	20	530	.00	20	60	10	10	55	
11...	20	15000	30	830	.04	20	60	14	14	55	
DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. FALL DIAM. % FINER THAN .062 MM (80158)	BED MAT. FALL DIAM. % FINER THAN .125 MM (80159)	BED MAT. FALL DIAM. % FINER THAN .250 MM (80160)	BED MAT. FALL DIAM. % FINER THAN .500 MM (80161)	BED MAT. FALL DIAM. % FINER THAN .062 MM (80164)				
AUG											
11...	1108	76	98	100	--	--	--	--	--	--	
11...	1130	64	94	97	99	100	--	--	--	--	
11...	1200	72	--	--	--	--	99	--	--	99	

\* Sample at center of pool.

† Sample at mouth of north inlet.

† Sample at mouth of south inlet.

## MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NEAR WALNUT GROVE, MN

LOCATION.--Lat 44°12'49", long 95°29'35", sec. 04, SE¼SE¼ sec.26, T.109 N., R.39 W., Redwood County, Hydrologic Unit 07020008, 0.05 mi (0.08 km) west of County Road 78, 1.3 mi (2.1 km) southwest of Walnut Grove.

DRAINAGE AREA.--7.0 mi<sup>2</sup> (18.1 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May to September 1983.

GAGE.--Water-stage recorder and crest-stage gage.

REMARKS.--Records good except those below gage height 11.9 ft (3.627 m), June 10-13, July 12-18, 23 to Sept. 13, which are fair.

EXTREMES FOR CURRENT PERIOD.--May to September 1983: Maximum daily discharge during period, 40 ft<sup>3</sup>/s (1.13 m<sup>3</sup>/s) May 8, gage height, 13.61 ft (4.148 m); minimum daily discharge, 0.13 ft<sup>3</sup>/s (.004 m<sup>3</sup>/s) Sept. 8-13, gage height, 11.01 ft (3.356 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								---	7.3	22	1.4	.34
2								---	7.2	26	1.2	.30
3								---	7.3	25	1.2	.28
4								---	7.0	22	1.0	.25
5								---	6.7	20	.94	.20
6								---	6.5	18	.76	.17
7								---	6.3	16	.63	.15
8								40	6.1	14	.48	.13
9								38	6.1	11	.34	.13
10								31	5.9	9.0	.23	.13
11								30	5.7	7.2	.17	.13
12								30	5.6	5.9	.15	.13
13								29	6.2	4.4	.17	.13
14								27	15	3.3	.20	.16
15								26	17	2.5	.23	.24
16								24	16	1.6	.23	.27
17								22	14	2.2	.25	.28
18								20	13	9.3	.28	.30
19								18	11	13	.28	.27
20								16	11	12	.28	.26
21								14	11	9.9	.28	.26
22								13	9.8	7.8	.28	.23
23								12	8.5	6.2	.25	.20
24								11	7.7	4.7	.25	.21
25								10	6.9	3.6	.28	.20
26								9.6	5.9	3.1	.28	.23
27								8.9	5.2	2.8	.30	.24
28								8.1	4.9	2.4	.34	.26
29								7.9	7.9	2.2	.38	.88
30								7.5	14	1.8	.41	.90
31								7.5	---	1.6	.41	---
TOTAL								---	262.7	290.5	13.88	7.86
MEAN								---	8.76	9.37	.45	.26
MAX								---	17	26	1.4	.90
MIN								---	4.9	1.6	.15	.13
AC-FT								---	521	576	28	16

## MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NEAR WALNUT GROVE, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--May to September 1983.

REMARKS.--Letter E indicates estimated value.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
MAY									
09...	1700	E20	640	--	--	E730	15.5	11.5	--
11...	1415	30	757	782	7.9	728	--	13.0	10.8
17...	1105	22	864	--	8.3	E730	--	13.0	12.8
JUN									
03...	1130	7.4	1140	--	8.2	725	--	16.0	11.7
27...	1050	5.1	1310	1330	7.9	730	--	22.5	8.1
JUL									
13...	0950	4.6	1180	--	8.0	731	26.5	24.0	7.2
28...	1002	2.5	1130	1260	8.1	730	30.0	25.5	6.6
AUG									
24...	1020	.30	1330	1320	7.9	734	22.0	24.5	6.3
SEP									
13...	1030	.13	1310	--	8.0	741	16.5	16.5	7.8
27...	0940	.23	1320	--	8.0	731	17.0	15.5	7.8

[illegible]

## MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NEAR WALNUT GROVE, MN--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
MAY									
09...	--	--	--	--	--	--	--	<.01	31
11...	250	9.3	.60	13	569	4.9	1.1	<.01	18
17...	--	--	--	--	--	--	--	.12	18
JUN									
03...	--	--	--	--	--	--	--	--	--
27...	510	16	1.0	19	989	9.0	1.0	.06	--
JUL									
13...	--	--	--	--	--	--	--	--	--
28...	470	17	.80	24	820	5.8	1.2	.08	--
AUG									
24...	570	15	.20	20	1140	3.1	--	.03	--
SEP									
13...	--	--	--	--	--	--	--	--	7
27...	--	--	--	--	--	--	--	--	--

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN (80164)	BED MAT. SIEVE DIAM. % FINER THAN (80165)	BED MAT. SIEVE DIAM. % FINER THAN (80166)	BED MAT. SIEVE DIAM. % FINER THAN (80167)	BED MAT. SIEVE DIAM. % FINER THAN (80168)	BED MAT. SIEVE DIAM. % FINER THAN (80169)	BED MAT. SIEVE DIAM. % FINER THAN (80170)	BED MAT. SIEVE DIAM. % FINER THAN (80171)	BED MAT. SIEVE DIAM. % FINER THAN (80172)	BED MAT. SIEVE DIAM. % FINER THAN (80173)
MAY											
12...	1300	10	14	29	56	72	80	85	89	96	100

## MINNESOTA RIVER BASIN

05316900 DRY CREEK NEAR JEFFERS, MN

LOCATION.--Lat 44°07'21", long 94°12'13", in NE¼NE¼ sec.31, T.108 N., R.36 W., Cottonwood County, on right bank 17 ft upstream from culvert on County Road 10, 4.5 mi (7.2 km) north of Jeffers.

DRAINAGE AREA.--3.13 mi<sup>2</sup> (8.11 km<sup>2</sup>).

PERIOD OF RECORD.--Annual maximum discharge, water years 1961-81. June 1982 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Aug. 9, 1960, to Oct. 4, 1979, recording gage at present site and datum. Aug. 30, 1960, to present, crest-stage gage at same site and datum.

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 520 ft<sup>3</sup>/s (14.7 m<sup>3</sup>/s) May 7, 1983, gage height, 10.12 ft (3.085 m); maximum gage height, 10.64 ft (3.243 m) Apr. 6, 1965 (backwater from ice); no flow for several periods.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 520 ft<sup>3</sup>/s (14.7 m<sup>3</sup>/s) May 7, gage height, 10.12 ft (3.085 m); minimum discharge, 0.03 ft<sup>3</sup>/s (0.001 m<sup>3</sup>/s) Mar. 24, gage height, 3.72 ft (1.134 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.54	1.5	2.2	1.2	.48	9.8	35	3.6	1.6	58	.66	.43
2	1.9	1.4	2.2	1.1	.48	9.5	35	13	1.6	8.4	.66	.40
3	2.2	1.3	1.9	1.1	.51	11	21	6.0	1.6	12	.54	.40
4	1.2	1.2	1.8	1.1	.45	14	15	4.2	1.4	8.1	.54	.47
5	.84	1.1	1.8	1.0	.45	16	11	4.2	1.4	4.4	.54	.61
6	1.0	1.2	1.6	1.2	.42	45	9.5	65	1.4	3.4	.50	.50
7	.98	1.4	1.3	1.0	.42	14	14	129	1.2	2.9	.43	.40
8	.93	1.1	1.1	.98	.39	4.9	13	9.8	1.2	2.4	.40	.35
9	3.2	1.4	.98	1.2	.39	4.7	11	6.6	1.1	2.2	.40	.32
10	3.2	8.0	.89	1.3	.39	4.5	19	5.0	1.0	1.9	.38	.32
11	2.1	5.7	.84	.98	.39	4.4	14	4.2	1.0	1.7	.38	.35
12	1.7	5.6	1.8	.84	.42	3.8	9.8	4.1	1.3	1.5	.40	.35
13	1.5	5.0	1.2	1.2	.98	3.9	69	3.6	4.7	1.4	.38	.35
14	1.4	3.2	1.1	1.0	28	3.4	11	3.4	19	1.3	.35	.35
15	1.2	2.8	.93	.84	90	3.5	16	3.1	7.8	1.2	.38	.40
16	.98	2.5	.89	.89	82	3.1	17	3.0	3.8	1.1	.38	.38
17	.98	2.5	.98	.80	111	3.0	11	2.9	3.0	1.7	.38	.32
18	.98	3.5	1.1	.68	61	2.9	8.4	3.1	2.9	2.7	.43	.23
19	1.4	8.6	.98	.64	56	2.8	7.1	3.2	2.6	1.8	.32	.23
20	2.5	5.6	.98	.61	41	2.4	6.2	2.9	4.9	1.5	.28	.28
21	3.5	3.4	1.0	.64	11	2.4	5.4	2.7	3.6	1.2	.32	.21
22	3.6	2.7	1.1	.64	10	2.6	4.5	2.4	2.7	1.1	.32	.19
23	3.7	2.2	1.3	.64	14	2.6	4.1	2.2	2.2	1.0	.28	.17
24	3.0	2.1	1.2	.61	7.6	2.0	3.6	2.1	2.3	.98	.32	.13
25	2.5	2.2	1.8	.61	5.0	2.1	3.5	2.0	2.3	.93	.38	.12
26	2.2	1.8	1.2	.61	4.7	2.2	3.2	2.0	2.3	.85	.32	.10
27	2.0	1.7	1.2	.54	14	3.0	2.8	2.0	2.4	.89	.50	.08
28	1.9	2.0	.27	.61	13	2.4	2.8	1.9	2.9	.93	.38	.07
29	1.7	2.0	.58	.58	---	2.8	2.6	1.8	7.8	.89	.50	.57
30	1.5	2.0	1.4	.58	---	3.0	2.7	1.9	5.4	.74	.77	.61
31	1.5	---	1.4	.51	---	14	---	1.8	---	.70	.47	---
TOTAL	57.83	86.7	39.02	26.23	554.47	205.7	388.2	302.7	98.4	129.81	13.29	9.69
MEAN	1.87	2.89	1.26	.85	19.8	6.64	12.9	9.76	3.28	4.19	.43	.32
MAX	3.7	8.6	2.2	1.3	111	45	69	129	19	58	.77	.61
MIN	.54	1.1	.27	.51	.39	2.0	2.6	1.8	1.0	.70	.28	.07
CFSM	.60	.92	.40	.27	6.33	2.12	4.12	3.12	1.05	1.34	.14	.10
IN.	.69	1.03	.46	.31	6.59	2.44	4.61	3.60	1.17	1.54	.16	.12
AC-FT	115	172	77	52	1100	408	770	600	195	257	26	19

WTR YR 1983 TOTAL 1912.04 MEAN 5.24 MAX 129 MIN .07 CFSM 1.67 IN 22.72 AC-FT 3790

## MINNESOTA RIVER BASIN

05317000 COTTONWOOD RIVER NEAR NEW ULM, MN

LOCATION.--Lat 44°17'29", long 94°26'24", in SW¼NE¼ sec.33, T.110 N., R.30 W., Brown County, Hydrologic Unit 07020008, on left bank 600 ft (183 m) upstream from highway bridge, 1.8 mi (2.9 km) south of New Ulm, and 3.2 mi (5.1 km) upstream from mouth.

DRAINAGE AREA.--1,280 mi<sup>2</sup> (3,320 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--July 1909 to December 1913, March 1931 to March 1938, August 1938 to current year (winter records incomplete prior to 1936).

REVISED RECORDS.--WSP 355: 1912.

GAGE.--Water-stage recorder. Datum of gage is 796.83 ft (242.874 m) National Geodetic Vertical Datum of 1929. July 1, 1909, to Dec. 13, 1913, nonrecording gage at site 2.7 mi (4.3 km) upstream at different datum. Mar. 15, 1931, to Mar. 31, 1938, nonrecording gage 2.2 mi (3.5 km) upstream at datum 11.41 ft (3.477 m) higher. Aug. 23, 1938, to June 25, 1948, nonrecording gage at present site and datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--49 years (water years 1912-13, 1936-37, 1939-83), 289 ft<sup>3</sup>/s (8,184 m<sup>3</sup>/s), 3.07 in/yr (78 mm/yr), 209,400 acre-ft/yr (258 hm<sup>3</sup>/yr); median of yearly mean discharges, 223 ft<sup>3</sup>/s (6.32 m<sup>3</sup>/s), 2.37 in/yr (60 mm/yr), 161,600 acre-ft/yr (199 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,700 ft<sup>3</sup>/s (813 m<sup>3</sup>/s) Apr. 10, 1969, gage height, 19.15 ft (5.837 m); maximum gage height, 20.86 ft (6.358 m) Apr. 8, 1965, from floodmark (backwater from ice); minimum discharge observed, 0.5 ft<sup>3</sup>/s (0.014 m<sup>3</sup>/s) Nov. 27, 1952; minimum gage height, 0.72 ft (0.219 m) Nov. 20, 1964.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 1,300 ft<sup>3</sup>/s (36.8 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Nov. 21	2300	1,490 42.2	6.55 1.996	Apr. 14	1915	6,390 181	13.00 3.962
Feb. 22	1300	2,180 61.7	8.09 2.466	May 9	1000	*12,500 354	*15.36 4.682
Mar. 8	0345	4,950 140	11.86 3.615	June 16	0045	2,450 69.4	8.32 2.536
Apr. 4	0200	5,720 162	12.57 3.831	July 4	0445	5,350 152	11.98 3.652

Minimum discharge, 44 ft<sup>3</sup>/s (1.25 m<sup>3</sup>/s) Sept. 27, 28; minimum gage height, 1.62 ft (0.494 m) Sept. 27-29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	115	415	709	207	112	2270	2000	1250	760	1920	267	88		
2	139	391	694	206	112	2650	3850	1290	732	2610	245	82		
3	144	373	721	202	112	3020	5340	1590	729	3710	226	77		
4	179	353	778	200	112	3180	5620	2030	722	4850	209	75		
5	227	333	797	193	112	3410	5010	2180	692	3630	196	76		
6	261	320	772	188	112	3680	4220	2250	660	2960	183	74		
7	251	308	697	180	112	4500	3930	3580	628	2330	171	70		
8	260	301	548	170	112	4870	3750	7750	599	1900	160	65		
9	281	308	316	162	112	4370	3470	11500	578	1590	152	64		
10	343	362	284	155	112	3370	3350	9170	557	1360	134	58		
11	465	461	397	148	112	2790	3410	7170	542	1180	122	55		
12	500	833	480	143	112	2580	3500	4960	510	1040	119	52		
13	496	1030	475	140	115	2440	4270	3720	510	906	114	50		
14	465	956	460	138	118	2300	6100	3020	870	802	110	50		
15	434	944	450	135	125	2180	6090	2520	2140	718	105	64		
16	407	952	440	130	140	2080	5370	2160	2400	648	101	63		
17	380	926	425	128	210	1950	4410	1890	2120	586	98	59		
18	357	878	410	126	350	1820	3760	1690	1790	556	101	58		
19	357	882	400	124	560	1690	3420	1570	1540	549	98	59		
20	391	1090	380	122	800	1570	3180	1490	1370	665	91	59		
21	428	1440	360	120	1500	1480	2990	1420	1300	758	86	56		
22	499	1480	367	118	1900	1380	2730	1340	1310	713	81	54		
23	536	1400	380	117	1720	1290	2510	1270	1420	606	77	52		
24	559	1190	374	117	1730	1200	2280	1180	1390	530	75	51		
25	577	996	370	116	1720	1130	2060	1100	1280	472	90	49		
26	578	920	308	115	1720	1080	1860	1020	1160	422	85	48		
27	553	849	250	114	1640	1030	1680	963	1090	382	93	46		
28	524	791	200	113	1900	970	1520	929	1060	360	88	44		
29	495	784	138	112	---	952	1390	906	1140	334	98	48		
30	468	749	200	112	---	979	1310	837	1370	310	102	56		
31	441	---	208	112	---	1100	---	791	---	292	91	---		
TOTAL	12110	23015	13788	4463	17592	69311	104380	84536	32969	39689	3968	1802		
MEAN	391	767	445	144	628	2236	3479	2727	1099	1280	128	60.1		
MAX	578	1480	797	207	1900	4870	6100	11500	2400	4850	267	88		
MIN	115	301	138	112	112	952	1310	791	510	292	75	44		
CFSM	.31	.60	.35	.11	.49	1.75	2.72	2.13	.86	1.00	.10	.05		
IN.	.35	.67	.40	.13	.51	2.01	3.03	2.46	.96	1.15	.12	.05		
AC-FT	24020	45650	27350	8850	34890	137500	207000	167700	65390	78720	7870	3570		
CAL YR 1982	TOTAL	161393	MEAN	442	MAX	1810	MIN	25	CFSM	.35	IN	4.69	AC-FT	320100
WTR YR 1983	TOTAL	407623	MEAN	1117	MAX	11500	MIN	44	CFSM	.87	IN	11.85	AC-FT	808500

## MINNESOTA RIVER BASIN

05317200 LITTLE COTTONWOOD RIVER NEAR COURTLAND, MN

LOCATION.--Lat 44°14'47", long 94°20'19", in SW¼NE¼ sec.17, T.109 N., R.29 W., Blue Earth County, Hydrologic Unit 07020007, on right bank 30 ft (9.1 m) downstream from bridge on State Highway 68, 0.7 mi (1.1 km) above mouth, 1.5 mi (2.4 km) south of Courtland.

DRAINAGE AREA.--230 mi<sup>2</sup> (596 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--October 1973 to current year. September 1969 to September 1973, operated as a low-flow station only.

GAGE.--Water-stage recorder. Datum of gage is 788.25 ft (240.259 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period and those affected by beaver activity, which are fair.

AVERAGE DISCHARGE.--10 years, 50.4 ft<sup>3</sup>/s (1.427 m<sup>3</sup>/s), 2.98 in/yr (76 mm/yr), 36,510 acre-ft/yr (45.0 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 951 ft<sup>3</sup>/s (26.9 m<sup>3</sup>/s) July 7, 1983, gage height, 7.80 ft (2.377 m); maximum gage height, 8.29 ft (2.527 m) Mar. 26, 1979, (backwater from ice); minimum discharge, 0.01 ft<sup>3</sup>/s (0.001 m<sup>3</sup>/s) Sept. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 180 ft<sup>3</sup>/s (5.10 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Nov. 12	----	193 5.47	-- --	Apr. 16	0515	789 22.3	7.12 2.170
Nov. 21	----	218 6.17	3.61 1.100	May 7	1045	682 19.3	6.61 2.015
Mar. 7	0845	643 18.2	6.42 1.957	May 10	1645	643 18.2	6.42 1.957
Mar. 11	1815	483 13.7	5.58 1.701	June 15	0015	204 5.78	3.83 1.167
Apr. 5	0900	653 18.5	6.47 1.972	July 7	0600	*951 26.9	*7.80 2.377

Minimum discharge, 5.1 ft<sup>3</sup>/s (0.14 m<sup>3</sup>/s) Sept. 28-29; gage height, 1.89 ft (0.576 m); minimum gage height, 1.39 ft (0.424 m) Oct. 1.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	13	86	122	25	28	461	367	164	113	318	56	14		
2	21	79	120	27	28	504	475	203	110	358	51	13		
3	30	73	125	31	28	525	502	214	108	337	44	12		
4	31	70	128	34	27	532	578	193	102	500	40	11		
5	30	65	130	33	26	519	643	197	97	493	37	11		
6	47	62	128	33	25	556	618	342	92	727	34	11		
7	60	60	95	33	25	609	589	627	87	925	31	11		
8	57	57	68	33	24	541	517	555	84	813	28	10		
9	56	57	47	33	24	409	466	498	80	658	25	9.6		
10	60	82	45	33	24	344	474	620	76	521	22	9.2		
11	70	110	47	33	24	400	457	577	74	417	21	8.8		
12	83	180	49	33	24	392	436	476	69	349	20	8.3		
13	80	190	50	33	24	368	594	405	68	299	19	7.9		
14	78	188	52	33	24	334	620	354	139	256	17	7.9		
15	74	182	52	33	25	325	669	314	194	219	17	10		
16	72	175	52	33	27	313	776	286	147	189	16	12		
17	69	170	53	33	36	296	730	264	134	163	15	12		
18	63	165	55	33	60	280	624	247	134	150	15	11		
19	62	160	52	33	109	265	539	239	136	140	15	10		
20	98	185	50	33	190	249	467	231	143	128	13	11		
21	106	212	50	32	202	234	405	217	145	119	12	10		
22	120	195	51	31	200	213	357	203	136	111	12	9.2		
23	130	180	52	31	223	188	322	189	126	104	12	8.2		
24	125	170	52	31	260	170	292	175	119	95	11	7.5		
25	115	160	52	31	262	155	270	159	113	88	12	7.5		
26	110	152	50	31	273	144	250	146	105	81	13	7.1		
27	102	148	49	31	310	129	235	134	99	76	15	6.7		
28	99	140	43	30	402	137	222	135	125	73	14	5.6		
29	97	135	24	31	---	123	205	129	217	69	14	5.3		
30	93	128	22	30	---	120	177	124	197	66	16	6.0		
31	90	---	22	30	---	199	---	119	---	62	16	---		
TOTAL	2341	4016	1987	984	2934	10034	13876	8736	3569	8904	683	283.8		
MEAN	75.5	134	64.1	31.7	105	324	463	282	119	287	22.0	9.46		
MAX	130	212	130	34	402	609	776	627	217	925	56	14		
MIN	13	57	22	25	24	120	177	119	68	62	11	5.3		
CFSM	.33	.58	.28	.14	.46	1.41	2.01	1.23	.52	1.25	.10	.04		
IN.	.38	.65	.32	.16	.47	1.62	2.24	1.41	.58	1.44	.11	.05		
AC-FT	4640	7970	3940	1950	5820	19900	27520	17330	7080	17660	1350	563		
CAL YR 1982	TOTAL	26080.2	MEAN	71.5	MAX	402	MIN	3.1	CFSM	.31	IN	4.22	AC-FT	51730
WTR YR 1983	TOTAL	58347.8	MEAN	160	MAX	925	MIN	5.3	CFSM	.70	IN	9.44	AC-FT	115700



CAL YR 1982	TOTAL	134010	MEAN	367	MAX	1720	MIN	24	CFSM	.45	IN	6.14	AC-FT	265800
WTR YR 1983	TOTAL	301947	MEAN	827	MAX	4140	MIN	26	CFSM	1.02	IN	13.83	AC-FT	598900

## MINNESOTA RIVER BASIN

## 05320000 BLUE EARTH RIVER NEAR RAPIDAN, MN

LOCATION.--Lat 44°05'44", long 94°06'33", in SE¼SE¼ sec.6, T.107 N., R.27 W., Blue Earth County, Hydrologic Unit 07020009, on left bank 0.2 mi (0.3 km) downstream from abandoned powerplant of Northern States Power Co., 2 mi (3.2 km) west of Rapidan, 3.5 mi (5.6 km) downstream from Watonwan River, and 7.8 mi (12.6 km) upstream from Le Sueur River.

DRAINAGE AREA.--2,430 mi<sup>2</sup> (6,290 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--July 1909 to November 1910 (published as "at Rapidan Mills," no winter records), October 1939 to September 1945, July 1949 to current year.

REVISED RECORDS.--WSP 895: Drainage area. WSP 1508: 1910.

GAGE.--Water-stage recorder. Datum of gage is 807.83 ft (246.227 m) National Geodetic Vertical Datum of 1929. July 20, 1909, to Apr. 28, 1910, nonrecording gage at site 0.2 mi (0.3 km) upstream at different datum. Apr. 29 to Nov. 12, 1910, nonrecording gage at site 800 ft (244 m) upstream at different datum. Oct. 4 to Nov. 14, 1939, nonrecording gage at present site and datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--40 years (water years 1940-45, 1950-83), 895 ft<sup>3</sup>/s (25.35 m<sup>3</sup>/s), 5.00 in/yr (127 mm/yr), 648,400 acre-ft/yr (799 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 43,100 ft<sup>3</sup>/s (1,220 m<sup>3</sup>/s) Apr. 9, 1965, gage height, 21.36 ft (6.511 m), from floodmark; minimum, 6.9 ft<sup>3</sup>/s (0.20 m<sup>3</sup>/s) Oct. 12, 1955, gage height, 1.04 ft (0.317 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,800 ft<sup>3</sup>/s (362 m<sup>3</sup>/s) Mar. 3, gage height, 10.11 ft (3.082 m); minimum, 84 ft<sup>3</sup>/s (2.38 m<sup>3</sup>/s) Sept. 14, 15, gage height, 1.52 ft (0.463 m), due to construction on dam above site.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	563	1910	2140	1100	520	8200	4350	3830	2150	5690	702	200
2	653	1810	2080	1200	510	9630	5900	4010	2020	6280	652	194
3	1290	1730	2130	1300	500	9860	7410	4650	1930	6830	600	182
4	1970	1660	2280	1400	495	8650	9010	4990	1870	7510	556	173
5	2160	1570	2380	1480	490	8860	10100	5080	1790	7830	499	176
6	2060	1490	2330	1480	480	9190	10200	4990	1700	7770	469	165
7	1890	1410	2230	1460	470	9820	9650	5200	1610	7690	428	158
8	1920	1360	1980	1410	460	10300	9150	5540	1550	7480	409	162
9	1900	1340	1500	1400	450	10300	8880	5470	1480	6770	369	164
10	1840	1490	1270	1400	445	9850	8810	5240	1420	5860	336	163
11	1980	2250	1300	1390	440	9010	8720	4810	1370	4980	321	144
12	2170	3490	1330	1310	430	7940	8500	4420	1330	4270	294	148
13	2160	4200	1370	1120	425	7000	8940	4550	1310	3710	272	139
14	2070	4480	1400	931	420	6260	10000	4660	1530	3240	236	127
15	1950	4460	1420	910	425	5750	10900	4250	2450	2890	267	145
16	1840	4220	1440	860	455	5380	11800	3840	3210	2590	231	154
17	1730	3770	1450	820	517	5070	12200	3520	3370	2330	218	138
18	1620	3480	1440	800	637	4880	11900	3290	3190	2120	203	142
19	1570	3250	1400	760	907	4730	11300	3160	2830	1980	212	165
20	1660	3230	1350	740	1580	4580	10500	3140	2650	1950	193	172
21	2200	3200	1270	700	2520	4480	9470	3160	3010	1800	188	162
22	2990	3170	1210	680	3320	4370	8570	3170	3960	1620	199	224
23	3300	3100	1240	660	3950	4130	7820	3070	4530	1470	181	394
24	3210	2890	1210	640	4520	3800	7160	2900	4920	1330	182	386
25	2940	2620	1200	620	5210	3540	6540	2720	4990	1210	177	328
26	2740	2470	1190	600	5990	3390	5940	2550	4550	1110	175	310
27	2580	2340	1180	590	6440	3300	5400	2420	4510	1030	173	271
28	2430	2300	1170	580	7190	3090	4900	2350	4850	950	175	241
29	2290	2300	1150	560	---	3000	4460	2300	5060	882	240	234
30	2170	2300	1100	550	---	3020	4080	2270	5270	817	245	211
31	2030	---	1020	540	---	3200	---	2240	---	754	210	---
TOTAL	63876	79290	47160	29991	50196	194580	252560	117790	86410	112743	9612	5972
MEAN	2061	2643	1521	967	1793	6277	8419	3800	2880	3637	310	199
MAX	3300	4480	2380	1480	7190	10300	12200	5540	5270	7830	702	394
MIN	563	1340	1020	540	420	3000	4080	2240	1310	754	173	127
CFSM	.85	1.09	.63	.40	.74	2.58	3.47	1.56	1.19	1.50	.13	.08
IN.	.98	1.21	.72	.46	.77	2.98	3.87	1.80	1.32	1.73	.15	.09
AC-FT	126700	157300	93540	59490	99560	385900	501000	233600	171400	223600	19070	11850
CAL YR 1982	TOTAL	587705	MEAN 1610	MAX 5330	MIN 117	CFSM .66	IN 9.00	AC-FT 1166000				
WTR YR 1983	TOTAL	1050180	MEAN 2877	MAX 12200	MIN 127	CFSM 1.18	IN 16.08	AC-FT 2083000				

## MINNESOTA RIVER BASIN

05320500 LE SUEUR RIVER NEAR RAPIDAN, MN

LOCATION.--Lat 44°06'40", long 94°02'28", in SW¼ sec.35, T.108 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, on right bank 600 ft (183 m) downstream from highway bridge, 1.8 mi (2.9 km) northeast of Rapidan, and 2.3 mi (3.7 km) upstream from mouth.

DRAINAGE AREA.--1,100 mi<sup>2</sup> (2,850 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--October 1939 to September 1945, July 1949 to current year.

GAGE.--Water-stage recorder. Datum of gage is 775.76 ft (236.452 m) National Geodetic Vertical Datum of 1929. Prior to Nov. 15, 1939, nonrecording gage at same site and datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--40 years (water years 1940-45, 1950-83), 457 ft<sup>3</sup>/s (12.94 m<sup>3</sup>/s), 5.64 in/yr (143 mm/yr), 331,100 acre-ft/yr (408 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,700 ft<sup>3</sup>/s (700 m<sup>3</sup>/s) Apr. 8, 1965, gage height, 22.10 ft (6.736 m), from floodmark; maximum gage height, 22.72 ft (6.925 m) May 22, 1960, from floodmark; minimum daily discharge, 1.6 ft<sup>3</sup>/s (0.045 m<sup>3</sup>/s) Feb. 9-25, 1959; minimum gage height, 0.65 ft (0.198 m) Sept. 7-13, 1976.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 1,300 ft<sup>3</sup>/s (36.8 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Oct. 23	1715	1,360 38.5	4.14 1.262	Apr. 18	1930	5,280 150	8.37 2.551
Nov. 13	2400	2,380 67.4	5.45 1.661	May 8	0215	3,440 97.4	6.62 2.018
Feb. 24	1430	Ice jam --	*11.62 3.542	May 13	1830	4,270 121	7.44 2.268
Mar. 4	2030	*7,760 220	10.38 3.164	June 15	0445	1,600 45.3	4.47 1.362
Apr. 3	1815	5,390 153	8.47 2.582	July 3	2215	6,010 170	9.00 2.743

Minimum discharge, 46 ft<sup>3</sup>/s (1.30 m<sup>3</sup>/s) Aug. 21, 24-25, Sept. 13, 14, 15; minimum gage height, 1.19 ft (0.363 m) Aug. 20, 21, 24, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	108	604	742	410	335	3200	3560	1820	931	3150	190	115		
2	140	561	731	445	330	5700	4580	2040	870	4500	175	115		
3	254	519	743	480	330	6840	5260	2180	809	5130	160	107		
4	474	483	765	530	328	7510	5240	2250	756	5540	148	96		
5	513	454	789	560	326	7490	4650	2150	700	5060	135	91		
6	483	423	788	575	325	7260	4130	2030	656	4570	125	82		
7	431	408	754	595	325	7470	3920	2920	615	3930	115	75		
8	417	406	628	580	325	6880	3680	3310	597	3240	105	70		
9	419	386	353	580	325	5760	3540	3000	549	2700	98	66		
10	427	631	340	560	328	4620	3450	2640	518	2260	89	61		
11	405	1070	400	530	330	3940	3280	2270	472	1880	84	58		
12	383	1670	500	500	330	3430	3240	2060	452	1570	75	53		
13	359	1990	550	475	335	2950	4190	3890	444	1320	71	48		
14	337	2120	550	450	340	2650	4740	3470	938	1140	68	46		
15	317	1870	500	430	350	2490	4940	2650	1560	985	63	52		
16	293	1620	470	420	370	2370	5090	2200	1530	853	59	58		
17	280	1550	460	410	410	2250	5130	1900	1440	757	56	62		
18	263	1340	450	400	460	2140	5220	1710	1200	689	53	68		
19	262	1330	450	395	540	2100	5090	1660	1070	636	52	71		
20	402	1360	440	390	620	2100	4820	1770	1020	595	49	83		
21	745	1350	430	380	900	2050	4520	1770	915	550	51	157		
22	1080	1350	410	375	1500	1930	4330	1830	900	489	52	742		
23	1270	1240	390	370	2100	1800	4290	1750	986	447	51	768		
24	1280	1000	370	365	3200	1690	4150	1500	972	387	47	596		
25	1220	900	380	360	4000	1610	3800	1360	879	342	47	458		
26	1020	820	370	355	4030	1550	3250	1240	836	313	53	369		
27	908	774	360	350	3800	1500	2780	1140	868	286	77	300		
28	825	760	350	345	3290	1400	2390	1110	984	267	86	251		
29	762	760	355	340	---	1330	2130	1110	1330	245	107	215		
30	702	750	360	340	---	1360	1980	1080	1340	225	144	191		
31	651	---	370	335	---	2040	---	1010	---	205	124	---		
TOTAL	17430	30499	15548	13630	30182	107410	121370	62820	27137	54261	2809	5524		
MEAN	562	1017	502	440	1078	3465	4046	2026	905	1750	90.6	184		
MAX	1280	2120	789	595	4030	7510	5260	3890	1560	5540	190	768		
MIN	108	386	340	335	325	1330	1980	1010	444	205	47	46		
CFSM	.51	.93	.46	.40	.98	3.15	3.68	1.84	.82	1.59	.08	.17		
IN.	.59	1.03	.53	.46	1.02	3.63	4.10	2.12	.92	1.84	.09	.19		
AC-FT	34570	60490	30840	27040	59870	213000	240700	124600	53830	107600	5570	10960		
CAL YR 1982	TOTAL	244777	MEAN	671	MAX	3180	MIN	43	CFSM	.61	IN	8.28	AC-FT	485500
WTR YR 1983	TOTAL	488620	MEAN	1339	MAX	7510	MIN	46	CFSM	1.22	IN	16.52	AC-FT	969200

## MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN

LOCATION.--Lat 44°09'58", long 94°00'57", in NW¼NE¼ sec.13, T.108 N., R.27 W., Nicollet County, Hydrologic Unit 07020007, on left bank 12 ft (3.7 m) downstream from bridge on U.S. Highway 169 in North Mankato, 1.1 mi (1.8 km) downstream from Blue Earth River and at mile 107.1 (172.3 km) upstream from Mississippi River.

DRAINAGE AREA.--14,900 mi<sup>2</sup> (38,600 km<sup>2</sup>), approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to current year (no winter records 1904, 1906-10, 1918-29). Monthly discharge only for some periods, published in WSP 1308. Published as "near Mankato": 1903-21.

REVISED RECORDS.--WSP 875: 1917. WSP 955: Drainage area. WSP 1085: 1929. WSP 1238: 1903, 1908, 1919. WSP 1508: 1916(M), 1918(M), 1926(M), 1928, 1930, 1932(M), 1938(M). WDR-MN-76-1: 1881(M).

GAGE.--Water-stage recorder. Datum of gage is 747.92 ft (227.966 m) National Geodetic Vertical Datum of 1929. Prior to Oct. 19, 1921, nonrecording gage, at site 1.1 mi (1.8 km) upstream at datum 6.4 ft (2.0 m) higher. Mar. 15, 1922, to Nov. 30, 1924, nonrecording gage, and Dec. 1, 1924 to May 24, 1971, recorder at site 0.5 mi (0.8 km) downstream at present datum. May 25, 1971 to Aug. 14, 1977, recorder at site 0.2 mi (0.3 km) downstream at present datum. Aug. 14, 1977 to July 27, 1978, nonrecording gage at present site and datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--62 years (water years 1905, 1911-17, 1930-83), 2,800 ft<sup>3</sup>/s (79.3 m<sup>3</sup>/s), 2.55 in/yr (65 mm/yr), 2,029,000 acre-ft/yr (2.50 km<sup>3</sup>/yr); median of yearly mean discharges, 2,510 ft<sup>3</sup>/s (71 m<sup>3</sup>/s) 2.29 in/yr (58 mm/yr), 1,818,000 acre-ft/yr (2.24 km<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,100 ft<sup>3</sup>/s (2,660 m<sup>3</sup>/s) Apr. 10, 1965, gage height, 29.09 ft (8.867 m); minimum observed, 26 ft<sup>3</sup>/s (0.74 m<sup>3</sup>/s) Aug. 4, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since Apr. 26, 1881, 29.9 ft (9.114 m) present site and datum, from floodmark, discharge, 110,000 ft<sup>3</sup>/s (3,120 m<sup>3</sup>/s).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 33,300 ft<sup>3</sup>/s (943 m<sup>3</sup>/s) Apr. 18, gage height, 22.13 ft (6.745 m); minimum, 640 ft<sup>3</sup>/s (18.1 m<sup>3</sup>/s) Aug. 25, 26, gage height, 3.85 ft (1.173 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1150	4200	6000	3600	1800	16600	13600	13600	6480	13300	2290	816
2	1310	3980	6040	3550	1750	20000	17300	13600	6120	16600	2110	800
3	1860	3810	6180	3450	1750	22500	20600	14000	5900	18400	1960	767
4	2730	3560	6360	3400	1700	23100	23500	14300	5700	20700	1840	767
5	3160	3390	6530	3350	1700	23400	25900	14600	5510	21800	1720	791
6	3290	3280	6460	3300	1650	24400	27000	15100	5290	21300	1620	775
7	3120	3120	6210	3200	1650	26000	26900	16600	5090	20500	1540	824
8	3130	3030	5370	3200	1600	27500	26200	18500	4900	19500	1450	887
9	3180	2990	4130	3150	1550	27900	25500	19400	4720	17800	1360	928
10	3180	3450	3940	3050	1550	26700	25100	20700	4520	15800	1250	936
11	3380	4450	5800	2950	1500	25100	24500	21300	4350	13900	1180	920
12	3870	6660	5700	2900	1500	23300	23900	20700	4220	12000	1140	936
13	4020	8280	5500	2800	1500	21600	25200	21000	4160	10300	1090	944
14	3930	8890	5300	2750	1500	20200	27700	20500	4980	8800	1040	944
15	3750	8320	5100	2700	1500	19200	29600	18900	7020	7720	992	1030
16	3590	8050	4850	2600	1530	18400	31700	17400	9510	6920	968	1110
17	3520	7610	4600	2550	1670	17600	32600	15900	10400	6190	920	1120
18	3440	7290	4300	2500	1840	16900	32800	14400	10300	5610	875	1160
19	3420	7040	4150	2450	2210	16300	31700	13400	9890	5210	856	1210
20	3720	7240	4000	2400	3500	15700	29800	12600	9590	5080	822	1180
21	4500	7970	3950	2350	6000	15200	27500	12200	9610	4970	827	1100
22	5740	8950	3900	2300	9000	14600	25500	11800	10400	4660	736	1490
23	6550	9040	3850	2250	10000	13800	23900	11100	10900	4250	690	1740
24	6660	7830	3800	2200	11100	13000	22300	10400	11000	3840	654	1720
25	6370	6550	3800	2150	12500	12200	20900	9630	10700	3490	675	1500
26	6010	6280	3750	2100	13900	11700	19400	8930	9790	3210	720	1390
27	5670	6030	3700	2050	14100	11300	18000	8340	9250	3020	775	1250
28	5390	6020	3700	1950	14600	10700	16700	7870	9500	2890	767	1180
29	5120	6220	3650	1900	---	10100	15500	7670	10300	2750	848	1090
30	4790	6060	3650	1880	---	9870	14500	7280	10800	2590	960	1060
31	4460	---	3600	1850	---	10400	---	6860	---	2450	895	---
TOTAL	124010	179590	147870	82830	126150	565270	725400	438580	230900	305550	35570	32365
MEAN	4000	5986	4770	2672	4505	18230	24180	14150	7697	9856	1147	1079
MAX	6660	9040	6530	3600	14600	27900	32800	21300	11000	21800	2290	1740
MIN	1150	2990	3600	1850	1500	9870	13600	6860	4160	2450	654	767
CFSM	.27	.40	.32	.18	.30	1.22	1.62	.95	.52	.66	.08	.07
IN.	.31	.45	.37	.21	.31	1.41	1.81	1.09	.58	.76	.09	.08
AC-FT	246000	356200	293300	164300	250200	1121000	1439000	869900	458000	606100	70550	64200
CAL YR 1982 TOTAL	1654513			MEAN 4533		MAX 14400	MIN 520	CFSM .30	IN 4.13	AC-FT 3282000		
WTR YR 1983 TOTAL	2994085			MEAN 8203		MAX 32800	MIN 654	CFSM .55	IN 7.48	AC-FT 5939000		

## MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1963-66, 1968 to current year.

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1967 to September 30, 1981, October 1982 to September 30, 1983.

SUSPENDED-SEDIMENT DISCHARGE: October 1967 to current year.

REMARKS.--During the winter period, suspended-sediment samples were collected weekly and daily sediment load was estimated on the basis of water records and these sediment samples. Water temperature was obtained once-daily during open water period and occasionally for the winter period. Temperature records are considered fair.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum daily, 30.5°C July 15, 1980; minimum daily, 0.0°C on many days each year.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,850 mg/L Aug. 7, 1968; minimum daily mean, 13 mg/L Nov. 24, 1974, Feb. 18, 19, 1979.

SEDIMENT LOADS: Maximum daily, 247,000 tons (224,100 tonnes) Apr. 9, 1969; minimum daily, 5.2 tons (4.7 tonnes) Nov. 6, 1976.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum daily, 27.0°C July 19, 21, 23, Aug. 20, Sept. 3, 8, 10; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 850 mg/L July 1; minimum daily mean, 41 mg/L Sept. 21.

SEDIMENT LOADS: Maximum daily, 41,300 tons (37,500 tonnes) Mar. 3; minimum daily, 122 tons (111 tonnes) Sept. 21.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.0	10.0	4.0	---	---	1.5	5.0	13.0	17.0	22.0	24.0	26.0
2	15.0	8.0	---	---	---	2.0	5.0	13.0	16.0	22.0	25.0	26.0
3	17.0	5.0	4.0	---	---	2.5	5.0	15.0	17.0	23.0	26.0	27.0
4	15.0	4.0	3.0	---	---	3.5	6.0	13.0	17.0	20.0	26.0	25.0
5	---	---	3.0	---	---	---	5.5	15.0	16.0	20.0	26.0	24.0
6	---	---	4.0	---	---	---	5.5	14.0	16.0	20.0	26.0	22.0
7	14.0	5.0	---	.0	---	---	5.5	13.0	17.0	21.0	25.0	23.0
8	14.0	---	---	---	---	---	6.0	14.0	20.0	24.0	26.0	27.0
9	14.0	---	---	---	---	.5	5.0	13.0	20.0	24.0	25.0	26.0
10	13.0	5.0	---	---	---	.0	6.0	14.0	21.0	25.0	25.0	27.0
11	12.0	5.0	---	---	---	.0	5.0	15.0	21.0	25.0	23.0	22.0
12	12.0	---	---	---	---	---	5.5	16.0	21.0	22.0	21.0	20.0
13	12.0	---	---	---	---	---	5.5	16.0	21.0	24.0	22.0	18.0
14	13.0	---	---	---	---	---	---	15.0	---	26.0	23.0	17.0
15	12.0	---	---	---	---	2.0	5.5	14.0	20.0	22.0	24.0	16.0
16	12.0	---	---	---	---	2.0	5.5	14.0	---	25.0	26.0	---
17	14.0	4.0	---	---	---	3.0	5.5	14.0	18.0	26.0	26.0	---
18	13.0	3.0	---	---	---	2.0	5.5	13.0	18.0	25.0	26.0	---
19	12.0	5.0	---	---	---	4.0	5.5	12.0	20.0	27.0	22.0	15.0
20	8.0	5.0	---	---	1.0	4.0	---	13.0	21.0	26.0	27.0	13.0
21	8.0	4.0	---	---	1.0	2.0	---	14.0	22.0	27.0	26.0	14.0
22	9.0	3.0	---	---	---	4.0	---	15.0	24.0	---	26.0	---
23	10.0	---	---	---	---	5.0	---	15.0	24.0	27.0	25.0	---
24	10.0	---	---	---	.5	5.0	---	16.0	22.0	25.0	25.0	---
25	10.0	---	---	---	1.0	5.0	---	---	24.0	25.0	25.0	17.0
26	11.0	---	---	---	---	3.0	---	16.0	25.0	25.0	---	15.0
27	10.0	---	---	---	2.0	3.0	---	16.0	22.0	25.0	---	19.0
28	10.0	---	---	---	2.0	5.0	---	17.0	21.0	25.0	---	19.0
29	10.0	---	---	---	---	4.0	---	16.0	20.0	25.0	---	21.0
30	9.0	---	---	---	---	5.0	---	15.0	22.0	26.0	---	20.0
31	9.0	---	---	---	---	5.0	---	16.0	---	26.0	---	---

## MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	75	233	298	3380	139	2250	68	661	50	243	551	24700
2	81	286	256	2750	162	2640	63	604	50	236	732	39500
3	194	974	215	2210	295	4920	60	559	50	236	680	41300
4	500	3690	171	1640	298	5120	55	505	51	234	625	39000
5	498	4250	188	1720	259	4570	52	470	51	234	487	30800
6	479	4250	201	1780	262	4570	48	428	52	232	455	30000
7	359	3020	160	1350	250	4190	45	389	52	232	460	32300
8	303	2560	99	810	171	2480	45	389	52	225	332	24700
9	375	3220	102	823	152	1690	45	383	53	222	308	23200
10	422	3620	220	2050	149	1590	45	371	53	222	287	20700
11	337	3080	265	3180	145	2270	45	358	53	215	260	17600
12	398	4160	510	9170	142	2190	45	352	54	219	171	10800
13	484	5250	515	11500	138	2050	46	348	54	219	141	8220
14	345	3660	450	10800	135	1930	46	342	55	223	157	8560
15	315	3190	458	10300	130	1790	47	343	55	223	180	9330
16	291	2820	428	9300	127	1660	47	330	56	231	188	9340
17	245	2330	320	6580	122	1520	47	324	56	253	199	9460
18	282	2620	332	6530	120	1390	48	324	68	338	198	9030
19	399	3680	347	6600	115	1290	48	318	115	686	151	6650
20	300	3010	345	6740	111	1200	48	311	158	1490	144	6100
21	328	3990	390	8390	108	1150	48	305	133	2150	156	6400
22	448	6940	361	8720	103	1080	48	298	132	3210	165	6500
23	450	7960	310	7570	100	1040	48	292	173	4670	156	5810
24	471	8470	275	5810	98	1010	48	285	248	7430	139	4880
25	488	8390	251	4440	92	944	49	284	148	4990	150	4940
26	387	6280	238	4040	90	911	49	278	215	8070	150	4740
27	385	5890	239	3890	85	849	49	271	429	16300	147	4480
28	318	4630	252	4100	82	819	49	258	620	24400	198	5720
29	352	4870	278	4670	78	769	49	251	---	---	190	5180
30	368	4760	290	4740	75	739	50	254	---	---	132	3520
31	338	4070	---	---	70	680	50	250	---	---	182	5110
TOTAL	---	126153	---	155583	---	61301	---	11135	---	77633	---	458570
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	390	14300	127	4660	181	3170	850	30500	230	1420	84	185
2	455	21300	192	7050	189	3120	652	29200	207	1180	95	205
3	502	27900	212	8010	263	4190	508	25200	193	1020	90	186
4	415	26300	169	6530	270	4160	441	24600	190	944	83	172
5	308	21500	259	10200	195	2900	390	23000	188	873	90	192
6	225	16400	255	10400	124	1770	340	19600	181	792	89	186
7	238	17300	362	16200	133	1830	296	16400	177	736	117	260
8	250	17700	430	21500	118	1560	261	13700	156	611	101	242
9	171	11800	470	24600	122	1550	241	11600	129	474	79	198
10	205	13900	398	22200	127	1550	237	10100	166	560	84	212
11	167	11000	357	20500	150	1760	237	8890	200	637	87	216
12	147	9490	381	21300	105	1200	263	8520	97	299	80	202
13	264	18000	590	33500	142	1590	297	8260	74	218	70	178
14	347	26000	352	19500	210	2820	327	7770	70	197	66	168
15	250	20000	237	12100	582	11000	333	6940	74	198	68	189
16	257	22000	268	12600	548	14100	321	6000	75	196	62	186
17	239	21000	240	10300	409	11500	310	5180	72	179	87	263
18	140	12400	148	5750	367	10200	300	4540	73	172	98	307
19	120	10300	119	4310	340	9080	288	4050	66	153	81	265
20	118	9490	151	5140	318	8230	280	3840	74	164	58	185
21	114	8500	119	3920	310	8040	274	3680	85	190	41	122
22	111	7640	119	3790	314	8820	270	3400	78	155	332	1340
23	110	7100	121	3630	324	9540	263	3020	88	164	331	1560
24	135	8130	195	5480	331	9830	261	2710	80	141	260	1210
25	145	8180	234	6080	332	9590	270	2540	95	173	193	782
26	168	8800	229	5520	338	8930	280	2430	85	165	150	563
27	180	8750	281	6330	326	8140	293	2390	70	146	164	553
28	126	5680	280	5950	311	7980	302	2360	80	166	139	443
29	108	4520	308	6380	300	8340	297	2210	100	229	109	321
30	110	4310	295	5800	380	11100	278	1940	104	270	102	292
31	---	---	277	5130	---	---	255	1690	83	201	---	---
TOTAL	---	419690	---	334360	---	187590	---	296260	---	13023	---	11383
TOTAL LOAD FOR YEAR:		2152681 TONS.										

## MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)
MAR 04...	1015	23200	3.5	569	35600	33	37

DATE	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
MAR 04...	40	53	76	82	97	100

## PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (00010)	BED MAT. SIEVE DIAM. PLING POINTS (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)
APR 18...	1250	33000	5.5	4	2	4	9	50

DATE	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
APR 18...	71	77	83	93	98	100

## MINNESOTA RIVER BASIN

05327000 HIGH ISLAND CREEK NEAR HENDERSON, MN

LOCATION.--Lat 44°34'19", long 93°55'18", in NE¼NW¼ sec.26, T.113 N., R.26 W., Sibley County, Hydrologic Unit 07020012, on left bank 20 ft (6.1 m) downstream from bridge on County Road 6, 1.6 mi (2.6 km) upstream from mouth, and 3.1 mi (5.0 km) north of Henderson.

DRAINAGE AREA.--237 mi<sup>2</sup> (614 km<sup>2</sup>).

PERIOD OF RECORD.--October 1973 to current year. May 1970 to September 1973, operated as a low-flow station only.

GAGE.--Water-stage recorder. Datum of gage is 728.56 ft (222.065 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period, which are fair, and those for periods of no gage height record, oct. 1-12, 21-25, which are poor.

AVERAGE DISCHARGE.--10 years, 72.5 ft<sup>3</sup>/s (2.053 m<sup>3</sup>/s), 4.15 in/yr (105 mm/yr), 52,530 acre-ft/yr (64.8 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,760 ft<sup>3</sup>/s (49.8 m<sup>3</sup>/s) Aug. 25, 1981, gage height, 9.09 ft (2.771 m); minimum discharge, 0.20 ft<sup>3</sup>/s (0.006 m<sup>3</sup>/s) Jan. 4, 1981, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 300 ft<sup>3</sup>/s (8.50 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Mar. 6	2330	994 28.2	6.18 1.884	May 13	0415	301 8.52	3.01 0.917
Mar. 11	1900	669 18.9	4.80 1.463	June 21	1145	667 18.9	4.79 1.460
Mar. 31	1900	878 24.9	5.70 1.737	July 3	1500	902 25.5	5.80 1.768
Apr. 7	0545	703 19.9	4.95 1.509	Aug. 25	0700	832 23.6	5.51 1.679
Apr. 13	1700	*1,140 32.3	*6.78 2.067				

Minimum discharge, 9.6 ft<sup>3</sup>/s (0.27 m<sup>3</sup>/s) Aug. 24-25, gage height, 1.01 ft (0.308 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	25	67	190	61	32	507	734	305	91	210	76	118		
2	31	64	188	68	32	534	573	298	88	206	69	97		
3	40	60	180	72	27	599	471	275	105	421	65	91		
4	38	56	169	69	25	637	432	251	100	553	60	94		
5	47	53	163	66	25	584	446	231	93	417	55	104		
6	60	47	157	62	24	777	553	221	86	345	51	101		
7	70	51	129	60	22	888	682	268	79	307	47	94		
8	68	47	123	60	20	644	642	252	72	297	43	83		
9	66	47	130	59	19	553	595	227	68	284	39	78		
10	80	77	132	58	18	540	608	210	62	267	35	69		
11	90	96	132	57	18	575	553	200	56	244	31	63		
12	95	172	128	55	17	580	501	205	50	230	28	55		
13	82	128	122	54	18	556	980	282	48	218	24	47		
14	85	122	118	52	18	525	928	240	77	193	22	42		
15	87	127	112	50	19	481	770	212	83	171	19	48		
16	87	131	110	49	20	460	881	196	82	179	17	55		
17	87	139	104	48	22	438	899	186	85	190	17	54		
18	85	156	99	46	24	423	838	178	87	184	16	54		
19	84	214	95	45	29	408	763	173	91	160	15	48		
20	110	280	93	42	63	389	676	165	99	137	13	49		
21	120	250	83	40	110	362	581	156	275	118	12	46		
22	125	220	80	38	165	346	528	141	318	110	11	43		
23	130	199	77	38	206	321	488	129	234	106	11	42		
24	110	172	75	38	187	304	442	121	212	105	10	42		
25	90	189	72	38	164	287	405	112	189	106	306	42		
26	78	194	69	38	177	271	388	106	177	107	208	39		
27	78	199	66	37	266	255	376	109	185	106	105	37		
28	78	200	63	38	496	245	372	105	165	105	70	35		
29	75	195	60	35	---	242	350	102	158	98	59	34		
30	72	191	58	34	---	249	325	99	157	88	194	35		
31	68	---	56	33	---	590	---	96	---	82	172	---		
TOTAL	2441	4143	3433	1540	2263	14570	17780	5851	3672	6344	1900	1839		
MEAN	78.7	138	111	49.7	80.8	470	593	189	122	205	61.3	61.3		
MAX	130	280	190	72	496	888	980	305	318	553	306	118		
MIN	25	47	56	33	17	242	325	96	48	82	10	34		
CFSM	.33	.58	.47	.21	.34	1.98	2.50	.80	.52	.87	.26	.26		
IN.	.38	.65	.54	.24	.36	2.29	2.79	.92	.58	1.00	.30	.29		
AC-FT	4840	8220	6810	3050	4490	28900	35270	11610	7280	12580	3770	3650		
CAL YR 1982	TOTAL	48835.9	MEAN	134	MAX	994	MIN	1.9	CFSM	.57	IN	7.67	AC-FT	96870
WTR YR 1983	TOTAL	65776.0	MEAN	180	MAX	980	MIN	10	CFSM	.76	IN	10.32	AC-FT	130500



## MINNESOTA RIVER BASIN

## 05330000 MINNESOTA RIVER NEAR JORDAN, MN

LOCATION.--Lat 44°41'35", long 93°38'30", in NW¼SW¼ sec.7, T.114 N., R.23 W., Carver County, Hydrologic Unit 07020012, on pier at center downstream side of bridge, 1.5 mi (2.4 km) northwest of Jordan, and at mile 39.4 (63.4 km) upstream from Mississippi River.

DRAINAGE AREA.--16,200 mi<sup>2</sup> (42,000 km<sup>2</sup>), approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1934 to current year. Prior to Oct. 1, 1966, published as "near Carver, Minn".

REVISED RECORDS.--WSP 955: Drainage area. WSP 1508: 1935.

GAGE.--Water-stage recorder. Datum of gage is 690.00 ft (210.312 m) National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1966, water-stage recorder 2.8 mi (4.5 km) downstream with auxiliary nonrecording gage at present site and present datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--49 years, 3,520 ft<sup>3</sup>/s (99.69 m<sup>3</sup>/s), 2.95 in/yr (75 mm/yr), 2,550,000 acre-ft/yr (3.14 km<sup>3</sup>/yr); median of yearly mean discharges, 3,040 ft<sup>3</sup>/s (86.1 m<sup>3</sup>/s), 2.55 in/yr (65 mm/yr), 2,200,000 acre-ft/yr (2.71 km<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 117,000 ft<sup>3</sup>/s (3,310 m<sup>3</sup>/s) Apr. 11, 1965; maximum gage height, 35.07 ft (10.689 m) Apr. 12, 1965 (backwater from Mississippi River); minimum discharge, 79 ft<sup>3</sup>/s (2.24 m<sup>3</sup>/s) Nov. 17, 1955; minimum gage height, 2.66 ft (0.811 m) Nov. 22, 1935.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 33,700 ft<sup>3</sup>/s (954 m<sup>3</sup>/s) Apr. 19, gage height, 26.14 ft (7.967 m); minimum, 1,040 ft<sup>3</sup>/s (29.5 m<sup>3</sup>/s) Aug. 25, gage height, 5.41 ft (1.649 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1410	5020	7010	4100	2250	13500	13000	17700	7970	12200	3510	2780		
2	1420	4760	6940	4000	2200	16200	14000	17000	7530	13600	3300	2360		
3	1490	4540	6910	3950	2200	22200	15100	16300	7330	15200	3100	2010		
4	1730	4360	7020	3900	2150	24400	16500	15600	7120	17300	2900	1800		
5	2480	4200	7140	3800	2150	26100	18200	15200	6830	20200	2700	1710		
6	3220	4060	7240	3700	2100	27600	21400	15100	6540	23400	2540	1770		
7	3520	3930	7220	3600	2100	28700	25200	15400	6270	25100	2380	1710		
8	3520	3780	6960	3550	2050	29700	27200	16300	6000	25500	2260	1580		
9	3500	3680	6200	3500	2000	30000	28000	17400	5750	25100	2130	1560		
10	3570	3800	4380	3450	2000	29800	27500	18500	5540	23900	2020	1520		
11	3600	4390	3640	3350	1950	29400	27200	19500	5360	22300	1900	1470		
12	3700	5540	4080	3300	1950	28500	26800	20600	5190	20200	1810	1410		
13	4060	7240	4590	3250	1950	27500	26900	21700	5050	18400	1730	1340		
14	4340	8410	5000	3200	1950	26200	28000	22100	5120	17000	1640	1310		
15	4370	8990	5680	3150	1950	24600	29200	21900	5960	15200	1580	1360		
16	4260	9170	5400	3100	1980	23400	30200	21400	7580	12600	1510	1520		
17	4150	8900	5200	3000	2050	22000	31500	20200	9130	10300	1480	1650		
18	4050	8580	5000	2950	2200	20800	32900	18900	10100	8750	1390	1660		
19	4000	8360	4700	2900	2500	19700	33300	17900	10600	7660	1330	1620		
20	4150	8440	4500	2850	2800	18900	33100	17100	10700	6960	1250	1650		
21	4510	8720	4450	2800	4000	18200	32100	16200	11300	6570	1220	1690		
22	5030	9040	4400	2750	5400	17500	30500	15300	12600	6270	1190	1630		
23	5860	9450	4350	2700	6800	17000	28800	14400	12900	5950	1120	1620		
24	6600	9580	4300	2650	8700	16500	27100	13600	12800	5520	1070	1990		
25	6850	9100	4250	2600	10200	16000	25500	12700	12800	5090	1460	2100		
26	6720	8200	4250	2550	10800	15300	24200	11700	12600	4710	2030	1960		
27	6440	7630	4200	2500	11400	14700	22500	10700	12200	4400	2110	1790		
28	6120	7300	4200	2450	12000	13900	20900	10000	11500	4180	2040	1630		
29	5830	7130	4200	2400	---	13200	19500	9360	11200	4000	1920	1510		
30	5550	7130	4150	2350	---	12500	18600	8860	11400	3830	2350	1420		
31	5260	---	4150	2300	---	12300	---	8460	---	3680	2950	---		
TOTAL	131310	203430	161710	96650	111780	656300	754900	497080	262970	395070	61920	51130		
MEAN	4236	6781	5216	3118	3992	21170	25160	16030	8766	12740	1997	1704		
MAX	6850	9580	7240	4100	12000	30000	33300	22100	12900	25500	3510	2780		
MIN	1410	3680	3640	2300	1950	12300	13000	8460	5050	3680	1070	1310		
CFSM	.26	.42	.32	.19	.25	1.31	1.55	.99	.54	.79	.12	.11		
IN.	.30	.47	.37	.22	.26	1.51	1.73	1.14	.60	.91	.14	.12		
AC-FT	260500	403500	320800	191700	221700	1302000	1497000	986000	521600	783600	122800	101400		
CAL YR 1982	TOTAL	1896343	MEAN	5195	MAX	17200	MIN	580	CFSM	.32	IN	4.35	AC-FT	3761000
WTR YR 1983	TOTAL	3384250	MEAN	9272	MAX	33300	MIN	1070	CFSM	.57	IN	7.77	AC-FT	6713000

## MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1963-69, 1972 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1973 to current year.

pH: January 1974 to current year.

WATER TEMPERATURES: July 1973 to current year.

DISSOLVED OXYGEN: July 1973 to current year.

INSTRUMENTATION.--Water-quality monitor since July 1973.

REMARKS.--Extremes are for years with 80 percent or more daily record. Letter K indicates non-ideal colony count. Letter E indicates estimated value. Water is pumped to a monitor that is inside a heated shelter; therefore, water temperature during the winter period may be affected.

COOPERATION.--Water-quality monitor is operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1978, 1980-83): Maximum, 1,290 micromhos Oct. 13, 1982; minimum, 324 micromhos June 3, 1980.

pH (water years 1978, 1980-82): Maximum, 8.9 units May 4, Sept. 15, 1982; minimum, 6.4 units Aug. 11, 1982.

WATER TEMPERATURES (water years 1978-83): Maximum, 30.0°C July 15, 1980; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN (water years 1978-83): Maximum, 19.6 mg/L Oct. 19, 1978; minimum, 2.5 mg/L Sept. 5, 1978.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 1,290 micromhos Oct. 13; minimum, 514 micromhos Aug. 9.

WATER TEMPERATURES: Maximum, 29.5°C July 22 and 23, Aug. 6 and 7; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN: Maximum, 16.0 mg/L Dec. 17, Mar. 31; minimum, 4.7 mg/L Aug. 28.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 18...	1305	4040	--	--	--	--	--	11.5	--	--	--
NOV 09...	1200	3680	1030	1060	8.4	8.1	4.0	4.0	22	755	12.5
FEB 24...	1300	8680	545	574	8.0	7.9	-1.0	.0	55	754	12.6
APR 11...	1300	27500	850	857	8.0	8.1	10.0	5.5	17	760	11.3
AUG 23...	1200	1060	850	808	8.2	8.1	25.0	22.0	24	--	7.5

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT 18...	--	--	--	--	--	--	--	--	--	--	--
NOV 09...	97	150	490	120	52	26	3.5	319	190	40	.40
FEB 24...	87	1000	K16000	66	23	8.7	5.3	182	66	21	.40
APR 11...	90	60	1000	110	41	14	3.7	238	160	25	.40
AUG 23...	E90	92	1400	82	46	31	4.8	246	160	34	.30

## MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, DIS- SOLVED TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED TOTAL (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED TOTAL (MG/L AS P) (00671)	SEDI- MENT, DIS- SOLVED TOTAL (MG/L AS P) (80154)	SEDI- MENT, DIS- SOLVED TOTAL (MG/L AS P) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 18...	--	--	--	--	--	--	--	--	341	3720	90
NOV 09...	22	620	9.90	.130	.80	.140	.070	.060	156	1550	88
FEB 24...	15	352	7.90	.430	2.2	.470	.280	.250	196	4590	84
APR 11...	18	577	10.0	<.010	.50	.150	.080	.070	71	5270	59
AUG 23...	15	515	<.100	.020	1.5	.170	.030	<.010	98	280	95

DATE	TIME	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
NOV 09...	1200	10	4	100	<1	<1	<1	<3	1	17	1
FEB 24...	1300	<10	3	62	<1	<1	<1	<3	8	30	3
APR 11...	1300	30	2	85	<1	<1	<1	<3	2	8	5
AUG 23...	1200	50	3	110	<.5	<1	<1	<3	3	4	1

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 09...	37	9	<.1	20	<1	1	--	430	<6	<4
FEB 24...	15	26	<.1	<10	10	<1	<1	190	<6	8
APR 11...	31	7	<.1	<10	2	4	<1	320	<6	3
AUG 23...	38	29	<.1	<10	2	1	<1	370	7	13

DATE	TIME	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)
APR 11...	1300	19	<1.1	7.9	3.9	7.7	3.8	.10	17
AUG 23...	1200	21	<2.4	15	3.6	13	3.4	.40	7.1

## MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	769	743	755	1060	1050	1050	---	---	---	860	738	796
2	810	769	797	1060	1040	1060	---	---	---	904	866	895
3	835	789	815	1060	1060	1060	---	---	---	902	894	897
4	860	824	842	---	---	---	---	---	---	894	858	882
5	875	837	856	---	---	---	---	---	---	898	876	887
6	942	860	893	---	---	---	---	---	---	906	890	898
7	975	942	965	---	---	---	1030	1000	1020	914	898	909
8	1040	966	1020	---	---	---	1000	993	999	916	898	907
9	1060	1040	1050	---	---	---	1150	999	1080	918	906	915
10	1140	1080	1110	---	---	---	1170	1150	1160	920	906	912
11	1180	1150	1120	---	---	---	1170	1140	1170	924	904	919
12	1230	1200	1210	---	---	---	1220	1170	1200	956	924	936
13	1290	1260	1270	---	---	---	1230	1220	1220	982	960	970
14	---	---	---	---	---	---	1230	1190	1210	1010	984	997
15	---	---	---	---	---	---	1250	1180	1230	1040	1010	1030
16	---	---	---	---	---	---	1240	1080	1160	1070	1040	1060
17	---	---	---	---	---	---	1230	1210	1220	1080	1070	1080
18	---	---	---	---	---	---	1260	1240	1250	1100	1080	1080
19	---	---	---	986	940	972	1260	1250	1260	1110	1100	1100
20	---	---	---	991	952	976	1220	1200	1210	1120	1100	1110
21	1050	876	959	959	943	951	1220	1190	1200	1120	1100	1110
22	977	965	970	977	956	962	1190	1140	1160	1110	1100	1110
23	966	933	952	983	939	965	1150	1100	1130	1110	1110	1110
24	958	928	936	987	910	917	1100	1040	1070	---	---	---
25	1020	952	986	925	913	918	---	---	---	---	---	---
26	1040	1020	1030	992	925	958	---	---	---	---	---	---
27	1060	1040	1050	1050	992	1030	874	822	838	1100	1080	1090
28	1050	902	1010	1070	1050	1060	826	770	806	1110	1100	1100
29	1050	974	1000	---	---	---	790	730	770	1110	1100	1110
30	1060	1040	1060	---	---	---	724	682	693	1100	1070	1100
31	1060	1050	1060	---	---	---	734	672	695	1110	1090	1100
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	1140	1100	1120	---	---	---	901	779	822	832	820	826
2	1130	1120	1130	---	---	---	800	736	762	834	818	826
3	1140	1120	1130	---	---	---	763	737	752	830	808	818
4	1140	1130	1140	---	---	---	764	728	749	810	774	795
5	1160	1140	1150	---	---	---	755	699	727	794	774	782
6	1160	1140	1150	---	---	---	722	670	692	798	776	790
7	1140	1120	1130	---	---	---	760	714	737	784	728	756
8	1120	1120	1120	---	---	---	830	764	793	757	693	722
9	1120	1100	1110	---	---	---	910	828	868	714	676	693
10	1110	1100	1100	---	---	---	966	900	937	701	627	670
11	1110	1100	1110	---	---	---	1020	964	987	660	554	602
12	1120	1100	1100	---	---	---	1040	1010	1030	616	574	598
13	1100	1090	1100	---	---	---	1040	1030	1040	704	614	665
14	1090	996	1080	---	---	---	1030	1020	1030	782	704	744
15	1070	922	1060	969	913	944	956	658	921	782	772	777
16	---	---	---	993	967	979	906	864	891	790	760	774
17	---	---	---	1030	1000	1020	876	816	845	828	772	799
18	---	---	---	1060	1030	1040	798	768	785	890	820	849
19	---	---	---	1090	1060	1070	798	758	779	910	880	895
20	---	---	---	1100	1090	1090	796	768	785	942	900	924
21	---	---	---	1140	1110	1120	800	778	789	948	928	939
22	---	---	---	1170	1140	1150	866	800	831	942	928	935
23	---	---	---	1190	1170	1180	910	850	885	934	910	922
24	---	---	---	1210	902	1090	946	910	930	940	910	928
25	---	---	---	945	918	932	916	886	905	920	904	913
26	---	---	---	956	943	951	886	852	870	900	884	890
27	---	---	---	955	950	952	852	816	836	892	872	884
28	---	---	---	952	945	949	842	808	825	874	854	863
29	---	---	---	951	942	945	824	810	820	870	854	862
30	---	---	---	944	936	939	832	818	825	860	836	853
31	---	---	---	952	880	919	---	---	---	852	834	844
MONTH	---	---	---	---	---	---	1040	658	848	948	554	811

## MINNESOTA RIVER BASIN

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05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	842	822	831	846	672	749	990	942	970	668	624	639
2	838	812	830	689	641	664	982	936	957	730	658	684
3	822	814	818	664	574	627	952	886	913	750	728	737
4	838	808	822	595	559	577	900	826	867	782	754	769
5	850	830	840	588	566	582	894	796	852	824	756	797
6	850	828	838	647	607	625	828	710	779	856	824	840
7	848	834	840	770	647	708	732	650	696	846	798	831
8	840	818	829	898	778	838	710	602	667	834	790	814
9	836	812	824	960	900	931	804	514	746	848	778	814
10	820	798	811	1020	962	988	818	798	806	856	782	817
11	822	786	806	1070	1020	1050	848	830	839	864	796	844
12	820	800	811	1110	1060	1090	872	826	855	906	854	881
13	844	826	834	1160	1120	1140	860	812	844	950	882	926
14	856	834	845	1170	1160	1170	864	792	840	952	926	938
15	856	812	834	938	910	926	834	784	813	926	838	883
16	826	812	819	944	928	937	844	798	821	872	836	855
17	798	754	773	938	916	925	830	796	813	886	854	869
18	804	748	781	928	897	920	836	798	822	878	840	859
19	862	760	800	935	923	928	846	820	833	862	842	853
20	954	868	911	933	919	927	848	792	821	870	834	851
21	984	822	869	944	938	942	842	796	817	850	824	838
22	895	819	845	960	944	951	872	834	850	852	750	800
23	960	934	946	988	958	971	876	846	862	782	756	763
24	934	898	913	994	986	989	882	862	870	770	742	761
25	954	898	930	1030	996	1010	900	672	792	750	638	669
26	964	948	955	1050	1030	1040	738	697	718	754	674	721
27	980	962	972	1050	1050	1050	768	722	747	788	750	766
28	990	956	973	1050	968	1000	798	716	763	798	784	793
29	946	832	895	1000	976	991	834	790	816	818	796	807
30	846	832	841	1010	996	1000	810	634	741	846	820	830
31	---	---	---	1010	968	996	652	560	600	---	---	---
MONTH	990	748	855	1170	559	911	990	514	811	952	624	808

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	7.5	7.3	7.4	8.6	8.0	8.1	---	---	---	7.4	7.3	7.3
2	7.6	7.3	7.5	8.2	7.8	8.0	---	---	---	7.4	7.3	7.3
3	8.1	7.1	7.6	8.1	7.5	8.0	---	---	---	7.4	7.3	7.3
4	8.2	7.2	7.8	---	---	---	---	---	---	7.3	7.3	7.3
5	8.2	7.6	7.9	---	---	---	---	---	---	7.3	7.3	7.3
6	8.2	7.5	8.0	---	---	---	---	---	---	7.5	7.3	7.4
7	7.6	7.4	7.5	---	---	---	---	---	---	7.5	7.5	7.5
8	7.6	7.3	7.4	---	---	---	---	---	---	7.5	7.5	7.5
9	7.7	7.5	7.6	---	---	---	7.9	7.7	7.7	7.5	7.5	7.5
10	7.8	7.5	7.6	---	---	---	7.7	7.7	7.7	7.5	7.5	7.5
11	7.8	7.4	7.6	---	---	---	7.7	7.7	7.7	7.5	7.5	7.5
12	7.7	7.5	7.6	---	---	---	7.7	7.6	7.6	7.5	7.5	7.5
13	7.7	7.5	7.6	---	---	---	7.6	7.5	7.6	7.5	7.5	7.5
14	---	---	---	---	---	---	7.6	7.5	7.6	7.6	7.5	7.6
15	---	---	---	---	---	---	7.6	7.6	7.6	7.6	7.6	7.6
16	---	---	---	---	---	---	7.5	7.5	7.5	7.6	7.6	7.6
17	---	---	---	---	---	---	7.5	7.5	7.5	7.6	7.6	7.6
18	---	---	---	---	---	---	7.5	7.4	7.5	7.6	7.6	7.6
19	---	---	---	---	---	---	7.5	7.5	7.5	7.6	7.6	7.6
20	---	---	---	---	---	---	7.5	7.3	7.5	7.7	7.5	7.7
21	---	---	---	---	---	---	7.5	7.4	7.5	7.7	7.6	7.6
22	8.4	8.0	8.2	---	---	---	7.5	7.4	7.4	7.7	7.6	7.6
23	8.4	8.3	8.3	---	---	---	7.4	7.4	7.4	7.6	7.6	7.6
24	8.3	8.2	8.2	---	---	---	7.5	7.4	7.5	---	---	---
25	8.4	8.2	8.3	---	---	---	7.5	7.4	7.5	7.7	7.2	7.6
26	8.4	8.3	8.4	---	---	---	7.5	7.4	7.5	7.7	6.6	7.6
27	8.4	8.2	8.3	---	---	---	7.5	7.4	7.4	7.7	7.7	7.7
28	---	---	---	---	---	---	7.5	7.4	7.5	7.7	7.7	7.7
29	---	---	---	---	---	---	7.5	7.4	7.5	7.7	7.7	7.7
30	---	---	---	---	---	---	7.4	7.4	7.4	7.8	7.7	7.7
31	---	---	---	---	---	---	7.4	7.3	7.4	7.8	7.7	7.7

## MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.8	7.7	7.7	---	---	---	8.3	8.2	8.3	8.2	8.2	8.2
2	7.7	7.7	7.7	---	---	---	8.2	8.2	8.2	8.2	8.2	8.2
3	7.7	7.7	7.7	---	---	---	8.2	8.2	8.2	8.2	8.2	8.2
4	7.7	7.6	7.7	---	---	---	8.2	8.2	8.2	8.2	8.2	8.2
5	7.6	7.6	7.6	8.6	8.6	8.6	8.2	8.2	8.2	8.2	8.2	8.2
6	7.7	7.6	7.6	8.7	8.6	8.6	8.3	8.2	8.2	8.2	8.2	8.2
7	7.6	7.6	7.6	8.7	8.7	8.7	8.2	8.1	8.1	8.2	8.1	8.1
8	7.6	7.6	7.6	8.7	8.7	8.7	8.1	8.1	8.1	8.1	8.1	8.1
9	7.6	7.6	7.6	8.8	8.6	8.7	8.2	8.1	8.1	8.1	8.0	8.1
10	7.7	7.6	7.6	8.8	8.7	8.8	8.2	8.2	8.2	8.1	8.0	8.0
11	7.7	7.6	7.6	8.8	8.1	8.4	8.2	8.2	8.2	8.0	8.0	8.0
12	7.7	7.6	7.6	8.1	8.1	8.1	8.2	8.2	8.2	7.9	7.9	7.9
13	7.7	7.6	7.6	8.2	8.1	8.1	8.2	8.2	8.2	7.9	7.9	7.9
14	7.7	7.6	7.7	8.2	8.1	8.2	8.3	8.2	8.2	8.0	7.9	7.9
15	---	---	---	8.2	8.1	8.2	8.3	8.2	8.3	8.0	7.9	7.9
16	---	---	---	8.2	8.1	8.2	8.2	8.2	8.2	8.0	7.9	7.9
17	---	---	---	8.2	7.8	8.0	8.2	8.2	8.2	8.0	8.0	8.0
18	---	---	---	7.9	7.8	7.8	8.2	8.2	8.2	8.0	8.0	8.0
19	---	---	---	7.9	7.8	7.8	8.2	8.2	8.2	8.0	8.0	8.0
20	---	---	---	7.9	7.8	7.9	8.2	8.2	8.2	8.2	8.2	8.2
21	---	---	---	7.9	7.9	7.9	8.2	8.2	8.2	8.3	8.2	8.2
22	---	---	---	7.9	7.9	7.9	8.3	8.2	8.3	8.3	8.2	8.2
23	---	---	---	8.0	7.9	7.9	8.3	8.3	8.3	8.3	8.2	8.2
24	---	---	---	8.0	7.5	7.8	8.4	8.3	8.4	8.3	8.2	8.3
25	---	---	---	7.6	7.5	7.5	8.4	8.3	8.4	8.2	8.2	8.2
26	---	---	---	7.6	7.5	7.6	8.5	8.4	8.4	8.2	8.2	8.2
27	---	---	---	7.6	7.6	7.6	8.5	8.4	8.5	8.2	8.2	8.2
28	---	---	---	7.6	7.6	7.6	8.5	8.2	8.3	8.2	8.2	8.2
29	---	---	---	7.6	7.6	7.6	8.3	8.2	8.2	8.2	8.2	8.2
30	---	---	---	7.6	7.6	7.6	8.3	8.2	8.2	8.2	8.2	8.2
31	---	---	---	8.3	7.6	8.1	---	---	---	8.2	8.2	8.2
MONTH	---	---	---	---	---	---	8.5	8.1	8.2	8.3	7.9	8.1
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	8.2	8.2	8.2	---	---	---	---	---	---	7.9	7.7	7.8
2	8.2	8.1	8.2	---	---	---	---	---	---	8.2	7.9	8.1
3	8.2	8.1	8.1	---	---	---	---	---	---	8.2	8.2	8.2
4	8.2	8.1	8.1	---	---	---	---	---	---	8.2	8.1	8.1
5	8.2	8.2	8.2	---	---	---	8.2	7.9	8.0	8.3	8.0	8.1
6	8.3	8.2	8.2	---	---	---	8.2	7.9	8.0	8.4	8.2	8.3
7	8.3	8.2	8.2	---	---	---	8.2	7.9	8.1	8.6	8.3	8.4
8	8.2	8.2	8.2	---	---	---	8.2	7.9	8.0	8.6	8.2	8.4
9	8.2	8.1	8.1	---	---	---	8.3	7.9	8.1	8.5	8.2	8.4
10	8.2	8.0	8.1	---	---	---	8.3	8.0	8.2	8.4	8.1	8.2
11	8.2	8.0	8.1	---	---	---	8.4	8.0	8.2	8.2	8.1	8.1
12	8.1	8.0	8.0	---	---	---	8.5	8.2	8.3	8.2	8.0	8.1
13	8.1	8.0	8.0	---	---	---	8.4	8.1	8.3	8.4	8.0	8.2
14	8.1	8.0	8.1	---	---	---	8.4	8.1	8.3	8.3	8.3	8.3
15	8.1	8.0	8.1	---	---	---	8.3	8.0	8.2	8.3	8.1	8.2
16	8.1	8.1	8.1	---	---	---	8.2	7.9	8.1	8.2	8.1	8.1
17	8.0	8.0	8.0	---	---	---	8.1	7.9	8.0	8.2	8.1	8.2
18	8.0	8.0	8.0	---	---	---	8.3	7.8	8.1	8.3	8.1	8.2
19	8.1	8.0	8.0	---	---	---	8.3	8.0	8.2	8.3	8.2	8.3
20	8.1	8.1	8.1	---	---	---	8.3	8.0	8.1	8.4	8.2	8.3
21	8.1	7.9	8.1	---	---	---	8.1	7.9	8.0	8.4	8.3	8.4
22	8.2	8.1	8.1	---	---	---	8.0	7.8	7.9	8.4	8.3	8.4
23	8.0	8.0	8.0	---	---	---	8.1	7.9	8.0	8.4	8.3	8.4
24	8.0	8.0	8.0	---	---	---	8.1	8.0	8.0	8.5	8.3	8.4
25	8.0	8.0	8.0	---	---	---	8.0	7.8	7.9	8.3	8.1	8.2
26	8.1	8.0	8.0	---	---	---	7.8	7.6	7.7	8.2	8.1	8.2
27	8.0	8.0	8.0	---	---	---	8.0	7.8	7.9	8.4	8.2	8.3
28	8.1	8.0	8.1	---	---	---	8.0	7.9	8.0	8.4	8.3	8.3
29	8.1	8.0	8.1	---	---	---	8.1	8.0	8.0	8.4	8.3	8.3
30	8.1	8.1	8.1	---	---	---	8.0	7.8	7.9	8.3	8.2	8.3
31	---	---	---	---	---	---	7.9	7.6	7.7	---	---	---
MONTH	8.3	7.9	8.1	---	---	---	---	---	---	8.6	7.7	8.2

## MINNESOTA RIVER BASIN

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05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	16.0	15.0	15.5	6.5	6.5	6.5	---	---	---	1.5	1.0	1.5
2	15.0	14.5	15.0	6.5	6.0	6.5	---	---	---	1.5	1.0	1.0
3	15.0	13.5	14.5	6.5	6.0	6.5	---	---	---	1.5	1.0	1.0
4	15.0	13.5	14.5	---	---	---	---	---	---	1.5	1.0	1.5
5	15.5	14.5	15.0	---	---	---	---	---	---	1.5	1.0	1.5
6	15.5	15.0	15.5	---	---	---	---	---	---	1.5	1.0	1.0
7	14.5	14.0	14.0	---	---	---	2.5	1.5	2.0	1.0	1.0	1.0
8	12.5	12.0	12.0	---	---	---	1.5	.5	1.0	1.0	1.0	1.0
9	12.0	11.5	12.0	---	---	---	1.0	.0	.5	1.0	1.0	1.0
10	11.5	11.5	11.5	---	---	---	1.5	1.0	1.0	1.0	1.0	1.0
11	11.5	10.5	11.0	---	---	---	1.0	.5	1.0	1.0	.5	1.0
12	10.5	10.5	10.5	---	---	---	1.0	1.0	1.0	1.0	.5	1.0
13	10.5	10.0	10.0	---	---	---	1.0	1.0	1.0	1.0	.5	1.0
14	---	---	---	---	---	---	1.5	1.0	1.0	1.0	1.0	1.0
15	---	---	---	---	---	---	1.0	.5	1.0	1.0	.5	1.0
16	---	---	---	---	---	---	1.0	1.0	1.0	1.0	.5	1.0
17	---	---	---	---	---	---	1.0	1.0	1.0	1.0	.5	1.0
18	---	---	---	2.5	1.0	1.5	1.0	1.0	1.0	1.0	.5	.5
19	---	---	---	3.5	2.0	3.0	1.0	1.0	1.0	1.0	.5	1.0
20	---	---	---	5.0	3.5	4.5	1.0	1.0	1.0	1.0	.5	.5
21	---	---	---	5.0	4.5	5.0	1.0	1.0	1.0	.5	.5	.5
22	6.5	5.0	6.0	5.0	4.0	4.5	1.0	1.0	1.0	1.0	.5	.5
23	6.0	5.0	5.5	4.0	2.5	3.0	1.0	1.0	1.0	.5	.5	.5
24	7.0	5.5	6.5	4.0	1.0	1.5	1.0	1.0	1.0	1.0	.0	.5
25	7.0	6.0	6.5	1.0	.5	1.0	1.0	1.0	1.0	1.0	.0	.5
26	7.5	6.5	7.0	.5	.5	.5	1.0	1.0	1.0	1.0	.0	.5
27	8.0	7.0	7.5	1.0	.5	.5	1.0	1.0	1.0	.0	.0	.0
28	9.0	7.5	8.5	.5	.5	.5	1.5	1.0	1.0	.5	.0	.5
29	9.5	9.0	9.0	---	---	---	1.5	1.0	1.0	.5	.5	.5
30	9.5	7.0	8.5	---	---	---	1.5	1.0	1.0	.5	.0	.5
31	7.0	6.5	6.5	---	---	---	1.5	1.0	1.5	.5	.0	.0
MONTH	---	---	---	---	---	---	---	---	---	1.5	.0	1.0
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.5	.0	.0	---	---	---	4.0	3.5	3.5	14.0	13.0	13.5
2	.5	.0	.5	---	---	---	4.5	4.0	4.5	13.0	12.5	12.5
3	.5	.0	.0	1.0	.0	.5	5.0	4.5	5.0	13.5	12.5	13.0
4	.5	.0	.0	1.5	.5	1.0	5.5	4.5	5.0	13.5	13.0	13.0
5	.5	.0	.0	2.5	1.5	2.0	5.0	5.0	5.0	14.0	13.0	13.5
6	.5	.0	.0	4.0	2.5	3.0	5.0	4.5	4.5	14.0	14.0	14.0
7	.5	.0	.0	4.5	4.0	4.0	4.5	4.0	4.0	14.0	13.5	13.5
8	.5	.0	.0	4.0	3.0	3.5	5.0	4.0	4.5	14.0	13.0	13.5
9	.5	.0	.5	2.5	2.0	2.0	5.0	4.5	4.5	14.5	13.5	14.0
10	.5	.5	.5	2.0	1.0	1.5	4.5	4.0	4.5	15.0	14.0	14.5
11	.5	.5	.5	1.0	.5	.5	5.5	4.5	5.0	16.0	14.5	15.0
12	.5	.0	.5	1.0	.0	.5	5.5	5.5	5.5	16.5	16.0	16.5
13	.5	.5	.5	1.0	1.0	1.0	5.5	5.0	5.0	16.5	16.0	16.0
14	---	---	---	2.5	1.5	2.5	5.0	4.5	4.5	16.5	15.5	15.5
15	---	---	---	2.5	2.0	2.5	4.0	3.0	4.0	15.0	14.5	15.0
16	---	---	---	2.0	1.5	2.0	5.0	4.0	4.5	15.5	14.5	15.0
17	---	---	---	2.0	2.0	2.0	5.0	4.0	4.5	15.0	14.5	15.0
18	---	---	---	2.0	1.5	2.0	5.0	4.0	4.5	15.0	14.0	14.5
19	---	---	---	2.5	2.0	2.0	6.0	4.5	5.5	14.0	14.0	14.0
20	---	---	---	2.0	1.5	2.0	6.5	5.5	6.0	14.0	13.5	13.5
21	---	---	---	2.0	1.5	1.5	8.0	6.0	7.0	14.5	13.5	14.0
22	---	---	---	2.5	1.5	2.0	9.0	7.5	8.0	15.5	14.5	15.0
23	---	---	---	2.5	2.0	2.5	10.0	8.5	9.5	16.0	15.0	15.5
24	---	---	---	2.5	2.0	2.5	11.0	9.5	10.5	17.0	16.0	16.5
25	---	---	---	3.0	2.5	2.5	12.5	11.0	11.5	17.5	16.5	17.0
26	---	---	---	3.0	2.5	3.0	13.0	12.0	12.5	17.5	16.5	17.0
27	---	---	---	2.5	2.0	2.5	13.5	12.5	13.0	18.0	17.0	17.5
28	---	---	---	2.5	2.0	2.0	13.0	13.0	13.0	18.0	17.5	17.5
29	---	---	---	3.0	2.5	2.5	13.0	12.5	13.0	17.5	17.0	17.5
30	---	---	---	3.0	2.5	3.0	13.5	12.5	13.0	17.0	16.5	17.0
31	---	---	---	3.5	3.0	3.0	---	---	---	16.5	16.0	16.0
MONTH	---	---	---	---	---	---	13.5	3.0	7.0	18.0	12.5	15.0

## MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	16.5	16.0	16.0	22.0	21.5	21.5	27.0	26.0	26.5	26.0	24.0	25.0
2	17.5	16.0	17.0	23.0	21.5	22.5	27.5	26.0	26.5	26.5	24.5	25.5
3	18.0	17.0	17.5	23.5	23.0	23.5	28.5	26.5	27.5	25.5	25.0	25.5
4	18.5	17.5	18.0	23.0	22.5	23.0	29.0	27.0	28.0	25.0	24.5	24.5
5	18.5	18.0	18.0	23.0	22.5	22.5	29.0	27.5	28.0	24.5	23.5	24.0
6	18.5	17.5	18.0	23.0	22.0	22.5	29.5	27.5	28.5	24.0	23.0	23.5
7	19.0	17.5	18.5	24.0	22.5	23.0	29.5	27.5	28.5	23.0	21.5	22.5
8	19.5	18.0	18.5	25.0	23.5	24.0	29.0	28.0	28.5	24.0	21.5	23.0
9	20.5	19.0	19.5	26.0	24.5	25.0	28.0	27.0	27.5	24.5	23.0	24.0
10	21.5	20.0	20.5	27.0	25.5	26.0	27.5	26.0	27.0	24.5	23.0	23.5
11	22.5	21.0	21.5	27.0	26.5	26.5	27.0	25.0	26.0	23.0	21.5	22.5
12	22.5	22.0	22.0	27.0	26.0	26.5	25.5	24.0	25.0	21.5	20.0	20.5
13	22.5	22.0	22.0	27.0	26.5	26.5	25.5	24.0	24.5	20.0	19.0	19.5
14	22.0	21.5	22.0	27.0	26.5	27.0	26.0	24.0	25.0	19.0	18.0	18.5
15	21.5	21.0	21.5	27.0	26.5	27.0	26.5	25.0	25.5	18.0	16.5	17.0
16	21.0	20.0	20.5	27.0	26.5	26.5	26.5	26.0	26.0	17.0	16.5	16.5
17	20.5	19.5	20.0	27.5	26.5	26.5	26.5	25.0	26.0	17.0	16.0	16.5
18	20.0	19.5	20.0	26.5	26.0	26.0	26.5	25.0	25.5	18.0	17.0	17.5
19	20.5	19.5	20.0	27.0	26.0	26.5	27.0	25.5	26.0	17.0	16.0	16.5
20	21.0	20.0	20.5	27.5	26.0	26.5	26.5	25.5	26.0	15.5	14.5	15.0
21	21.5	21.0	21.0	29.0	27.5	28.5	25.5	25.0	25.5	14.0	13.0	13.5
22	23.0	21.5	22.0	29.5	28.5	29.0	26.0	24.5	25.5	13.0	11.5	12.5
23	24.0	23.5	24.0	29.5	28.5	29.0	25.5	24.5	25.0	12.5	11.5	12.0
24	24.0	24.0	24.0	29.0	28.5	28.5	25.0	24.5	24.5	13.5	11.5	12.5
25	25.0	24.0	24.5	28.5	27.5	28.0	25.0	23.5	24.5	14.5	12.5	14.0
26	25.5	24.5	25.0	27.5	27.0	27.0	26.0	23.5	25.0	16.0	14.0	15.5
27	25.0	24.0	25.0	27.0	26.0	26.5	27.0	25.5	26.0	17.5	15.5	17.0
28	24.0	23.0	23.5	26.0	25.5	26.0	27.0	26.0	26.5	19.0	17.0	18.0
29	22.5	21.5	22.0	27.0	25.5	26.0	27.0	25.5	26.5	19.0	18.5	19.0
30	22.0	21.0	21.5	27.0	26.5	26.5	26.5	25.0	25.5	20.0	18.5	19.5
31	---	---	---	27.0	26.0	26.5	25.5	24.5	25.0	---	---	---
MONTH	25.5	16.0	21.0	29.5	21.5	26.0	29.5	23.5	26.0	26.5	11.5	19.0

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	13.2	11.0	12.1	12.0	11.9	11.9	---	---	---	15.4	14.0	14.7
2	13.0	10.3	11.4	12.1	12.0	12.0	---	---	---	14.6	14.0	14.3
3	14.9	10.7	12.4	12.0	11.9	12.0	---	---	---	15.2	13.8	14.5
4	14.5	11.3	12.8	---	---	---	---	---	---	14.6	13.8	14.2
5	12.8	10.5	11.8	---	---	---	---	---	---	15.8	13.8	15.0
6	10.4	8.1	9.1	---	---	---	---	---	---	15.4	13.3	14.0
7	8.1	7.6	7.9	---	---	---	14.4	13.9	14.2	13.4	13.2	13.3
8	8.9	8.2	8.6	---	---	---	14.5	14.3	14.4	13.2	13.0	13.1
9	8.9	8.7	8.8	---	---	---	14.9	14.5	14.6	13.2	13.0	13.1
10	9.0	8.6	8.8	---	---	---	14.8	14.2	14.5	13.2	13.0	13.1
11	8.8	8.6	8.7	---	---	---	14.5	14.3	14.4	15.8	13.0	13.7
12	8.7	7.9	8.4	---	---	---	14.7	14.3	14.5	15.3	14.8	15.0
13	8.3	7.7	8.0	---	---	---	15.3	14.3	14.8	15.3	14.4	14.8
14	9.3	7.0	7.6	---	---	---	15.3	14.4	14.7	15.2	14.3	14.6
15	---	---	---	15.3	15.0	15.2	14.9	14.5	14.7	14.7	13.4	14.2
16	---	---	---	15.5	15.2	15.3	15.1	14.9	15.0	14.4	12.8	13.6
17	---	---	---	15.5	15.2	15.4	16.0	14.7	15.2	12.8	12.3	12.5
18	---	---	---	15.4	15.0	15.2	15.8	14.6	15.3	12.3	12.2	12.3
19	---	---	---	15.1	14.6	14.8	15.6	14.6	15.0	12.2	11.9	12.0
20	---	---	---	14.6	14.2	14.3	15.3	14.5	14.8	12.9	11.8	12.5
21	9.6	8.8	9.3	14.3	14.1	14.2	15.7	14.6	15.1	12.7	12.5	12.6
22	11.2	9.0	10.2	14.4	14.1	14.3	15.5	14.3	14.7	12.5	12.3	12.4
23	11.2	10.3	11.0	15.0	14.4	14.7	15.7	14.4	15.1	12.3	12.3	12.3
24	10.8	8.2	9.2	15.3	14.5	15.1	15.5	14.3	14.9	---	---	---
25	10.9	8.5	9.8	15.4	15.2	15.3	15.6	14.3	14.7	---	---	---
26	10.7	10.4	10.6	15.3	15.1	15.2	15.9	14.2	14.7	---	---	---
27	10.5	7.5	9.1	15.2	15.0	15.1	15.1	14.3	14.7	12.2	11.9	12.1
28	8.7	5.7	7.5	15.1	14.9	15.0	14.7	14.2	14.4	12.0	11.8	11.9
29	9.0	5.4	7.2	---	---	---	14.5	14.1	14.3	11.9	11.8	11.8
30	10.8	8.0	9.0	---	---	---	14.2	14.0	14.0	14.5	11.7	13.1
31	12.0	10.8	11.6	---	---	---	15.5	13.9	14.7	12.2	11.7	11.9



## MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	11.7	11.5	11.6	---	---	---	13.8	13.5	13.6	9.2	9.0	9.1
2	13.7	11.6	12.4	---	---	---	13.6	13.2	13.4	9.3	8.4	9.0
3	13.5	12.2	12.7	13.3	11.5	12.9	13.2	13.0	13.1	9.5	8.8	9.2
4	12.6	12.3	12.4	13.1	11.3	12.5	13.2	13.0	13.1	9.5	9.0	9.1
5	12.4	11.9	12.1	12.3	10.6	11.0	13.0	12.3	12.5	10.0	9.7	9.8
6	12.2	11.6	11.9	11.2	10.8	11.0	12.8	12.3	12.5	10.7	9.8	10.4
7	11.9	11.3	11.7	13.4	10.6	11.9	13.2	11.6	12.3	10.5	9.4	9.7
8	11.7	11.4	11.6	13.6	12.8	13.1	12.2	11.8	12.0	9.6	9.4	9.5
9	11.7	11.4	11.6	13.9	13.0	13.4	12.3	11.9	12.1	9.4	9.3	9.4
10	11.7	11.4	11.5	14.8	11.0	13.0	12.4	12.1	12.2	9.3	9.2	9.3
11	11.7	11.4	11.5	15.1	10.5	12.9	12.4	12.1	12.3	9.2	8.9	9.0
12	13.3	11.1	11.7	13.3	11.4	12.3	12.1	11.8	11.9	8.9	8.5	8.6
13	11.5	11.3	11.4	13.0	11.6	12.7	12.3	11.7	12.1	8.5	8.3	8.4
14	---	---	---	13.4	10.7	11.7	12.3	12.1	12.2	8.8	8.3	8.5
15	---	---	---	10.8	10.3	10.6	12.9	11.8	12.2	9.1	8.7	8.9
16	---	---	---	10.7	10.0	10.1	12.7	12.1	12.4	9.1	8.7	8.9
17	---	---	---	10.1	10.0	10.0	13.2	12.1	12.4	9.1	8.9	9.0
18	---	---	---	10.2	9.9	10.0	13.6	12.5	13.0	9.0	8.9	8.9
19	---	---	---	10.2	9.9	10.0	12.8	11.4	12.1	8.9	8.9	8.9
20	---	---	---	10.1	9.8	10.0	11.8	11.3	11.5	9.2	9.0	9.1
21	---	---	---	10.2	9.8	10.0	11.6	10.9	11.2	9.0	8.7	8.9
22	---	---	---	10.0	9.6	9.8	11.2	10.3	10.7	8.9	8.4	8.7
23	---	---	---	10.1	9.6	9.8	10.6	10.2	10.4	12.0	8.1	9.2
24	---	---	---	12.8	9.7	10.9	10.5	9.7	10.1	12.2	8.9	11.2
25	---	---	---	13.4	12.0	12.7	12.4	9.7	11.8	10.9	9.0	10.1
26	---	---	---	13.5	13.2	13.3	11.9	10.7	11.5	9.1	7.3	8.2
27	---	---	---	13.5	13.3	13.4	11.2	10.7	10.9	8.4	7.2	8.0
28	---	---	---	13.5	13.3	13.5	10.6	9.0	10.1	7.9	7.0	7.6
29	---	---	---	13.5	12.7	13.1	9.3	8.9	9.1	8.0	7.1	7.6
30	---	---	---	13.5	13.2	13.3	9.4	9.1	9.3	7.9	7.0	7.6
31	---	---	---	13.6	13.1	13.3	---	---	---	8.0	7.3	7.5
MONTH	---	---	---	---	---	---	13.8	8.9	11.8	12.2	7.0	8.0
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	8.5	7.9	8.2	6.9	5.3	6.7	7.0	6.5	6.9	6.0	5.8	5.9
2	9.0	8.5	8.7	6.8	6.2	6.7	7.5	6.8	7.3	6.9	6.0	6.3
3	8.8	8.3	8.5	6.5	6.2	6.3	7.9	7.4	7.7	6.5	6.3	6.4
4	8.5	8.2	8.3	6.4	5.7	6.2	8.4	7.9	8.2	6.4	6.2	6.3
5	8.4	8.1	8.2	6.4	6.1	6.3	8.5	7.6	8.2	6.3	5.9	6.0
6	8.4	7.9	8.2	6.5	6.4	6.4	8.4	7.9	8.2	6.3	6.1	6.2
7	8.7	8.0	8.4	6.8	6.5	6.6	8.4	7.9	8.2	6.8	6.5	6.7
8	8.6	8.2	8.5	6.6	6.3	6.5	8.3	7.8	8.1	8.1	7.1	7.6
9	8.9	8.5	8.7	6.4	6.0	6.3	8.3	7.9	8.1	7.9	7.4	7.6
10	8.7	8.3	8.5	6.4	5.8	6.2	8.2	7.5	8.0	7.3	6.8	7.1
11	8.6	8.0	8.3	6.5	5.9	6.3	8.4	7.3	8.0	7.0	6.7	6.9
12	8.1	7.6	8.0	6.5	6.3	6.3	8.8	7.8	8.5	6.9	6.4	6.7
13	7.8	7.4	7.6	6.5	6.3	6.4	9.0	7.9	8.6	6.5	6.2	6.4
14	7.8	7.3	7.5	6.5	6.4	6.5	8.5	8.1	8.3	6.2	5.9	6.0
15	8.0	7.3	7.6	6.7	6.3	6.5	8.7	7.8	8.2	8.5	5.6	7.3
16	8.3	7.2	7.7	6.4	6.3	6.4	8.3	7.8	8.0	8.3	7.9	8.1
17	8.1	7.3	7.8	6.4	5.6	6.2	7.8	7.3	7.6	7.9	7.5	7.7
18	8.4	7.7	8.0	6.4	5.9	6.0	7.8	6.8	7.1	7.6	7.0	7.4
19	8.2	6.9	7.5	6.1	5.9	5.9	7.0	6.2	6.7	6.9	6.5	6.7
20	8.4	7.7	8.0	6.0	5.7	5.9	7.0	6.1	6.6	6.6	6.3	6.5
21	8.2	7.2	7.9	6.1	5.9	6.0	6.7	5.9	6.3	6.4	6.0	6.2
22	8.4	7.2	8.0	6.1	5.9	6.0	6.2	5.6	5.9	9.7	5.9	8.7
23	8.8	8.4	8.5	6.0	5.8	5.9	6.2	5.5	6.0	9.1	8.0	8.6
24	8.9	7.0	8.4	6.0	5.3	5.9	6.0	5.3	5.8	8.7	7.4	8.1
25	8.7	7.3	8.1	6.1	5.9	6.0	5.8	5.2	5.6	7.9	6.3	7.3
26	8.2	6.7	7.8	6.2	5.9	6.0	5.4	4.8	5.2	7.5	6.1	6.8
27	7.8	7.3	7.7	6.2	5.7	6.0	5.1	4.9	5.0	7.9	7.0	7.4
28	7.7	7.4	7.5	6.9	5.9	6.5	5.1	4.7	5.0	8.6	8.0	8.3
29	7.5	7.1	7.3	7.0	6.4	6.8	5.2	4.9	5.1	11.1	9.8	10.4
30	7.1	5.4	6.2	7.0	6.3	6.8	5.2	4.8	5.1	11.8	9.0	10.4
31	---	---	---	7.0	6.4	6.8	5.4	5.0	5.2	---	---	---
MONTH	9.0	5.4	8.0	7.0	5.3	6.3	9.0	4.7	7.0	11.8	5.6	7.3

## MINNESOTA RIVER BASIN

05330908 MINNESOTA RIVER AT BURNSVILLE, MN

LOCATION.--Lat 44°48'41", long 93°15'04", in NE¼SE¼ sec.23, T.27 N., R.20 W., Dakota County, Hydrologic Unit 07020012, on right bank 8.9 mi (14.3 km) from mouth at Northern States' Black Dog Power Plant.

DRAINAGE AREA.--Not determined.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1980 to current year (discontinued).

pH: June 1980 to current year (discontinued).

WATER TEMPERATURE: June 1980 to current year (discontinued).

DISSOLVED OXYGEN: June 1980 to current year (discontinued).

INSTRUMENTATION.--Water-quality monitor since June 1980.

COOPERATION.--Water-quality monitor is operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	1110	1090	1100	---	---	---	---	---	---
2	---	---	---	1090	1080	1090	1230	1090	1160	---	---	---
3	---	---	---	1090	1080	1080	1240	1200	1230	---	---	---
4	---	---	---	1070	1020	1050	1230	1210	1220	---	---	---
5	---	---	---	1080	1070	1080	1210	1190	1200	---	---	---
6	---	---	---	1080	1070	1070	1190	1160	1170	---	---	---
7	980	940	958	1070	1060	1070	1160	1120	1130	---	---	---
8	1030	984	1010	1060	1060	1060	1120	1100	1120	---	---	---
9	1080	1030	1050	1060	1050	1050	1120	1100	1110	---	---	---
10	1090	1080	1090	1070	1040	1050	---	---	---	---	---	---
11	1110	1080	1090	1040	1020	1030	---	---	---	---	---	---
12	1120	1090	1110	1020	896	958	---	---	---	---	---	---
13	1180	1120	1150	882	846	866	---	---	---	---	---	---
14	1220	1190	1200	848	828	836	---	---	---	---	---	---
15	1260	1230	1250	896	840	870	1250	1230	1240	---	---	---
16	1280	1260	1270	932	898	918	1300	1230	1260	---	---	---
17	1290	1280	1290	964	932	944	1330	1300	1320	---	---	---
18	1320	1290	1310	976	966	970	1350	1330	1350	---	---	---
19	1360	1320	1330	---	---	---	1370	1340	1360	---	---	---
20	1360	1290	1320	---	---	---	1380	1370	1370	---	---	---
21	1310	1210	1260	---	---	---	1370	1310	1360	---	---	---
22	1200	1100	1150	---	---	---	1340	1230	1310	---	---	---
23	1100	1080	1090	---	---	---	1300	1260	1280	---	---	---
24	1090	1060	1080	---	---	---	1260	1200	1240	---	---	---
25	1080	1040	1070	---	---	---	1370	1110	1150	---	---	---
26	1100	1060	1080	---	---	---	1330	1030	1080	---	---	---
27	1100	1070	1090	---	---	---	1290	901	979	---	---	---
28	1090	1070	1080	---	---	---	902	864	876	---	---	---
29	1090	1070	1090	---	---	---	884	867	876	---	---	---
30	1100	1090	1090	---	---	---	866	854	860	---	---	---
31	1110	1100	1100	---	---	---	856	793	823	---	---	---

## MINNESOTA RIVER BASIN

05330908 MINNESOTA RIVER AT BURNSVILLE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	8.0	8.0	8.0	---	---	---			
2	---	---	---	8.1	8.0	8.1	7.8	7.2	7.5			
3	---	---	---	8.1	8.1	8.1	7.7	7.7	7.7			
4	---	---	---	8.1	8.1	8.1	7.8	7.7	7.8			
5	---	---	---	8.1	8.1	8.1	7.9	7.8	7.9			
6	---	---	---	8.2	8.1	8.1	7.9	7.9	7.9			
7	8.0	7.9	8.0	8.2	8.2	8.2	8.0	7.9	7.9			
8	7.9	7.9	7.9	8.2	8.2	8.2	8.0	7.9	8.0			
9	7.9	7.9	7.9	8.2	8.2	8.2	8.0	8.0	8.0			
10	8.0	7.9	8.0	8.2	8.1	8.1	---	---	---			
11	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
12	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
13	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
14	8.0	7.9	8.0	8.1	8.0	8.0	---	---	---			
15	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.7	7.9			
16	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.8	7.8			
17	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.8	7.9			
18	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.9	7.9			
19	7.9	7.9	7.9	---	---	---	7.9	7.9	7.9			
20	8.0	7.9	8.0	---	---	---	7.9	7.9	7.9			
21	8.0	8.0	8.0	---	---	---	7.9	7.9	7.9			
22	8.0	7.9	8.0	---	---	---	8.0	7.9	7.9			
23	7.9	7.9	7.9	---	---	---	8.0	7.9	8.0			
24	7.9	7.8	7.9	---	---	---	8.0	7.9	8.0			
25	7.9	7.8	7.9	---	---	---	8.0	7.9	8.0			
26	7.9	7.8	7.9	---	---	---	8.0	7.9	7.9			
27	7.9	7.8	7.9	---	---	---	8.0	7.9	7.9			
28	8.0	7.9	7.9	---	---	---	7.9	7.9	7.9			
29	8.0	8.0	8.0	---	---	---	7.9	7.8	7.8			
30	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8			
31	8.0	8.0	8.0	---	---	---	7.9	7.8	7.8			

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	7.0	6.5	7.0	---	---	---			
2	---	---	---	7.0	6.5	6.5	1.5	1.0	1.5			
3	---	---	---	6.5	6.0	6.5	1.5	1.5	1.5			
4	---	---	---	6.0	5.0	5.5	2.0	1.5	1.5			
5	---	---	---	5.0	4.0	4.5	2.0	1.5	2.0			
6	---	---	---	4.0	3.5	3.5	1.5	1.0	1.5			
7	13.0	12.5	13.0	3.0	2.5	3.0	1.0	1.0	1.0			
8	12.5	12.5	12.5	2.5	2.5	2.5	1.0	.5	.5			
9	12.5	12.5	12.5	2.0	2.0	2.0	.5	.0	.0			
10	12.5	12.0	12.0	2.0	2.0	2.0	---	---	---			
11	12.0	12.0	12.0	2.0	2.0	2.0	---	---	---			
12	12.0	11.5	12.0	2.0	1.5	2.0	---	---	---			
13	11.5	11.5	11.5	1.5	1.0	1.5	---	---	---			
14	11.5	10.0	11.0	1.0	1.0	1.0	---	---	---			
15	10.0	10.0	10.0	1.0	.5	.5	.5	.5	.5			
16	10.0	9.5	10.0	.5	.5	.5	.5	.5	.5			
17	10.0	9.5	10.0	.5	.5	.5	.5	.5	.5			
18	10.0	9.5	10.0	.5	.5	.5	.5	.5	.5			
19	10.0	9.5	10.0	---	---	---	.5	.0	.5			
20	9.5	9.0	9.0	---	---	---	.5	.0	.5			
21	9.0	6.5	8.0	---	---	---	.5	.0	.5			
22	6.5	6.5	6.5	---	---	---	1.0	.5	.5			
23	6.5	6.0	6.0	---	---	---	1.0	.5	.5			
24	6.5	6.0	6.0	---	---	---	.5	.5	.5			
25	6.5	6.5	6.5	---	---	---	.5	.5	.5			
26	7.0	6.5	7.0	---	---	---	.5	.5	.5			
27	7.0	7.0	7.0	---	---	---	.5	.5	.5			
28	7.0	7.0	7.0	---	---	---	.5	.5	.5			
29	7.0	7.0	7.0	---	---	---	.5	.5	.5			
30	7.0	7.0	7.0	---	---	---	.5	.5	.5			
31	7.0	7.0	7.0	---	---	---	.5	.5	.5			



## MINNESOTA RIVER BASIN

05330920 MINNESOTA RIVER AT FORT SNELLING STATE PARK, ST. PAUL, MN

LOCATION.--Lat 44°52'13", long 93°11'32", in NE¼SE¼ sec.32, T.28 N., R.23 W., Hennepin County, Hydrologic Unit 07020012, on left bank 3 mi (5 km) upstream from mouth.

DRAINAGE AREA.--16,900 mi<sup>2</sup> (43,800 km<sup>2</sup>).

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1978 to current year (discontinued).

pH: October 1978 to current year (discontinued).

WATER TEMPERATURE: October 1978 to current year (discontinued).

DISSOLVED OXYGEN: October 1978 to current year (discontinued).

INSTRUMENTATION.--Water-quality monitor since October 1978.

REMARKS.--Extremes are published for those years with 80 percent or more daily record.

COOPERATION.--Samples collected and water-quality monitor operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water year 1980-82): Maximum, 1,320 micromhos Dec. 21, 1981; minimum, 220 micromhos Mar. 26, 1980.

pH (water year 1980-81): Maximum, 8.5 units Jan. 1, 3, Feb. 27, 1980; minimum, 7.1 units Jan 28-29, 1980.

WATER TEMPERATURES (water year 1980-82): Maximum, 27.0°C July 14-15, 1980, July 10, 1981; minimum, 0.5°C many days during winter.

DISSOLVED OXYGEN (water year 1980-81): Maximum, 17.7 mg/L May 12, 1980; minimum, 3.3 mg/L July 31, 1980.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	976	946	962	1050	1020	1040	---	---	---			
2	968	848	922	1110	1040	1060	1250	1240	1240			
3	978	934	954	1110	1100	1100	1260	1240	1250			
4	954	910	932	1110	1100	1110	1260	1240	1250			
5	938	880	916	1110	1100	1110	1240	1220	1230			
6	924	856	900	1110	1100	1110	1220	1190	1200			
7	954	870	928	1100	1100	1100	1190	1060	1120			
8	1020	954	986	1100	1090	1090	1070	1050	1060			
9	1050	1010	1030	1090	1040	1080	1060	1050	1050			
10	1090	1040	1060	1090	978	1050	1100	1060	1080			
11	1100	1080	1090	1060	950	1030	1110	1090	1100			
12	1100	1080	1100	1030	950	1000	1130	1110	1120			
13	1160	1110	1130	948	880	906	1150	1130	1140			
14	1190	1170	1180	880	864	870	1180	1140	1160			
15	1220	1170	1190	936	870	900	1200	1180	1190			
16	1220	1190	1200	966	928	950	1230	1180	1200			
17	1210	1200	1200	976	964	970	1260	1230	1250			
18	1210	1190	1200	1060	991	1020	1310	1260	1280			
19	1210	1010	1110	1080	1040	1060	1320	1290	1300			
20	1180	1070	1150	1100	1080	1090	1320	1310	1320			
21	1150	1130	1140	1100	1060	1090	1320	1290	1310			
22	1130	1070	1110	1090	1060	1070	1290	1260	1280			
23	1060	1040	1040	1100	1080	1090	1270	1210	1240			
24	1040	1010	1030	1110	1060	1090	1220	1060	1180			
25	1040	1010	1020	1060	1060	1060	---	---	---			
26	1070	930	1000	1070	1050	1060	---	---	---			
27	966	944	956	1120	1070	1100	---	---	---			
28	986	966	978	1170	1120	1150	---	---	---			
29	1010	986	1000	1210	1170	1190	841	830	836			
30	1030	1010	1020	1240	1220	1230	837	808	817			
31	1050	1030	1040	---	---	---	818	763	795			
MONTH	1220	848	1050	1240	864	1060						

## MINNESOTA RIVER BASIN

05330920 MINNESOTA RIVER AT FORT SNELLING STATE PARK AT ST. PAUL, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1			
2	8.1	7.9	8.0	8.1	8.1	8.1	8.1	8.0	8.0			
3	8.2	8.0	8.1	8.1	8.1	8.1	8.0	8.0	8.0			
4	8.3	8.1	8.2	8.2	8.1	8.2	8.0	8.0	8.0			
5	8.2	8.1	8.1	8.2	8.2	8.2	8.0	8.0	8.0			
6	8.1	8.0	8.1	8.2	8.2	8.2	8.1	8.0	8.0			
7	8.1	8.0	8.0	8.3	8.2	8.2	8.1	8.1	8.1			
8	8.0	8.0	8.0	8.3	8.3	8.3	8.2	8.1	8.1			
9	8.0	8.0	8.0	8.3	8.3	8.3	8.2	8.1	8.2			
10	8.1	8.0	8.1	8.3	8.1	8.2	8.3	8.1	8.2			
11	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.2	8.2			
12	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.1	8.1			
13	8.1	8.1	8.1	8.1	8.0	8.1	8.1	8.1	8.1			
14	8.1	7.9	8.0	8.1	8.0	8.0	8.1	8.1	8.1			
15	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1			
16	8.1	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1			
17	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.1	8.1			
18	8.1	8.0	8.0	8.1	8.0	8.0	8.1	8.1	8.1			
19	8.1	8.0	8.1	8.0	8.0	8.0	8.1	8.1	8.1			
20	8.1	8.1	8.1	8.0	8.0	8.0	8.1	8.1	8.1			
21	8.1	8.1	8.1	8.0	7.9	8.0	8.1	8.1	8.1			
22	8.2	8.1	8.1	8.0	7.9	8.0	8.1	8.1	8.1			
23	8.1	8.1	8.1	8.0	8.0	8.0	8.1	8.1	8.1			
24	8.1	8.0	8.1	8.1	8.0	8.0	8.1	8.0	8.1			
25	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
26	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
27	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
28	8.0	8.0	8.0	8.1	8.1	8.1	---	---	---			
29	8.1	8.0	8.1	8.1	8.1	8.1	8.2	8.0	8.0			
30	8.1	8.1	8.1	8.1	8.1	8.1	8.0	7.9	8.0			
31	8.1	8.1	8.1	---	---	---	8.0	7.9	7.9			
MONTH	8.3	7.9	8.1	8.3	7.9	8.1						

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	14.5	14.5	14.5	7.0	7.0	7.0	1.0	.5	.5			
2	14.5	14.5	14.5	7.0	6.5	7.0	1.5	1.0	1.0			
3	14.5	14.0	14.0	6.5	6.0	6.5	1.5	1.5	1.5			
4	14.5	14.0	14.0	6.0	5.5	6.0	2.0	1.5	2.0			
5	14.5	14.0	14.0	5.5	5.0	5.5	2.0	1.5	2.0			
6	14.5	14.0	14.5	4.5	4.5	4.5	1.5	1.5	1.5			
7	14.0	13.5	14.0	4.0	3.5	3.5	1.5	1.0	1.0			
8	13.5	13.5	13.5	3.0	3.0	3.0	1.0	.5	1.0			
9	13.5	13.0	13.0	2.5	2.5	2.5	.5	.5	.5			
10	13.0	13.0	13.0	2.0	2.0	2.0	.5	.5	.5			
11	13.0	13.0	13.0	2.0	2.0	2.0	.5	.5	.5			
12	13.0	12.5	12.5	2.0	1.5	2.0	.5	.5	.5			
13	12.5	12.5	12.5	1.5	1.0	1.5	.5	.5	.5			
14	12.5	10.5	11.5	1.0	1.0	1.0	.5	.5	.5			
15	10.5	10.5	10.5	1.0	1.0	1.0	.5	.5	.5			
16	10.5	10.0	10.5	1.0	.5	.5	.5	.5	.5			
17	10.5	10.0	10.5	.5	.5	.5	.5	.5	.5			
18	10.5	10.0	10.5	1.0	.5	.5	.5	.5	.5			
19	10.5	10.0	10.5	1.5	1.0	1.0	.5	.5	.5			
20	10.0	9.5	9.5	2.0	1.5	1.5	.5	.5	.5			
21	9.5	9.0	9.5	2.0	1.5	2.0	.5	.5	.5			
22	9.0	8.5	9.0	2.0	2.0	2.0	.5	.5	.5			
23	8.0	8.0	8.0	2.0	1.5	2.0	.5	.5	.5			
24	7.5	7.5	7.5	1.5	1.0	1.0	.5	.5	.5			
25	7.5	7.0	7.0	1.0	.5	1.0	---	---	---			
26	7.0	7.0	7.0	.5	.5	.5	---	---	---			
27	7.0	7.0	7.0	.5	.5	.5	---	---	---			
28	7.0	7.0	7.0	.5	.5	.5	---	---	---			
29	7.0	7.0	7.0	.5	.5	.5	.5	.5	.5			
30	7.0	7.0	7.0	.5	.5	.5	.5	.5	.5			
31	7.0	7.0	7.0	---	---	---	.5	.5	.5			
MONTH	14.5	7.0	11.0	7.0	.5	2.5						

## MINNESOTA RIVER BASIN

05330920 MINNESOTA RIVER AT FORT SNELLING STATE PARK AT ST. PAUL, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO DECEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	13.4	11.6	12.7	10.3	10.2	10.2	13.7	13.2	13.4			
2	12.9	10.7	11.9	10.9	10.3	10.6	13.6	13.3	13.5			
3	14.2	11.2	12.4	11.1	10.8	10.9	13.3	13.1	13.2			
4	14.9	11.8	13.3	11.4	11.0	11.2	13.1	12.8	12.9			
5	15.8	13.9	14.7	11.7	11.3	11.4	12.8	12.7	12.7			
6	14.6	11.1	13.1	12.2	11.8	12.0	13.0	12.8	12.9			
7	10.8	8.4	9.4	12.8	12.3	12.6	13.3	13.0	13.1			
8	8.7	7.9	8.3	13.0	12.8	12.9	13.6	13.3	13.4			
9	8.2	8.0	8.1	13.3	13.2	13.2	13.9	13.3	13.6			
10	8.4	7.9	8.2	13.8	13.3	13.5	14.0	13.8	13.9			
11	8.6	8.2	8.4	13.6	13.4	13.5	14.3	14.0	14.2			
12	8.8	8.4	8.6	13.4	13.2	13.3	14.1	13.8	14.0			
13	9.0	8.6	8.8	13.2	13.1	13.2	13.9	13.7	13.8			
14	10.2	8.8	9.4	13.4	13.1	13.3	13.7	13.2	13.4			
15	9.8	9.6	9.7	13.7	13.4	13.5	13.2	12.9	13.0			
16	9.8	9.5	9.7	13.9	13.7	13.8	13.3	13.0	13.1			
17	9.9	9.7	9.8	14.0	13.8	13.9	13.4	13.2	13.3			
18	9.9	9.7	9.8	14.2	13.6	13.9	13.5	13.1	13.2			
19	10.1	9.7	9.8	13.7	13.5	13.6	13.2	13.1	13.2			
20	10.0	9.7	9.9	13.5	12.9	13.1	13.2	13.1	13.2			
21	10.5	9.9	10.2	12.9	12.5	12.7	13.3	13.1	13.1			
22	10.8	10.2	10.6	12.5	12.3	12.4	13.1	13.0	13.0			
23	10.9	10.6	10.7	12.8	12.5	12.6	13.0	12.8	12.9			
24	10.8	10.5	10.7	13.0	12.8	12.9	12.8	12.7	12.8			
25	10.5	10.3	10.5	13.3	13.0	13.1	---	---	---			
26	10.4	10.2	10.3	13.7	13.3	13.5	---	---	---			
27	10.3	10.2	10.2	13.7	13.6	13.7	---	---	---			
28	10.2	10.0	10.1	13.7	13.6	13.6	---	---	---			
29	10.1	9.9	10.0	13.6	13.4	13.5	12.9	12.6	12.7			
30	10.1	10.0	10.0	13.4	13.3	13.3	12.6	12.5	12.6			
31	10.2	10.0	10.1	---	---	---	12.6	12.3	12.4			
MONTH	15.8	7.9	10.3	14.2	10.2	12.8						

## MISSISSIPPI RIVER MAIN STEM

05331000 MISSISSIPPI RIVER AT ST. PAUL, MN

LOCATION.--Lat 44°56'40", long 93°05'20", in SE¼NE¼ sec.6, T.28 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, on left bank in St. Paul, 300 ft (91 m) upstream from Robert Street Bridge, 6 mi (10 km) downstream from Minnesota River, and at mile 839.3 (1,350 km) upstream from Ohio River.

DRAINAGE AREA.--36,800 mi<sup>2</sup> (95,300 km<sup>2</sup>), approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--Water year 1867-69, 1872-92 (annual maximums), March 1892 to current year (prior to 1901, fragmentary during some winters). Records prior to March 1892, published in the 19th Annual Report, Part 4, have been found to be unreliable and should not be used. Monthly discharge only for some periods, published in WSP 1308. Gage-height records (winter records incomplete) collected at same site since 1866 are contained in reports of U.S. Weather Bureau, War Department and Mississippi River Commission.

REVISED RECORDS.--WSP 285: 1892-96. WSP 715: Drainage area. WSP 875: 1938. WSP 895: 1939. WSP 1308: 1867(M). WSP 1508: 1897, 1898(M), 1903(M), 1917-18(M), 1928(M), 1929. WRD MN-74: 1973.

GAGE.--Water-stage recorder. Datum of gage is 683.62 ft (208.367 m) National Geodetic Vertical Datum of 1929. Prior to Mar. 18, 1925, nonrecording gage at several sites within 300 ft (91 m) of present site at present datum. Mar. 18, 1925, to Mar. 10, 1933, water-stage recorder and Mar. 11, 1933, to Sept. 14, 1939, nonrecording gage, at present site and datum. Since September 1938, auxiliary water-stage recorder 5.6 mi (9.0 km) downstream.

REMARKS.--Records good. Slight regulation except during extreme floods by reservoirs on headwaters and by power plants. Beginning July 20, 1938, sewage from Minneapolis and St. Paul, which formerly entered above station, was diverted to a sewage-disposal plant, thence to river below station. Figures of daily discharge do not include this diversion.

COOPERATION.--Records of Mississippi River at Twin City lock and dam computed and furnished by Ford Motor Co. Diversion through sewage disposal plant furnished by Metropolitan Waste Control Commission.

AVERAGE DISCHARGE (ADJUSTED FOR DIVERSION).--85 years (water years 1895, 1897, 1901-83) 10,780 ft<sup>3</sup>/s (305.3 m<sup>3</sup>/s), 3.98 in/yr (101 mm/yr); median of yearly mean discharges, 10,130 ft<sup>3</sup>/s (287 m<sup>3</sup>/s), 3.74 in/yr (95 mm/yr).

EXTREMES FOR PERIOD OF RECORD (1867-70, 1872-1983).--Maximum discharge, 171,000 ft<sup>3</sup>/s (4,840 m<sup>3</sup>/s) Apr. 16, 1965, gage height, 26.01 ft (7.928 m) from floodmark.

Maximum flood known since at least 1851, that of 1965. Flood of Apr. 11, 1870 reached a stage of 19.4 ft (5.9 m), discharge, 100,000 ft<sup>3</sup>/s (2,830 m<sup>3</sup>/s).

EXTREMES FOR PERIOD OF RECORD (1897,1917-83).--Minimum daily discharge, 632 ft<sup>3</sup>/s (17.9 m<sup>3</sup>/s) Aug. 26, 1934.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 64,100 ft<sup>3</sup>/s (1,820 m<sup>3</sup>/s) Mar. 12; maximum gage height, 12.33 ft (3.758 m) Mar. 13; minimum daily, 6,340 ft<sup>3</sup>/s (180 m<sup>3</sup>/s) Aug. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6800	17200	22200	12700	9310	23100	26200	34300	17700	376700	13500	8280
2	7080	17200	24300	13200	9320	25600	26800	33300	16900	36400	13100	8880
3	6380	16500	23500	12600	8210	29600	28300	31900	16400	39400	12700	8700
4	6630	16300	23000	12400	8250	37600	31100	30200	16100	41700	12400	8230
5	7120	15300	22800	13100	8130	41700	33200	29000	15800	43900	11700	8650
6	7550	14600	22800	12800	8220	47500	35500	28300	15700	46100	11100	8470
7	9770	14400	20900	12700	8560	53500	40100	27700	14800	51100	10800	7580
8	12200	14300	19200	12400	8160	60500	44700	27600	14500	52900	11000	7060
9	16200	14200	16200	11700	8120	62500	48000	27900	13400	52000	11000	7760
10	17800	14600	14700	12600	9160	61700	50600	28200	13400	50200	10700	7160
11	19300	14300	11900	12900	8650	63400	49700	29500	12400	47300	10300	7360
12	20600	15200	10900	12200	8660	64100	48900	30000	12000	44100	9880	7640
13	22200	16100	12000	11700	8600	63600	49700	31800	12800	39200	8940	7420
14	22900	17100	14000	12000	8710	61800	50200	32800	12900	36000	8260	7470
15	23100	18400	15600	11700	9470	59400	50700	33400	13600	34000	8600	8430
16	23200	18900	16400	11400	9580	55000	52000	33200	16800	31300	9280	7430
17	22800	19100	15400	11300	8860	51900	53800	32700	19900	27400	9700	8140
18	22900	20100	14900	11200	8760	48800	55800	31200	22100	24500	9420	8410
19	22800	19600	15100	11000	8850	45800	57600	30100	23900	22700	9070	8990
20	22000	21200	14900	11200	9470	42300	57800	29000	24700	21500	8650	8830
21	21100	22100	14400	11700	10100	39500	56300	27600	25900	20300	7670	8530
22	20700	23900	13700	11600	10600	36800	55700	27000	28500	19800	7980	9140
23	21100	23900	14700	10900	13000	34500	52300	25900	29800	18800	7520	8680
24	21500	22200	15100	10400	15400	33400	49700	24800	30600	17800	6920	7610
25	22200	20700	15500	10300	17500	31200	47100	23700	30700	17400	6340	7550
26	21800	21100	14400	10000	19100	30500	44200	22300	32400	16500	7700	7150
27	20900	19300	13400	8950	20500	29300	42100	21100	37300	15600	7440	8060
28	19800	19100	12200	8700	22000	28400	39900	20200	37100	15100	7560	7300
29	19700	20600	10200	11000	---	26900	37200	19300	35800	14500	8520	6580
30	19000	21700	11400	10300	---	25100	35500	18600	36400	13900	8450	7230
31	18000	---	12800	9700	---	25500	---	18300	---	13700	8160	---
TOTAL	545130	549200	498500	356350	303250	1340500	1350700	860900	650300	961800	294360	238720
MEAN	17580	18310	16080	11500	10830	43240	45020	27770	21680	31030	9495	7957
MAX	23200	23900	24300	13200	22000	64100	57800	34300	37300	52900	13500	9140
MIN	6380	14200	10200	8700	8120	23100	26200	18300	12000	13700	6340	6580
CFSM	.48	.50	.44	.31	.29	1.18	1.22	.76	.59	.84	.26	.22
IN.	.55	.56	.50	.36	.31	1.36	1.37	.87	.66	.97	.30	.24
†	301	282	274	270	287	349	429	391	377	344	388	375
MEAN ‡	17881	18592	16354	11770	11117	43589	45449	28161	22057	31374	9883	8332
CFSM ‡	.49	.51	.44	.32	.30	1.18	1.24	.77	.60	.85	.27	.23
IN. ‡	.56	.56	.51	.37	.31	1.37	1.38	.88	.67	.98	.31	.25
CAL YR 1982 TOTAL	6212430			MEAN 17020	MAX 57400	MIN 4120	MEAN ‡ 17342	CFSM ‡ .47	IN. ‡ 6.40			
WTR YR 1983 TOTAL	7949710			MEAN 21780	MAX 64100	MIN 6340	MEAN ‡ 22119	CFSM ‡ .60	IN. ‡ 8.16			

† Diversion equivalent in cubic feet per second, through sewage disposal plant.

‡ Adjusted for diversion.



## MISSISSIPPI RIVER BASIN

05331000 MISSISSIPPI RIVER AT ST. PAUL, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1956 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1956 to current year.

INSTRUMENTATION.--Temperature recorder since October 1956.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum 31.0°C July 24-28, 1964, July 31, 1975, July 19, 21, 1977; minimum, 0.0°C many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum 29.0°C Aug. 7-8; minimum, 0.0°C many days during winter period.

## TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN OCTOBER	MEAN	MAX	MIN NOVEMBER	MEAN	MAX	MIN DECEMBER	MEAN	MAX	MIN JANUARY	MEAN
1	18.0	17.5	17.5	9.0	8.5	8.5	.5	.0	.5	1.5	1.0	1.0
2	17.5	16.5	17.0	9.0	8.5	9.0	.5	.0	.5	1.5	.5	1.0
3	16.5	16.0	16.0	9.0	8.0	8.5	.5	.0	.5	1.5	.5	1.0
4	16.0	15.5	15.5	9.0	7.0	8.5	.5	.5	.5	2.0	.5	1.0
5	16.5	15.5	16.0	8.5	6.0	7.0	.5	.0	.5	1.5	.0	1.0
6	17.5	16.0	16.5	8.5	5.5	7.0	.0	.0	.0	2.0	1.0	1.5
7	16.0	15.0	15.5	8.0	5.0	6.5	.5	.0	.5	3.0	1.0	2.0
8	15.0	13.5	14.0	8.5	5.0	7.0	1.0	.5	1.0	3.0	.5	2.0
9	13.5	13.0	13.5	6.5	5.0	6.0	1.5	.5	1.0	3.5	.0	2.0
10	13.0	13.0	13.0	6.0	4.5	5.0	2.0	1.0	1.5	1.0	.0	.5
11	13.0	12.5	12.5	7.0	4.5	6.0	3.5	1.0	2.5	1.5	.0	1.0
12	12.0	12.0	12.0	6.5	4.5	5.5	3.5	1.5	2.5	3.0	1.0	2.0
13	12.0	11.5	12.0	6.0	4.0	5.0	3.5	1.0	2.0	3.5	.0	2.0
14	12.0	11.5	11.5	5.0	3.5	4.0	2.0	.0	1.0	2.0	.0	1.0
15	12.5	11.5	12.0	5.0	3.5	4.0	1.0	.0	.5	2.0	.5	1.0
16	12.0	11.5	11.5	5.0	3.0	4.0	1.5	.0	1.0	3.5	1.0	2.0
17	11.5	11.0	11.5	4.0	3.0	3.5	1.5	.0	1.0	3.5	1.0	2.0
18	12.0	11.0	11.5	4.0	2.0	3.0	3.5	.0	2.0	3.0	.5	2.0
19	11.5	10.5	11.5	4.0	3.0	3.5	3.5	1.0	2.0	3.5	1.5	2.5
20	11.0	9.5	10.0	4.5	3.0	4.0	4.0	.5	2.0	3.5	.5	2.0
21	9.5	9.0	9.0	4.5	3.5	4.0	1.0	.0	.5	3.5	.0	2.0
22	9.0	8.5	8.5	4.0	3.5	4.0	1.0	.0	.5	.5	.0	.5
23	8.5	8.0	8.5	4.0	3.5	4.0	1.0	.0	.5	3.5	.5	2.0
24	8.5	8.5	8.5	3.5	2.0	3.0	1.0	.0	.5	4.0	3.0	3.5
25	9.5	8.5	9.0	3.0	1.5	2.0	1.5	.0	1.0	4.0	1.0	2.5
26	9.5	9.0	9.5	3.5	1.5	2.5	3.0	.0	1.5	3.5	.5	2.0
27	9.5	9.5	9.5	2.0	1.5	2.0	1.5	.0	1.0	3.5	1.0	2.0
28	9.5	9.5	9.5	1.5	1.0	1.0	3.5	1.0	2.0	3.5	1.0	2.0
29	9.5	9.0	9.5	1.5	1.0	1.0	4.0	.0	2.0	3.0	.0	1.5
30	10.0	9.5	9.5	1.0	.5	1.0	1.5	.5	1.0	3.0	.0	1.5
31	9.5	9.0	9.0	---	---	---	1.0	.5	1.0	3.0	.5	2.0
MONTH	18.0	8.0	12.0	9.0	.5	4.5	4.0	.0	1.0	4.0	.0	1.5

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	3.0	3.0	3.0	2.0	1.5	2.0	5.5	5.5	5.5	13.5	13.0	13.0
2	3.0	.0	1.5	1.5	1.5	1.5	5.5	5.5	5.5	13.5	13.0	13.0
3	3.0	.0	1.5	1.5	1.0	1.0	6.0	5.5	6.0	13.5	13.0	13.0
4	1.5	.5	1.0	3.0	1.5	2.0	6.5	6.0	6.0	14.0	13.5	14.0
5	1.5	1.0	1.0	3.5	3.0	3.0	6.5	6.5	6.5	15.0	14.0	14.5
6	2.0	1.5	2.0	3.5	2.0	3.0	6.5	6.5	6.5	15.5	15.0	15.0
7	2.0	.5	1.0	2.5	2.5	2.5	6.5	6.5	6.5	15.0	14.5	15.0
8	2.0	1.0	1.5	2.5	2.0	2.0	7.0	6.5	7.0	14.5	14.5	14.5
9	3.0	2.0	2.5	2.5	1.0	2.0	6.5	6.5	6.5	15.0	14.5	15.0
10	2.0	.5	1.0	1.0	1.0	1.0	6.5	6.5	6.5	15.5	15.0	15.0
11	2.0	.5	1.0	1.0	1.0	1.0	7.0	6.5	7.0	16.5	15.5	16.0
12	2.0	.5	1.0	1.0	1.0	1.0	7.0	7.0	7.0	17.0	15.5	16.0
13	3.5	1.0	2.0	1.5	1.0	1.0	7.0	7.0	7.0	17.0	15.5	16.0
14	3.5	.5	2.0	2.0	1.5	2.0	7.0	7.0	7.0	16.5	16.0	16.0
15	2.0	.5	1.0	2.0	2.0	2.0	7.0	6.5	7.0	16.0	16.0	16.0
16	3.5	1.0	2.0	2.0	2.0	2.0	7.0	6.5	7.0	16.0	15.5	16.0
17	4.0	1.0	2.5	2.0	2.0	2.0	7.0	7.0	7.0	15.5	15.5	15.5
18	4.0	1.0	2.5	2.0	2.0	2.0	7.0	7.0	7.0	15.5	15.5	15.5
19	4.0	1.5	3.0	2.5	2.0	2.0	7.5	7.0	7.0	15.5	15.5	15.5
20	5.0	1.5	3.0	3.0	2.5	3.0	8.0	7.5	8.0	15.5	15.5	15.5
21	3.0	1.5	2.0	3.0	3.0	3.0	8.5	8.0	8.0	16.0	15.5	16.0
22	4.0	2.0	3.0	3.0	3.0	3.0	9.0	8.5	9.0	16.0	16.0	16.0
23	4.5	1.5	3.0	3.0	3.0	3.0	10.0	9.0	9.5	17.0	16.0	16.5
24	1.5	1.0	1.0	3.5	3.0	3.0	10.5	10.0	10.0	17.5	17.0	17.0
25	1.5	1.0	1.0	4.0	3.5	4.0	11.5	10.5	11.0	17.5	17.0	17.0
26	2.0	1.5	2.0	4.0	4.0	4.0	12.0	11.5	12.0	18.0	17.0	17.5
27	2.0	1.5	2.0	4.0	3.5	4.0	13.0	12.0	12.5	18.0	17.5	18.0
28	1.5	1.5	1.5	4.0	3.5	4.0	13.0	13.0	13.0	18.0	17.5	18.0
29	---	---	---	4.5	4.0	4.0	13.0	13.0	13.0	17.5	17.0	17.0
30	---	---	---	5.0	4.5	5.0	13.0	13.0	13.0	17.0	16.5	17.0
31	---	---	---	5.5	4.5	5.0	---	---	---	16.5	16.5	16.5
MONTH	5.0	.0	2.0	5.5	1.0	2.5	13.0	5.5	8.0	18.0	13.0	15.5
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	17.0	16.5	17.0	22.5	22.0	22.0	26.5	25.5	26.0	26.5	25.5	26.0
2	17.5	17.0	17.0	23.0	22.5	23.0	26.5	26.0	26.5	27.0	25.0	26.0
3	17.5	17.0	17.0	23.5	23.0	23.0	27.0	26.5	27.0	26.0	25.5	

[illegible]

## MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	FEBRUARY				MARCH				APRIL				MAY		
1	649	563	611						---	---	---				
2	614	537	572						---	---	---				
3	615	546	579						---	---	---				
4	703	577	642						---	---	---				
5	676	655	664						---	---	---				
6	671	652	658						542	514	527				
7	657	631	642						551	479	515				
8	637	631	639						535	514	525				
9	654	622	635						581	512	529				
10	642	611	625						608	596	602				
11	638	587	609						602	584	592				
12	---	---	---						587	460	556				
13	---	---	---						526	472	500				
14	---	---	---						569	527	553				
15	---	---	---						575	565	569				
16	---	---	---						583	572	579				
17	---	---	---						557	567	571				
18	---	---	---						591	565	576				
19	---	---	---						599	579	587				
20	---	---	---						608	589	598				
21	---	---	---						619	593	607				
22	---	---	---						614	600	609				
23	---	---	---						616	601	609				
24	---	---	---						617	600	608				
25	---	---	---						626	607	615				
26	---	---	---						632	611	623				
27	---	---	---						633	614	622				
28	---	---	---						630	602	618				
29	---	---	---						618	595	606				
30	---	---	---						609	579	596				
31	---	---	---						599	587	580				

[illegible]

## MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.0	7.9	8.0	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8
2	8.0	7.8	7.9	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8
3	8.0	7.8	7.9	8.0	8.0	8.0	---	---	---	8.2	7.8	7.8
4	8.1	7.8	7.9	8.0	8.0	8.0	---	---	---	8.1	7.9	7.9
5	8.3	7.9	8.0	8.0	8.0	8.0	---	---	---	8.5	7.9	8.0
6	8.2	8.1	8.2	8.0	8.0	8.0	---	---	---	7.9	7.9	7.9
7	8.1	7.8	8.1	8.0	8.0	8.0	---	---	---	7.9	7.8	7.9
8	8.0	8.0	8.0	8.1	8.0	8.0	---	---	---	7.8	7.8	7.8
9	8.0	7.9	8.0	8.2	8.0	8.0	---	---	---	7.9	7.8	7.8
10	7.9	7.9	7.9	8.0	8.0	8.0	---	---	---	8.1	7.8	7.9
11	7.9	7.9	7.9	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8
12	7.9	7.9	7.9	8.0	7.9	7.9	---	---	---	7.8	7.8	7.8
13	8.0	7.6	7.8	7.9	7.9	7.9	---	---	---	7.8	7.8	7.8
14	7.6	7.6	7.6	7.9	7.9	7.9	---	---	---	---	---	---
15	7.6	7.6	7.6	7.9	7.8	7.9	---	---	---	---	---	---
16	7.7	7.6	7.6	7.9	7.8	7.8	7.8	7.8	7.8	---	---	---
17	7.6	7.6	7.6	8.0	7.9	7.9	7.9	7.8	7.8	---	---	---
18	7.7	7.6	7.6	8.0	7.9	7.9	7.9	7.9	7.9	---	---	---
19	8.3	7.6	7.8	---	---	---	7.9	7.9	7.9	---	---	---
20	8.0	7.8	7.9	---	---	---	7.9	7.8	7.9	7.9	7.9	7.9
21	7.9	7.9	7.9	---	---	---	8.0	7.8	7.8	8.1	7.9	8.0
22	8.0	7.9	7.9	---	---	---	8.0	7.8	7.8	8.0	8.0	8.0
23	7.9	7.9	7.9	---	---	---	7.9	7.8	7.8	8.0	8.0	8.0
24	8.0	7.9	7.9	---	---	---	7.8	7.8	7.8	8.0	8.0	8.0
25	8.0	7.9	7.9	---	---	---	7.8	7.8	7.8	8.0	8.0	8.0
26	8.0	7.9	7.9	---	---	---	7.8	7.8	7.8	8.0	8.0	8.0
27	8.0	8.0	8.0	---	---	---	7.9	7.8	7.9	8.0	8.0	8.0
28	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8	8.2	7.9	8.0
29	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8	8.2	8.1	8.1
30	8.0	8.0	8.0	---	---	---	8.0	7.8	7.8	8.2	8.1	8.1
31	8.0	8.0	8.0	---	---	---	7.8	7.8	7.8	8.2	8.1	8.1
MONTH	8.3	7.6	7.9	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	8.1	8.0	8.1							---	---	---
2	8.0	7.9	8.0							---	---	---
3	8.0	7.9	8.0							---	---	---
4	8.0	8.0	8.0							---	---	---
5	8.0	7.9	7.9							---	---	---
6	8.0	7.9	7.9							8.2	8.1	8.1
7	8.2	7.9	8.0							8.2	8.0	8.0
8	8.3	7.9	8.0							8.3	8.0	8.1
9	8.1	8.0	8.0							8.2	8.0	8.1
10	8.0	8.0	8.0							8.2	8.1	8.2
11	8.0	8.0	8.0							8.2	8.1	8.1
12	---	---	---							8.1	8.0	8.1
13	---	---	---							8.1	7.9	8.0
14	---	---	---							8.0	7.9	8.0
15	---	---	---							8.2	8.0	8.1
16	---	---	---							8.3	7.9	8.0
17	---	---	---							8.2	8.0	8.1
18	---	---	---							8.2	8.0	8.1
19	---	---	---							8.1	8.0	8.0
20	---	---	---							8.1	8.0	8.0
21	---	---	---							8.2	8.0	8.1
22	---	---	---							8.2	8.0	8.1
23	---	---	---							8.2	8.1	8.2
24	---	---	---							8.3	8.1	8.2
25	---	---	---							8.3	8.1	8.2
26	---	---	---							8.4	8.1	8.2
27	---	---	---							8.3	8.1	8.2
28	---	---	---							8.3	8.1	8.2
29	---	---	---							8.2	8.0	8.1
30	---	---	---							8.1	8.0	8.1
31	---	---	---							8.2	8.0	8.1

## MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
		JUNE				JULY				AUGUST				SEPTEMBER	
1	8.1	7.9	8.0		7.9	7.6	7.8		---	---	---		8.4	7.9	8.2
2	8.1	8.0	8.0		7.9	7.7	7.8		8.5	8.3	8.4		8.3	8.1	8.2
3	8.1	7.9	8.0		7.8	7.6	7.7		8.4	8.3	8.4		8.3	8.1	8.2
4	8.2	7.9	8.1		7.8	7.5	7.7		8.5	8.3	8.4		---	---	---
5	8.2	8.0	8.1		---	---	---		8.5	8.3	8.4		---	---	---
6	8.4	8.0	8.2		---	---	---		8.4	8.3	8.4		8.4	8.1	8.3
7	8.4	8.1	8.3		---	---	---		8.5	8.2	8.3		8.5	8.1	8.2
8	8.4	8.2	8.3		---	---	---		8.6	8.2	8.4		8.3	8.1	8.2
9	8.5	8.3	8.4		---	---	---		8.4	8.1	8.3		8.3	8.1	8.2
10	8.5	8.2	8.4		---	---	---		8.3	8.0	8.1		8.3	8.2	8.3
11	8.5	8.3	8.4		---	---	---		8.0	7.8	7.9		8.4	8.2	8.3
12	8.4	8.2	8.3		---	---	---		8.3	7.8	8.1		8.4	8.2	8.3
13	8.4	8.2	8.3		---	---	---		8.2	7.9	8.1		8.4	8.3	8.3
14	8.3	8.0	8.1		---	---	---		8.2	7.9	8.1		8.4	8.3	8.3
15	8.2	8.0	8.1		---	---	---		8.2	8.0	8.1		8.4	8.2	8.3
16	8.2	8.0	8.1		---	---	---		8.2	8.0	8.1		8.3	8.1	8.2
17	8.2	8.0	8.1		---	---	---		8.1	7.5	7.7		8.3	8.2	8.2
18	8.0	7.9	8.0		---	---	---		7.9	7.7	7.8		8.3	8.1	8.2
19	8.1	7.9	8.0		---	---	---		7.9	7.7	7.8		8.2	8.1	8.2
20	8.1	8.0	8.1		---	---	---		8.1	7.7	7.9		8.2	8.1	8.1
21	8.1	8.0	8.0		---	---	---		7.9	7.8	7.9		8.2	8.1	8.1
22	8.1	7.9	8.0		---	---	---		8.1	7.8	7.9		8.3	8.1	8.2
23	8.1	7.9	8.0		---	---	---		8.2	7.8	8.0		8.4	8.1	8.3
24	8.2	8.0	8.1		---	---	---		8.2	8.0	8.1		8.5	8.1	8.3
25	8.2	8.0	8.1		---	---	---		8.2	8.0	8.1		8.5	8.3	8.4
26	8.2	8.0	8.1		---	---	---		8.3	8.0	8.1		8.5	8.2	8.4
27	8.2	8.0	8.1		---	---	---		8.3	8.0	8.1		8.5	8.3	8.4
28	8.1	7.9	8.0		---	---	---		8.3	8.0	8.2		8.3	8.2	8.3
29	8.0	7.9	7.9		---	---	---		8.3	7.9	8.1		8.3	8.1	8.2
30	8.1	7.7	7.9		---	---	---		8.3	8.0	8.1		8.4	8.1	8.2
31	---	---	---		---	---	---		8.1	7.9	8.0		---	---	---
MONTH	8.5	7.7	8.1		---	---	---		---	---	---		---	---	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	OCTOBER				NOVEMBER				DECEMBER				JANUARY		
1	16.0	15.5	16.0		7.0	6.5	7.0		---	---	---		.5	.5	.5
2	16.0	15.5	15.5		7.0	7.0	7.0		---	---	---		.5	.5	.5
3	15.5	14.5	15.0		7.0	6.0	6.5		---	---	---		.5	.5	.5
4	14.5	14.0	14.5		6.0	4.5	5.0		---	---	---		.5	.5	.5
5	15.0	14.0	14.5		4.5	3.0	3.5		---	---	---		.5	.5	.5
6	15.0	14.5	15.0		3.0	3.0	3.0		---	---	---		.5	.5	.5
7	14.0	12.5	13.0		3.0	2.5	3.0		---	---	---		.5	.5	.5
8	12.5	11.0	12.0		3.0	2.5	3.0		---	---	---		.5	.5	.5
9	11.0	10.5	11.0		3.0	2.5	2.5		---	---	---		.5	.5	.5
10	10.5	10.5	10.5		2.5	2.5	2.5		---	---	---		1.0	.5	.5
11	10.5	10.0	10.0		2.5	2.0	2.5		---	---	---		.5	.5	.5
12	10.0	9.5	9.5		3.0	1.0	2.0		---	---	---		1.5	.5	.5
13	10.0	9.5	9.5		1.5	.5	.5		---	---	---		1.0	.5	.5
14	10.0	9.5	10.0		1.0	.5	1.0		---	---	---		.5	.5	.5
15	11.0	10.5	11.0		1.5	1.0	1.5		---	---	---		---	---	---
16	11.0	10.5	10.5		2.5	1.5	2.0		1.0	.5	.5		---	---	---
17	11.0	10.5	11.0		1.5	1.0	1.0		1.0	.5	.5		---	---	---
18	11.5	11.0	11.5		1.5	1.0	1.5		1.0	.5	1.0		---	---	---
19	12.0	11.5	12.0		---	---	---		1.0	.5	.5		---	---	---
20	11.0	9.5	10.5		---	---	---		1.0	.5	.5		.5	.5	.5
21	9.0	8.5	8.5		---	---	---		.5	.5	.5		.5	.5	.5
22	7.5	7.0	7.5		---	---	---		1.0	.5	.5		.5	.5	.5
23	7.0	7.0	7.0		---	---	---		1.0	.5	1.0		.5	.5	.5
24	7.0	7.0	7.0		---	---	---		1.0	.5	1.0		.5	.5	.5
25	7.0	6.5	7.0		---	---	---		1.0	.5	1.0		.5	.5	.5
26	7.5	7.0	7.0		---	---	---		.5	.5	.5		.5	.5	.5
27	7.5	7.0	7.5		---	---	---		.5	.5	.5		.5	.5	.5
28	7.0	7.0	7.0		---	---	---		.5	.5	.5		.5	.5	.5
29	7.5	7.0	7.0		---	---	---		.5	.5	.5		.5	.5	.5
30	7.5	7.0	7.0		---	---	---		.5	.5	.5		.5	.5	.5
31	7.5	7.0	7.0		---	---	---		.5	.5	.5		.5	.5	.5
MONTH	16.0	6.5	10.5		---	---	---		---	---	---		---	---	---







## MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
		JUNE				JULY				AUGUST				SEPTEMBER	
1	9.7	9.0	9.3		8.0	7.3	7.7		---	---	---		5.9	5.5	5.7
2	9.6	8.9	9.2		7.7	7.1	7.5		8.6	7.5	8.0		6.6	5.9	6.3
3	9.6	8.7	9.2		7.7	7.2	7.5		9.0	8.5	8.7		6.8	6.1	6.5
4	9.4	8.6	9.0		7.5	7.0	7.2		9.1	7.0	7.8		---	---	---
5	9.3	8.6	8.9		---	---	---		7.5	6.2	7.0		---	---	---
6	9.4	8.3	9.0		---	---	---		6.9	6.4	6.7		6.9	6.1	6.6
7	9.3	8.7	8.9		---	---	---		7.2	6.5	6.9		7.1	6.8	7.0
8	8.9	8.0	8.5		---	---	---		7.2	5.9	6.7		7.3	7.2	7.3
9	8.6	7.7	8.1		---	---	---		7.7	6.2	6.8		7.4	6.4	7.1
10	9.1	7.7	8.4		---	---	---		8.7	7.3	8.0		7.5	7.0	7.2
11	9.5	8.6	9.0		---	---	---		9.3	8.2	8.8		7.9	7.5	7.7
12	9.2	8.3	8.7		---	---	---		9.5	7.9	8.6		8.3	7.4	8.0
13	8.8	7.5	8.2		---	---	---		8.7	7.9	8.3		9.4	8.8	9.1
14	7.8	7.6	7.7		---	---	---		8.9	8.2	8.4		9.9	9.0	9.5
15	8.5	7.9	8.2		---	---	---		8.3	7.5	7.8		10.2	8.7	9.4
16	8.8	8.2	8.5		---	---	---		9.0	7.0	8.1		9.4	8.6	9.0
17	9.1	8.2	8.7		---	---	---		10.0	8.8	9.6		9.8	9.1	9.4
18	9.2	8.5	8.8		---	---	---		10.5	8.7	9.7		9.9	9.2	9.5
19	9.3	8.6	9.0		---	---	---		9.8	7.0	8.6		10.0	8.2	9.3
20	8.9	7.6	8.4		---	---	---		7.9	7.2	7.5		9.6	8.6	9.2
21	8.2	7.6	7.9		---	---	---		8.3	7.7	8.0		10.4	9.2	10.0
22	8.1	7.6	7.9		---	---	---		8.6	7.1	7.9		12.0	10.2	11.0
23	8.6	7.5	8.0		---	---	---		8.0	7.2	7.6		12.3	11.0	11.7
24	8.6	7.1	7.8		---	---	---		8.1	7.4	7.7		12.1	11.3	11.7
25	7.8	7.2	7.5		---	---	---		8.3	7.6	7.9		12.1	11.3	11.8
26	7.7	7.1	7.4		---	---	---		8.2	5.4	6.7		11.9	10.6	11.3
27	7.9	7.2	7.6		---	---	---		6.0	5.5	5.8		11.3	9.8	10.5
28	9.8	7.7	8.8		---	---	---		6.1	5.7	5.9		10.5	9.7	10.1
29	9.6	9.0	9.4		---	---	---		6.5	5.8	6.1		10.1	9.5	9.8
30	7.7	7.5	7.6		---	---	---		7.0	6.1	6.6		10.0	9.0	9.5
31	---	---	---		---	---	---		6.8	6.0	6.3		---	---	---
MONTH	9.8	7.1	8.5		---	---	---		---	---	---		---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN

LOCATION.--Lat 44°51'37", long 93°00'24", in NE¼NE¼ sec.2, T.27 N., R.22 W., Washington County, Hydrologic Unit 07010206, on left bank at the end of Fifth Street, and at mile 830.6 (1,337 km) upstream from Ohio River.

PERIOD OF RECORD.--December 1978 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: December 1978 to current year.

pH: December 1978 to current year.

WATER TEMPERATURES: December 1978 to current year.

DISSOLVED OXYGEN: December 1978 to current year.

INSTRUMENTATION.--Water-quality monitor since December 1978.

REMARKS.--Water is pumped to a monitor that is inside a heated shelter. Extremes are published for those years with 80 percent or more days of record.

COOPERATION.--Water-quality monitor is operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1981, 1983): Maximum, 821 micromhos Nov. 15, 1982, minimum, 288 micromhos Mar. 2, 1981.

pH (water years 1981, 1983): Maximum, 8.6 units Apr. 18, 1981; minimum, 7.3 units June 28, 29, 1981.

WATER TEMPERATURES (water years 1981, 1983): Maximum, 27.5°C July 10, 1981; minimum, 0.0°C Jan. 13, 1981.

DISSOLVED OXYGEN (water years 1981, 1983): Maximum 15.7 mg/L Mar.25, 1981; minimum, 4.1 mg/L Apr. 20, 28, 1981.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 821 micromhos Nov. 15; minimum, 314 micromhos Oct. 13.

pH: Maximum, 8.4 units Jan. 24, 31, June 8-11, Sept. 13, 14; minimum, 7.5 units Oct. 13, Jan. 20, July 7.

WATER TEMPERATURES: Maximum, 27.0°C July 22-24, Aug. 28, 29; minimum, 0.0°C several days during winter.

DISSOLVED OXYGEN: Maximum, 13.7 mg/L Feb. 18; minimum, 3.5 mg/L Aug. 18.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	522	492	499	598	588	593	683	666	679	607	552	577
2	521	443	479	595	558	576	680	587	636	556	521	536
3	454	420	429	565	560	563	655	635	642	535	505	515
4	483	448	466	582	558	569	643	619	631	591	539	558
5	489	480	485	581	568	575	646	629	637	601	595	598
6	505	450	464	599	572	579	645	618	632	601	567	578
7	531	498	512	600	579	589	693	635	654	604	593	596
8	519	440	495	597	585	591	749	658	698	612	583	591
9	477	428	453	596	581	590	797	709	763	606	575	583
10	420	404	412	598	518	557	785	732	755	612	590	599
11	394	362	373	596	547	564	762	654	740	592	563	575
12	359	332	350	602	550	581	659	608	633	---	---	---
13	484	314	391	667	606	627	657	622	639	---	---	---
14	480	468	471	723	667	693	669	621	643	---	---	---
15	473	453	464	821	724	761	643	593	613	---	---	---
16	470	315	441	808	626	717	659	625	641	---	---	---
17	449	413	427	719	644	669	719	635	682	---	---	---
18	440	413	428	715	656	669	736	687	711	---	---	---
19	425	404	415	703	659	676	732	708	719	---	---	---
20	454	376	409	701	650	678	702	683	694	636	601	615
21	493	438	458	692	667	678	683	667	674	657	603	628
22	514	481	489	677	639	654	709	670	688	626	567	593
23	504	479	493	682	654	663	705	675	693	606	567	586
24	543	501	512	751	671	716	672	599	623	615	590	602
25	549	521	537	803	742	765	604	505	552	629	591	610
26	552	504	522	800	727	755	617	536	582	623	607	615
27	599	566	577	746	716	733	644	561	614	625	615	620
28	616	593	600	748	712	726	628	616	625	645	627	637
29	612	586	597	738	670	705	650	587	615	638	627	633
30	616	574	594	701	674	690	671	642	655	633	571	595
31	615	589	600	---	---	---	669	605	634	611	586	599
MONTH	616	314	479	821	518	650	797	505	658	---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	620	590	606	539	522	530	701	671	685	669	650	662
2	631	591	614	544	528	534	677	624	639	659	623	641
3	630	599	614	546	528	538	629	592	613	666	657	653
4	646	617	629	544	521	532	591	578	583	665	648	657
5	687	622	655	532	498	515	616	576	598	658	601	631
6	653	619	641	508	472	487	613	590	601	611	591	597
7	640	601	625	477	455	462	584	550	564	599	552	578
8	630	610	616	458	438	446	580	560	568	585	578	582
9	634	616	626	452	437	442	614	583	597	588	573	580
10	632	611	624	481	453	470	617	608	613	590	576	581
11	613	595	607	486	473	477	650	616	635	593	561	571
12	620	603	614	483	475	479	676	651	662	560	531	540
13	625	592	613	491	478	485	673	649	656	544	465	485
14	630	595	616	514	489	499	658	654	657	535	498	511
15	663	583	624	539	514	523	719	658	678	558	537	544
16	600	549	578	604	541	565	716	670	689	582	558	572
17	564	542	554	621	599	608	668	648	655	604	568	583
18	624	539	575	641	623	637	647	642	645	620	592	602
19	630	594	613	670	643	657	642	614	624	633	621	625
20	626	596	608	697	673	683	610	597	604	658	633	646
21	614	594	602	730	700	712	622	596	607	682	648	662
22	682	617	656	740	616	674	620	609	614	691	662	673
23	705	650	683	669	643	655	615	604	609	679	660	670
24	663	555	600	693	665	682	632	610	623	681	669	676
25	566	502	531	729	687	709	653	620	635	673	658	666
26	517	484	499	734	720	729	675	647	661	673	638	659
27	514	493	500	778	723	739	678	663	670	638	616	627
28	531	510	518	781	755	768	682	669	675	629	611	621
29	---	---	---	759	712	731	676	656	666	610	579	585
30	---	---	---	741	718	726	674	656	665	578	564	571
31	---	---	---	747	676	718	---	---	---	565	556	560
MONTH	705	484	601	781	437	594	719	550	633	691	465	607

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	600	574	589	502	482	490	---	---	---	552	526	536
2	625	568	591	517	487	504	---	---	---	548	507	524
3	639	529	586	481	400	442	---	---	---	510	495	502
4	---	---	---	429	412	424	---	---	---	508	479	489
5	---	---	---	442	416	426	---	---	---	497	442	465
6	---	---	---	441	430	436	---	---	---	489	466	476
7	640	628	636	446	431	453	---	---	---	533	492	510
8	639	620	629	477	440	475	---	---	---	539	514	528
9	647	624	633	507	470	489	---	---	---	558	519	535
10	654	619	641	539	501	515	---	---	---	550	502	526
11	667	653	658	563	532	547	---	---	---	586	552	568
12	676	656	664	583	559	570	---	---	---	580	503	542
13	677	658	670	613	581	597	---	---	---	537	508	519
14	668	600	625	645	612	630	---	---	---	523	493	505
15	650	623	633	659	645	654	---	---	---	517	486	505
16	644	591	621	659	627	645	500	461	476	523	447	472
17	601	586	593	619	598	607	495	342	395	557	526	549
18	599	576	585	601	573	584	444	402	423	547	504	518
19	602	575	590	573	547	567	464	431	441	530	503	521
20	613	592	603	550	529	542	468	426	447	550	504	522
21	625	599	611	562	538	547	456	430	440	561	518	533
22	613	567	589	558	536	544	482	456	465	545	502	518
23	576	542	560	542	525	533	488	449	465	522	486	502
24	591	573	580	554	535	542	491	452	470	504	466	489
25	589	576	582	550	539	544	493	470	485	510	498	504
26	591	570	582	559	543	550	565	477	518	514	492	501
27	569	505	537	574	546	557	524	445	491	524	506	510
28	501	481	488	564	544	555	557	533	545	---	---	---
29	519	495	505	---	---	---	550	452	492	---	---	---
30	521	495	504	---	---	---	491	457	471	---	---	---
31	---	---	---	---	---	---	527	473	493	---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	8.1	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.7	7.8
2	8.0	7.9	8.0	8.0	7.9	7.9	8.0	7.9	7.9	7.7	7.7	7.7
3	8.0	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9	7.7	7.7	7.7
4	8.1	7.9	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.8	7.7	7.7
5	8.2	7.9	8.1	8.0	8.0	8.0	8.0	7.9	8.0	7.7	7.7	7.7
6	8.2	8.1	8.1	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.8	7.8
7	8.1	7.9	8.0	8.1	8.0	8.0	8.0	8.0	8.0	7.9	7.8	7.9
8	8.0	8.0	8.0	8.1	8.0	8.0	8.1	8.0	8.1	7.9	7.8	7.8
9	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.1	7.8	7.8	7.8
10	8.0	8.0	8.0	8.1	7.9	8.0	8.1	8.0	8.1	7.9	7.8	7.8
11	8.0	8.0	8.0	8.0	7.9	8.0	8.1	8.0	8.0	7.8	7.8	7.8
12	8.0	8.0	8.0	8.0	7.9	8.0	8.1	8.0	8.0	---	---	---
13	8.0	7.5	7.8	8.1	8.0	8.1	8.0	8.0	8.0	---	---	---
14	7.7	7.6	7.6	8.1	8.0	8.1	8.0	8.0	8.0	---	---	---
15	7.7	7.6	7.6	8.1	8.0	8.0	8.0	7.9	8.0	---	---	---
16	7.7	7.6	7.7	8.1	8.0	8.0	8.0	7.9	8.0	---	---	---
17	7.7	7.6	7.6	8.0	8.0	8.0	8.0	7.9	8.0	---	---	---
18	7.7	7.6	7.6	8.0	8.0	8.0	8.0	8.0	8.0	---	---	---
19	7.7	7.6	7.6	8.0	7.9	8.0	8.0	8.0	8.0	---	---	---
20	7.7	7.6	7.6	8.0	7.9	8.0	8.0	7.8	7.9	8.1	7.5	8.0
21	7.8	7.7	7.7	8.0	7.9	8.0	7.8	7.7	7.7	8.2	8.0	8.1
22	7.8	7.6	7.8	8.0	8.0	8.0	7.8	7.7	7.7	8.2	8.2	8.2
23	7.8	7.8	7.8	8.0	8.0	8.0	8.0	7.7	7.8	8.2	8.2	8.2
24	7.8	7.8	7.8	8.1	8.0	8.0	7.9	7.7	7.8	8.4	8.2	8.2
25	7.8	7.8	7.8	8.0	8.0	8.0	7.8	7.7	7.8	8.3	8.2	8.2
26	7.8	7.7	7.8	8.0	8.0	8.0	7.9	7.8	7.8	8.3	8.1	8.2
27	7.8	7.8	7.8	8.0	8.0	8.0	8.0	7.8	7.9	8.2	8.1	8.2
28	7.8	7.8	7.8	8.0	8.0	8.0	7.9	7.8	7.8	8.1	8.1	8.1
29	7.8	7.8	7.8	8.0	7.9	8.0	7.8	7.8	7.8	8.2	8.1	8.1
30	7.9	7.8	7.8	8.0	7.9	8.0	7.8	7.8	7.8	8.2	8.1	8.2
31	7.9	7.8	7.9	---	---	---	7.8	7.8	7.8	8.4	8.1	8.2
MONTH	8.2	7.5	7.8	8.1	7.9	8.0	8.1	7.7	7.9	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	8.3	8.0	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.0	7.9	8.0
2	8.1	8.0	8.0	8.1	8.1	8.1	8.1	8.0	8.1	8.0	7.9	7.9
3	8.1	8.0	8.0	8.1	8.0	8.1	8.1	8.1	8.1	7.9	7.9	7.9
4	8.1	7.9	8.0	8.1	8.0	8.1	8.1	8.0	8.1	8.0	7.9	7.9
5	8.0	7.9	8.0	8.1	8.1	8.1	8.2	8.0	8.2	8.0	7.9	7.9
6	8.0	7.9	8.0	8.1	8.0	8.1	8.2	8.2	8.2	8.0	7.9	7.9
7	8.1	7.9	8.0	8.2	8.1	8.1	8.2	8.0	8.1	7.9	7.9	7.9
8	8.1	8.0	8.1	8.1	7.6	7.8	8.1	8.0	8.0	7.9	7.8	7.9
9	8.1	8.0	8.0	7.7	7.6	7.6	8.1	8.0	8.0	7.9	7.9	7.9
10	8.0	8.0	8.0	7.7	7.6	7.7	8.1	8.0	8.0	7.9	7.9	7.9
11	8.1	8.0	8.0	7.7	7.6	7.7	8.1	8.1	8.1	7.9	7.9	7.9
12	8.1	8.0	8.1	7.6	7.6	7.6	8.1	8.0	8.0	7.9	7.8	7.9
13	8.1	8.0	8.1	7.6	7.6	7.6	8.0	8.0	8.0	7.8	7.7	7.7
14	8.1	8.0	8.1	7.7	7.6	7.6	8.0	8.0	8.0	7.8	7.8	7.8
15	8.1	8.1	8.1	7.7	7.6	7.7	8.1	8.0	8.0	7.8	7.8	7.8
16	8.1	8.1	8.1	7.8	7.7	7.7	8.0	8.0	8.0	7.9	7.8	7.8
17	8.1	8.1	8.1	7.8	7.7	7.7	8.0	8.0	8.0	7.9	7.8	7.8
18	8.2	8.1	8.1	7.8	7.7	7.8	8.0	7.9	8.0	7.9	7.9	7.9
19	8.2	8.1	8.1	7.8	7.8	7.8	8.0	7.9	7.9	8.1	7.8	7.9
20	8.2	8.1	8.1	7.9	7.8	7.8	7.9	7.9	7.9	8.1	8.0	8.1
21	8.2	8.1	8.2	7.9	7.8	7.8	7.9	7.9	7.9	8.1	8.1	8.1
22	8.2	8.1	8.2	7.9	7.8	7.9	7.9	7.9	7.9	8.2	8.1	8.1
23	8.2	8.1	8.2	7.9	7.8	7.9	8.0	7.9	8.0	8.2	8.1	8.1
24	8.2	8.1	8.2	7.9	7.8	7.9	8.0	8.0	8.0	8.2	8.1	8.1
25	8.2	8.1	8.1	7.9	7.9	7.9	8.0	8.0	8.0	8.2	8.1	8.2
26	8.1	8.1	8.1	7.9	7.9	7.9	8.1	8.0	8.0	8.2	8.2	8.2
27	8.1	8.1	8.1	7.9	7.9	7.9	8.1	8.0	8.1	8.2	8.1	8.2
28	8.1	8.1	8.1	8.0	7.9	7.9	8.1	8.0	8.1	8.2	8.1	8.1
29	---	---	---	8.0	7.7	7.8	8.1	8.0	8.0	8.1	8.0	8.1
30	---	---	---	7.7	7.7	7.7	8.1	8.0	8.0	8.0	8.0	8.0
31	---	---	---	8.1	7.6	7.9	---	---	---	8.1	8.0	8.0
MONTH	8.3	7.9	8.1	8.2	7.6	7.9	8.2	7.9	8.0	8.2	7.7	8.0

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.1	8.1	8.1	8.1	8.0	8.1	---	---	---	8.1	8.0	8.1
2	8.2	8.1	8.1	8.1	8.0	8.1	---	---	---	8.1	8.0	8.1
3	8.1	8.0	8.1	8.0	7.9	8.0	---	---	---	8.1	8.0	8.0
4	---	---	---	8.0	8.0	8.0	---	---	---	8.1	7.9	8.0
5	---	---	---	8.0	7.9	8.0	---	---	---	7.9	7.9	7.9
6	---	---	---	8.0	8.0	8.0	---	---	---	7.9	7.8	7.8
7	8.3	8.2	8.3	8.0	7.5	8.0	---	---	---	8.0	7.7	7.9
8	8.4	8.3	8.3	8.0	8.0	8.0	---	---	---	8.1	8.0	8.0
9	8.4	8.3	8.4	8.0	8.0	8.0	---	---	---	8.0	8.0	8.0
10	8.4	8.3	8.4	8.0	8.0	8.0	---	---	---	8.1	8.0	8.0
11	8.4	8.3	8.3	8.0	8.0	8.0	---	---	---	8.1	8.0	8.0
12	8.3	8.2	8.2	8.1	8.0	8.1	---	---	---	8.0	8.0	8.0
13	8.3	8.1	8.2	8.1	8.1	8.1	---	---	---	8.4	7.9	8.1
14	8.2	8.0	8.1	8.1	8.1	8.1	---	---	---	8.4	8.3	8.3
15	8.2	8.0	8.1	8.1	8.0	8.1	---	---	---	8.3	8.2	8.3
16	8.2	8.1	8.1	8.0	7.9	8.0	8.2	8.2	8.2	8.3	8.2	8.3
17	8.1	8.0	8.1	7.9	7.9	7.9	8.1	7.6	7.9	8.3	8.2	8.2
18	8.1	8.0	8.0	8.0	7.9	7.9	7.9	7.6	7.8	8.3	8.2	8.2
19	8.0	8.0	8.0	8.0	7.9	8.0	7.8	7.8	7.8	8.3	8.2	8.2
20	8.0	8.0	8.0	8.0	7.9	8.0	7.9	7.8	7.9	8.2	8.1	8.2
21	8.1	8.0	8.0	8.0	7.9	8.0	7.9	7.7	7.8	8.3	8.2	8.2
22	8.1	8.0	8.0	8.1	7.9	8.0	7.9	7.7	7.8	8.3	8.3	8.3
23	8.0	7.9	8.0	8.2	8.1	8.1	8.0	7.9	7.9	8.3	8.1	8.2
24	8.0	8.0	8.0	8.2	8.1	8.2	8.0	7.9	8.0	8.2	8.1	8.2
25	8.0	8.0	8.0	8.2	8.1	8.2	8.0	7.9	8.0	8.2	8.2	8.2
26	8.1	8.0	8.0	8.2	8.1	8.2	7.9	7.8	7.9	8.2	8.2	8.2
27	8.1	8.0	8.1	8.2	8.1	8.2	8.0	7.9	7.9	8.2	8.1	8.1
28	8.1	8.0	8.0	8.1	8.1	8.1	8.0	7.9	7.9	---	---	---
29	8.1	8.0	8.0	---	---	---	7.9	7.6	7.8	---	---	---
30	8.1	8.0	8.0	---	---	---	8.0	7.6	7.8	---	---	---
31	---	---	---	---	---	---	8.1	8.0	8.0	---	---	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	16.0	16.0	16.0	7.0	6.5	7.0	1.0	.5	1.0	.5	.5	.5
2	16.0	16.0	16.0	8.0	6.5	7.5	1.0	1.0	1.0	.5	.5	.5
3	16.0	15.5	15.5	7.5	7.0	7.0	1.5	1.0	1.5	.5	.5	.5
4	15.5	15.0	15.5	7.0	6.0	6.5	1.5	1.5	1.5	.5	.5	.5
5	15.5	15.0	15.0	6.0	5.5	6.0	1.5	1.0	1.5	.5	.5	.5
6	15.5	15.5	15.5	5.5	5.5	5.5	1.0	1.0	1.0	.5	.5	.5
7	15.5	15.0	15.0	5.5	5.0	5.5	1.0	.5	1.0	.5	.5	.5
8	15.0	14.5	14.5	5.5	5.0	5.5	1.0	.5	.5	.5	.5	.5
9	14.5	14.0	14.0	5.5	3.0	4.0	.5	.5	.5	1.0	.5	.5
10	14.0	13.5	13.5	3.0	3.0	3.0	.5	.5	.5	1.0	.5	.5
11	13.5	13.5	13.5	3.0	3.0	3.0	.5	.5	.5	.5	.5	.5
12	13.5	13.0	13.0	3.0	1.5	2.0	.5	.5	.5	---	---	---
13	13.0	11.5	11.5	1.0	.5	1.0	.5	.5	.5	---	---	---
14	10.5	10.5	10.5	1.0	.5	.5	.5	.5	.5	---	---	---
15	11.0	10.5	10.5	1.0	1.0	1.0	.5	.5	.5	---	---	---
16	11.0	11.0	11.0	1.5	1.0	1.5	.5	.5	.5	---	---	---
17	11.5	11.0	11.0	1.5	1.0	1.5	.5	.5	.5	---	---	---
18	12.0	11.5	11.5	2.0	1.5	1.5	1.0	.5	1.0	---	---	---
19	12.0	11.5	11.5	2.5	1.5	2.0	1.0	.5	1.0	---	---	---
20	10.5	10.0	10.0	3.0	2.5	2.5	1.0	.5	.5	.5	.5	.5
21	8.5	7.0	7.0	3.0	2.5	3.0	1.0	.5	.5	.5	.5	.5
22	9.5	6.5	6.5	2.5	2.5	2.5	1.0	.5	1.0	.5	.5	.5
23	6.5	6.5	6.5	2.5	1.5	2.0	1.0	1.0	1.0	.5	.5	.5
24	6.5	6.5	6.5	1.5	1.0	1.5	1.0	1.0	1.0	.5	.5	.5
25	7.0	6.5	6.5	1.5	1.0	1.5	1.0	.5	1.0	.5	.5	.5
26	8.5	7.5	7.5	1.5	1.0	1.0	.5	.5	.5	.5	.5	.5
27	8.0	8.0	8.0	1.0	1.0	1.0	.5	.5	.5	.5	.5	.5
28	7.5	7.0	7.0	1.0	1.0	1.0	.5	.5	.5	.5	.5	.5
29	7.5	7.0	7.0	1.0	1.0	1.0	.5	.5	.5	.5	.5	.5
30	7.5	7.0	7.0	1.0	.5	1.0	.5	.5	.5	.5	.0	.5
31	7.0	7.0	7.0	---	---	---	.5	.5	.5	.5	.0	.5
MONTH	16.0	6.5	11.0	8.0	.5	3.0	1.5	.5	1.0	---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.5	.0	.5	2.0	1.5	1.5	4.0	4.0	4.0	14.0	13.5	13.5
2	.5	.5	.5	2.0	2.0	2.0	4.5	4.0	4.0	13.5	13.0	13.5
3	.5	.5	.5	2.0	2.0	2.0	4.5	4.5	4.5	13.5	13.0	13.5
4	.5	.0	.5	2.5	1.0	2.0	5.0	4.5	4.5	13.5	13.0	13.5
5	.5	.0	.5	2.5	2.0	2.5	6.0	4.5	5.5	14.5	13.5	14.0
6	.5	.5	.5	3.0	2.5	2.5	5.5	5.5	5.5	14.5	14.0	14.5
7	.5	.0	.5	3.0	3.0	3.0	5.5	5.0	5.5	14.5	14.0	14.0
8	.5	.0	.5	3.0	2.0	2.5	5.5	5.0	5.5	14.5	13.5	14.0
9	.0	.0	.0	2.0	2.0	2.0	5.5	5.0	5.5	14.5	14.0	14.0
10	.0	.0	.0	2.0	2.0	2.0	5.5	5.0	5.0	14.5	14.0	14.5
11	.0	.0	.0	2.0	1.5	2.0	5.5	5.0	5.5	15.0	14.5	15.0
12	.0	.0	.0	2.5	2.0	2.0	6.5	5.5	6.0	16.5	15.0	15.5
13	.0	.0	.0	2.5	2.0	2.0	6.5	6.0	6.5	17.0	16.5	16.5
14	.5	.0	.0	2.5	2.5	2.5	6.0	6.0	6.0	16.5	16.0	16.0
15	.5	.0	.0	2.5	2.5	2.5	5.5	5.0	5.0	16.0	15.5	16.0
16	.5	.0	.0	2.5	2.5	2.5	6.0	5.5	5.5	16.0	15.5	15.5
17	.5	.0	.0	2.5	2.5	2.5	6.0	5.5	6.0	16.0	15.5	15.5
18	.5	.0	.5	2.5	2.5	2.5	6.5	6.0	6.0	15.5	15.5	15.5
19	1.0	.5	.5	2.5	2.5	2.5	7.0	6.0	6.5	15.5	15.0	15.5
20	1.0	.5	1.0	2.5	2.0	2.5	7.5	7.0	7.5	15.5	15.0	15.0
21	1.0	.5	1.0	2.5	2.5	2.5	8.5	7.0	8.5	16.0	15.0	15.5
22	1.0	1.0	1.0	2.5	2.0	2.5	9.5	9.0	9.5	16.0	15.5	15.5
23	1.0	1.0	1.0	3.0	2.5	2.5	10.5	10.0	10.5	16.5	15.5	16.0
24	1.0	1.0	1.0	3.0	2.5	3.0	11.5	11.0	11.5	17.0	16.5	16.5
25	1.0	.5	1.0	3.5	3.0	3.0	13.0	12.5	12.5	17.0	16.5	16.5
26	1.0	.5	.5	3.5	3.0	3.0	13.0	13.0	13.0	17.5	16.5	17.0
27	1.0	.5	1.0	3.0	3.0	3.0	13.5	13.0	13.5	17.5	16.5	17.0
28	1.5	1.0	1.0	3.0	2.5	3.0	13.5	13.5	13.5	17.5	17.0	17.0
29	---	---	---	3.5	3.0	3.5	13.5	13.0	13.5	17.0	16.5	17.0
30	---	---	---	4.0	3.5	3.5	14.0	13.0	13.5	16.5	16.5	16.5
31	---	---	---	4.0	3.5	4.0	---	---	---	16.5	16.0	16.5
MONTH	1.5	.0	.5	4.0	1.0	2.5	14.0	4.0	7.5	17.5	13.0	15.5

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	JUNE				JULY				AUGUST				SEPTEMBER		
1	17.0	16.0	16.5		22.5	22.0	22.5		---	---	---		26.5	26.0	26.0
2	17.0	16.5	17.0		23.0	22.5	22.5		---	---	---		26.5	25.5	26.0
3	17.5	17.0	17.0		23.0	22.5	23.0		---	---	---		26.0	25.5	25.5
4	18.0	17.0	17.0		22.5	22.5	22.5		---	---	---		26.0	25.0	25.5
5	17.5	17.5	17.5		22.5	22.0	22.0		---	---	---		25.5	25.0	25.0
6	18.0	17.5	17.5		22.5	22.0	22.0		---	---	---		25.0	24.0	24.5
7	19.5	19.5	19.5		23.0	22.0	22.5		---	---	---		24.0	23.0	23.5
8	20.0	19.0	19.5		23.5	22.5	23.0		---	---	---		23.5	22.5	23.0
9	20.5	19.5	20.0		24.0	23.5	23.5		---	---	---		24.0	23.0	23.5
10	21.0	20.0	20.5		24.5	24.0	24.0		---	---	---		23.5	23.0	23.5
11	21.5	21.0	21.0		24.5	24.5	24.5		---	---	---		23.0	22.5	23.0
12	21.5	21.0	21.5		25.5	24.5	25.0		---	---	---		22.5	22.0	22.5
13	21.5	21.5	21.5		25.5	25.0	25.0		---	---	---		22.0	20.0	21.0
14	21.5	21.5	21.5		26.0	25.5	25.5		---	---	---		20.0	19.5	20.0
15	21.5	21.0	21.5		26.0	25.5	25.5		---	---	---		19.5	19.0	19.0
16	21.0	20.5	20.5		26.0	25.5	25.5		26.5	26.5	26.5		18.5	17.0	17.5
17	20.5	20.0	20.5		25.5	25.0	25.5		26.5	26.5	26.5		17.0	17.0	17.0
18	20.5	20.0	20.0		25.0	25.0	25.0		26.5	26.0	26.0		17.0	16.5	17.0
19	20.5	20.0	20.0		25.5	24.5	25.0		26.5	26.0	26.5		17.0	16.5	16.5
20	21.0	20.0	20.5		26.0	25.5	26.0		26.5	26.0	26.5		16.5	16.0	16.0
21	21.0	20.5	21.0		26.5	26.0	26.0		26.5	26.0	26.0		16.0	15.0	15.5
22	21.5	21.0	21.5		27.0	26.5	26.5		26.0	25.0	25.5		15.0	14.5	14.5
23	22.5	21.5	22.0		27.0	26.5	27.0		25.0	24.5	25.0		14.5	13.0	13.5
24	22.5	22.0	22.0		27.0	26.5	26.5		25.0	24.5	25.0		13.0	13.0	13.0
25	23.0	22.0	22.5		26.5	26.0	26.5		25.5	25.0	25.0		13.5	13.0	13.5
26	23.5	22.5	23.0		26.5	26.0	26.5		26.0	25.0	25.5		14.0	13.5	13.5
27	23.0	22.5	23.0		26.0	25.5	26.0		26.5	26.0	26.5		14.5	14.0	14.0
28	22.5	21.5	22.0		26.0	25.5	26.0		27.0	26.5	27.0		---	---	---
29	21.5	21.0	21.5		---	---	---		27.0	26.5	26.5		---	---	---
30	22.0	21.0	21.5		---	---	---		26.5	26.0	26.5		---	---	---
31	---	---	---		---	---	---		26.5	26.0	26.5		---	---	---
MONTH	23.5	16.0	20.5		---	---	---		---	---	---		---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	7.9	7.6	7.8	10.0	9.4	9.6	13.5	13.4	13.5	13.2	12.9	13.0
2	8.1	7.5	7.8	10.0	9.4	9.7	13.5	13.4	13.4	13.6	13.0	13.2
3	8.2	7.5	7.8	11.9	9.5	10.5	13.4	13.1	13.2	13.6	13.1	13.3
4	9.5	8.3	8.9	12.2	11.8	12.0	13.3	13.1	13.2	13.5	13.2	13.3
5	9.8	9.6	9.7	12.3	11.9	12.1	13.2	13.1	13.2	13.2	13.0	13.1
6	9.7	9.2	9.6	12.6	12.2	12.4	13.4	13.1	13.2	13.6	12.9	13.5
7	9.8	8.2	9.2	12.7	12.4	12.5	13.4	13.2	13.3	13.5	13.2	13.3
8	8.7	7.8	8.2	13.0	12.4	12.6	13.5	13.3	13.4	13.5	13.1	13.3
9	8.4	8.1	8.2	12.9	12.7	12.8	13.5	13.3	13.4	13.2	13.0	13.1
10	8.1	7.9	8.0	12.9	12.1	12.6	13.3	13.3	13.3	13.1	12.9	12.9
11	8.2	7.8	8.0	12.8	12.2	12.6	13.5	13.2	13.3	13.2	12.9	13.0
12	9.0	7.9	8.3	12.8	12.1	12.4	13.6	13.4	13.5	---	---	---
13	8.9	8.1	8.7	12.6	12.3	12.5	13.4	13.2	13.3	---	---	---
14	9.1	8.0	8.9	12.6	12.3	12.4	13.3	13.1	13.2	---	---	---
15	9.1	8.8	8.9	12.9	12.3	12.5	13.2	13.1	13.1	---	---	---
16	9.2	8.0	9.0	13.0	12.4	12.7	13.2	13.1	13.1	---	---	---
17	9.0	8.6	8.9	12.5	12.3	12.4	13.2	13.1	13.1	---	---	---
18	8.9	8.5	8.8	12.5	12.3	12.4	13.2	13.0	13.1	---	---	---
19	9.5	8.9	9.2	12.5	12.2	12.4	13.1	13.0	13.0	---	---	---
20	9.8	9.3	9.6	12.3	12.0	12.2	13.6	13.0	13.3	13.6	13.1	13.3
21	10.5	10.0	10.3	12.2	11.9	12.1	13.4	13.2	13.3	13.4	13.0	13.2
22	10.8	8.9	10.6	12.4	12.2	12.3	13.3	13.2	13.3	13.3	13.0	13.1
23	10.8	10.6	10.7	12.6	12.2	12.4	13.4	13.2	13.2	13.2	12.9	13.0
24	10.8	10.5	10.6	12.7	12.6	12.6	13.3	12.9	13.2	13.0	12.8	12.9
25	10.6	10.2	10.5	12.8	12.7	12.7	13.2	12.8	13.0	13.0	12.6	12.8
26	10.5	9.8	10.0	13.1	12.9	13.0	13.5	13.1	13.4	13.0	12.6	12.7
27	9.9	9.8	9.9	13.4	13.2	13.3	13.5	13.2	13.4	13.2	12.7	12.8
28	9.9	9.5	9.7	13.4	13.3	13.4	13.2	13.1	13.2	13.1	12.8	12.9
29	9.6	9.4	9.5	13.5	13.4	13.4	13.1	12.9	13.0	13.0	12.7	12.8
30	9.6	9.4	9.5	13.7	13.5	13.6	13.0	12.9	13.0	13.2	12.7	12.9
31	9.6	9.4	9.5	---	---	---	13.2	12.9	13.0	13.3	12.7	13.0
MONTH	10.8	7.5	9.2	13.7	9.4	12.3	13.6	12.8	13.2	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	13.3	12.8	13.0	11.8	11.2	11.4	11.5	11.4	11.4	10.0	9.3	9.8
2	13.0	12.6	12.8	11.7	11.6	11.6	11.4	11.2	11.2	9.6	9.0	9.3
3	13.0	11.9	12.6	11.7	11.2	11.6	11.2	10.9	11.0	9.4	9.2	9.3
4	12.6	12.1	12.4	11.6	11.2	11.4	11.1	11.0	11.0	9.4	9.0	9.2
5	12.3	12.0	12.1	11.5	11.5	11.5	11.1	8.6	9.5	9.1	8.8	9.0
6	12.1	11.8	12.0	11.8	11.4	11.5	8.6	8.5	8.6	9.0	8.4	8.7
7	12.1	11.7	11.8	11.8	11.4	11.5	8.6	8.5	8.6	8.6	8.1	8.4
8	11.8	11.5	11.6	11.6	11.2	11.4	8.8	8.6	8.7	8.6	8.5	8.5
9	11.6	11.3	11.4	11.3	11.2	11.2	8.8	8.5	8.7	8.6	8.4	8.5
10	11.6	11.2	11.4	11.6	11.4	11.5	9.2	9.0	9.1	8.7	8.3	8.5
11	11.8	11.3	11.5	12.2	11.6	11.9	9.7	9.6	9.6	8.7	8.4	8.5
12	11.7	11.5	11.6	12.2	11.7	12.0	10.5	10.4	10.5	8.4	7.9	8.2
13	12.0	11.7	11.8	12.3	11.9	12.1	10.4	10.4	10.4	7.8	7.4	7.6
14	11.9	11.6	11.7	12.7	12.3	11.8	10.7	10.4	10.5	8.0	7.7	7.8
15	12.1	11.4	11.8	13.1	11.6	12.9	11.0	10.8	10.9	8.3	7.8	8.0
16	11.8	11.6	11.7	12.6	12.6	12.6	11.0	10.8	10.9	8.3	8.0	8.2
17	11.8	11.6	11.7	12.6	12.5	12.6	11.0	10.9	10.9	8.8	8.1	8.4
18	13.7	11.2	12.1	12.6	12.4	12.5	11.2	11.0	11.1	8.6	8.4	8.5
19	13.4	13.1	13.3	12.6	12.4	12.5	11.2	10.8	11.1	8.4	8.1	8.2
20	13.1	12.6	12.8	12.5	12.4	12.5	11.0	10.9	11.0	8.7	8.2	8.4
21	12.6	12.1	12.4	12.6	12.0	12.4	10.9	10.7	10.8	8.9	8.5	8.7
22	11.5	11.2	11.4	12.0	8.6	10.0	10.9	10.5	10.7	8.9	8.6	8.7
23	11.3	11.1	11.2	8.6	8.5	8.6	11.4	10.7	11.1	9.2	8.6	8.8
24	11.4	11.1	11.2	8.6	8.4	8.5	11.3	10.9	11.2	8.7	8.2	8.5
25	11.4	11.1	11.3	8.7	8.3	8.5	11.1	10.7	11.0	8.8	8.4	8.6
26	11.5	11.2	11.4	8.6	8.4	8.5	10.7	10.4	10.6	8.7	8.3	8.5
27	11.5	11.2	11.4	8.5	8.4	8.4	10.7	10.3	10.5	8.6	8.1	8.3
28	11.4	11.1	11.3	8.7	8.4	8.6	10.6	10.0	10.4	8.1	7.7	7.9
29	---	---	---	11.9	8.6	10.5	10.6	10.0	10.3	7.8	7.6	7.8
30	---	---	---	11.8	11.7	11.7	10.7	10.0	10.3	7.9	7.7	7.8
31	---	---	---	11.7	11.3	11.5	---	---	---	8.3	7.7	8.0
MONTH	13.7	11.1	11.9	13.1	8.3	11.1	11.5	8.5	10.4	10.0	7.4	8.5

## MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.4	8.1	8.2	7.0	6.9	6.9	---	---	---	6.0	5.5	5.8
2	8.3	8.0	8.2	7.0	6.7	6.9	---	---	---	5.8	5.4	5.6
3	8.2	7.6	7.8	6.7	6.3	6.5	---	---	---	5.4	4.7	5.1
4	---	---	---	6.7	6.4	6.6	---	---	---	4.6	4.4	4.5
5	---	---	---	7.0	6.6	6.7	---	---	---	4.6	3.9	4.2
6	---	---	---	7.0	6.8	6.9	---	---	---	5.3	4.6	5.0
7	8.8	8.4	8.6	6.9	6.7	6.8	---	---	---	6.0	5.1	5.6
8	9.0	8.6	8.8	6.7	6.5	6.6	---	---	---	6.4	5.9	6.2
9	9.1	8.6	8.8	6.6	6.4	6.5	---	---	---	6.4	5.8	6.1
10	9.1	8.6	8.8	6.5	6.2	6.4	---	---	---	6.1	5.7	5.9
11	9.1	8.5	8.8	6.4	6.1	6.3	---	---	---	5.8	5.6	5.7
12	8.6	7.9	8.2	6.6	6.1	6.4	---	---	---	6.3	5.8	6.0
13	8.1	7.5	7.8	6.6	6.3	6.4	---	---	---	7.2	6.3	6.7
14	7.4	6.6	7.0	6.4	6.1	6.3	---	---	---	7.7	7.2	7.5
15	7.7	6.6	7.2	6.1	5.8	6.0	---	---	---	7.8	6.7	7.4
16	7.9	7.4	7.6	5.9	5.3	5.7	6.4	5.8	6.3	7.1	6.7	6.9
17	7.7	7.4	7.6	5.7	5.4	5.5	5.4	3.7	4.5	7.6	6.8	7.2
18	7.6	7.2	7.3	5.7	5.4	5.6	5.6	3.5	4.7	7.9	7.5	7.7
19	7.5	7.2	7.4	5.8	5.5	5.7	5.7	5.4	5.5	8.0	7.8	7.9
20	7.4	7.3	7.3	5.8	5.6	5.7	5.8	5.3	5.6	7.8	7.6	7.7
21	7.3	6.9	7.2	5.9	5.7	5.8	5.5	5.2	5.3	7.9	7.6	7.7
22	7.1	6.9	7.0	6.0	5.7	5.8	6.3	4.9	5.6	8.2	7.8	8.0
23	6.8	6.7	6.8	6.0	5.6	5.9	6.7	6.3	6.5	8.5	8.2	8.3
24	6.8	6.5	6.7	6.0	5.7	5.9	6.7	6.3	6.6	8.6	8.4	8.5
25	6.7	6.5	6.6	6.1	5.8	5.9	6.4	6.0	6.2	8.8	8.5	8.6
26	6.6	6.5	6.6	6.1	5.9	6.0	6.2	3.9	5.3	8.7	8.4	8.5
27	6.6	6.4	6.6	6.0	5.6	5.8	5.3	4.6	4.9	8.2	7.9	8.1
28	7.0	6.5	6.8	5.9	5.6	5.8	5.3	4.7	5.0	---	---	---
29	6.9	6.8	6.8	---	---	---	5.3	4.8	5.1	---	---	---
30	7.1	6.6	6.9	---	---	---	5.6	4.1	5.1	---	---	---
31	---	---	---	---	---	---	5.7	5.3	5.5	---	---	---



## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN

## WATER-QUALITY RECORDS

LOCATION.--Lat 44°48'13", long 93°00'43", in NW¼NE¼ sec.26, T.27 N., R.22 W., Washington County, Hydrologic Unit 07010206, on left bank at the J. L. Shiely Co. loading dock, and at mile 826.2 (1,330 km) upstream from Ohio River.

PERIOD OF RECORD.--February 1977 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: September 1977 to current year.

pH: September 1977 to current year.

WATER TEMPERATURES: September 1977 to current year.

DISSOLVED OXYGEN: September 1977 to current year.

INSTRUMENTATION.--Water-quality monitor since September 1977.

REMARKS.--Water discharge computed on the basis of discharge for Mississippi River at St. Paul (station 05331000) adjusted for inflow and travel time. Extremes are published for years with 80 percent or more daily record.

COOPERATION.--Samples collected and water-quality monitor operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water year 1981-83): Maximum, 739 micromhos Nov. 24-25, 1982; minimum, 318 micromhos Sept. 17, 1981.

pH (water year 1981): Maximum, 8.7 units May 13, Sept. 6, 7, 9, 13, 1981; minimum, 7.2 units Dec. 14-15, 1982; Aug. 26, 1983.

WATER TEMPERATURES (water year 1981-83): Maximum, 29.0°C Aug. 7, 1982; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN (water year 1981-82): Maximum, 15.3 mg/L Mar. 24, 1981; minimum, 3.2 mg/L Aug. 30, 1982.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 739 micromhos Nov. 24-25; minimum, 414 micromhos Oct. 16.

pH: Maximum, 8.5 units June 8-10; minimum, 7.2 units Dec. 14-15, Aug. 26.

WATER TEMPERATURES: Maximum, 29.0°C July 23, Aug. 6; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN: Maximum, 17.6 mg/L Apr. 5; minimum, 2.3 mg/L Aug. 8.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	509	494	501	576	564	569	652	595	627	612	579	598
2	511	478	501	566	542	553	630	618	623	579	557	571
3	483	455	466	560	541	551	621	607	614	561	550	555
4	482	456	468	555	543	547	620	611	616	591	561	575
5	504	469	486	551	531	547	613	597	604	607	594	603
6	492	474	482	553	536	548	655	601	628	606	588	595
7	516	481	504	556	542	550	687	638	661	614	601	606
8	511	485	501	554	538	550	730	672	701	618	600	607
9	515	476	489	554	541	547	730	689	707	606	587	597
10	473	461	467	547	512	534	706	690	701	612	600	605
11	466	444	452	532	513	526	680	622	637	610	586	595
12	447	434	442	598	531	566	648	624	638	591	580	585
13	437	425	430	617	583	596	644	626	633	601	578	585
14	434	428	431	644	608	626	647	617	630	606	584	595
15	439	428	434	690	635	655	656	641	649	605	584	593
16	445	414	431	692	672	682	665	656	659	592	575	583
17	434	418	427	706	684	693	705	664	681	594	581	588
18	440	428	435	696	672	684	709	690	700	636	594	616
19	457	432	438	692	660	679	734	720	729	637	626	631
20	457	456	457	679	663	671	726	690	710	653	627	640
21	477	454	461	664	643	652	691	676	680	657	628	643
22	496	481	485	669	645	657	694	673	681	641	609	625
23	503	488	496	711	666	690	693	661	679	627	609	618
24	524	497	510	739	707	717	669	623	638	632	618	625
25	538	526	532	739	702	719	631	567	597	641	614	629
26	552	519	538	712	696	704	629	573	605	629	617	625
27	568	550	556	710	689	699	643	595	624	632	625	629
28	580	567	571	703	670	690	642	626	633	641	629	637
29	580	565	571	688	659	670	638	612	625	639	632	635
30	579	558	570	660	653	657	645	619	633	638	606	622
31	580	566	572	---	---	---	648	613	634	625	609	617
MONTH	580	414	487	739	512	624	734	567	651	657	550	607

## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	633	617	625	484	481	482	691	676	683	644	625	634
2	640	620	631	---	---	---	676	648	659	643	615	626
3	637	621	629	---	---	---	649	633	642	637	619	629
4	639	620	632	---	---	---	631	616	622	639	615	623
5	665	636	653	---	---	---	658	615	625	628	611	619
6	649	635	643	---	---	---	---	---	---	626	607	619
7	641	630	636	---	---	---	619	617	618	630	600	612
8	630	618	626	---	---	---	630	606	622	637	616	624
9	626	618	623	---	---	---	648	631	639	634	618	622
10	626	616	622	---	---	---	654	647	650	637	612	626
11	616	609	614	---	---	---	675	640	663	627	615	622
12	619	607	615	---	---	---	661	646	652	616	577	594
13	621	612	618	---	---	---	660	646	652	584	544	557
14	627	607	618	---	---	---	652	633	643	580	558	568
15	635	620	631	---	---	---	679	643	658	599	571	588
16	635	606	625	---	---	---	682	658	671	604	591	597
17	620	602	614	---	---	---	655	642	648	607	592	598
18	622	604	613	---	---	---	645	632	642	618	603	608
19	618	596	609	---	---	---	643	623	631	623	617	620
20	616	578	596	---	---	---	627	619	623	643	623	632
21	592	574	584	---	---	---	635	623	628	658	639	645
22	632	591	616	---	---	---	640	635	638	658	642	649
23	643	609	629	635	630	632	642	637	640	660	644	652
24	606	549	575	649	635	643	656	642	650	665	641	661
25	547	504	527	671	647	658	669	644	654	644	638	641
26	506	485	494	675	667	673	673	634	651	664	638	647
27	490	476	483	694	672	677	657	631	646	640	632	637
28	491	474	482	701	682	691	655	637	646	637	628	634
29	---	---	---	704	678	696	656	643	650	632	613	622
30	---	---	---	711	697	704	654	634	647	622	611	618
31	---	---	---	714	679	703	---	---	---	613	596	601
MONTH	665	474	602	---	---	---	---	---	---	665	544	620
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	613	606	608	506	497	501	562	551	557	506	480	496
2	613	588	599	515	500	508	557	550	553	513	491	505
3	603	567	587	497	448	474	557	549	554	496	482	489
4	617	594	596	466	451	461	556	543	549	489	470	482
5	626	615	622	459	450	454	552	545	548	479	457	472
6	625	618	621	458	450	455	555	520	539	470	450	462
7	638	626	631	465	457	461	539	525	532	502	466	485
8	639	626	632	489	466	476	525	507	514	514	501	509
9	644	619	629	513	492	504	511	497	484	525	504	511
10	647	622	634	535	511	521	504	492	500	515	493	507
11	635	627	631	561	537	548	493	469	480	528	492	515
12	638	624	631	577	560	568	489	472	482	519	502	510
13	633	621	627	599	577	587	496	473	486	501	486	493
14	625	563	595	614	597	606	493	478	486	500	484	495
15	586	567	580	622	612	618	493	474	487	495	480	488
16	593	572	581	622	609	615	507	472	487	495	455	470
17	581	565	572	606	589	593	500	420	457	517	476	505
18	571	561	560	592	571	580	464	441	456	517	494	504
19	575	561	569	571	546	558	471	461	468	500	486	493
20	580	571	576	556	546	550	482	461	472	503	478	492
21	597	584	590	558	542	551	477	464	469	510	496	500
22	593	565	580	562	549	555	491	466	479	516	481	503
23	568	552	561	554	544	548	485	458	473	500	482	493
24	573	524	553	557	550	552	478	465	472	501	481	492
25	---	---	---	560	552	557	479	460	470	514	481	503
26	---	---	---	557	550	554	519	470	484	516	506	512
27	---	---	---	558	550	554	518	458	486	533	515	522
28	490	486	488	567	550	558	516	482	505	531	505	521
29	505	489	497	560	553	557	512	463	495	525	503	512
30	510	494	504	563	559	560	474	456	464	529	506	522
31	---	---	---	561	550	554	477	465	472	---	---	---
MONTH	---	---	---	622	448	540	562	420	495	533	450	499

## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.2	8.0	8.1	7.8	7.8	7.8	7.5	7.5	7.5	8.1	8.1	8.1
2	8.1	7.9	8.1	7.8	7.8	7.8	7.5	7.4	7.5	8.1	8.0	8.0
3	8.1	7.7	7.9	7.9	7.8	7.8	7.5	7.5	7.5	8.1	7.9	8.0
4	8.2	8.0	8.1	8.0	7.9	7.9	7.5	7.4	7.5	8.1	8.1	8.1
5	8.2	8.0	8.1	8.1	7.9	8.0	7.5	7.4	7.5	8.1	8.0	8.0
6	8.2	8.0	8.1	8.1	7.9	8.0	7.5	7.4	7.5	8.0	7.9	7.9
7	8.0	7.9	8.0	8.0	7.9	8.0	7.5	7.5	7.5	7.9	7.9	7.9
8	8.1	7.9	8.0	8.0	7.9	8.0	7.5	7.5	7.5	7.9	7.8	7.9
9	8.1	8.0	8.0	8.0	7.9	8.0	7.5	7.5	7.5	7.9	7.9	7.9
10	8.0	7.9	7.9	7.9	7.9	7.9	7.5	7.4	7.5	7.9	7.8	7.9
11	8.0	7.9	7.9	8.0	7.9	7.9	7.6	7.5	7.5	7.8	7.8	7.8
12	8.0	7.9	7.9	7.9	7.8	7.8	7.7	7.4	7.6	7.8	7.5	7.7
13	7.9	7.6	7.8	7.9	7.8	7.8	7.4	7.3	7.3	7.5	7.5	7.5
14	7.7	7.6	7.7	7.8	7.7	7.8	7.3	7.2	7.3	7.8	7.5	7.6
15	7.7	7.7	7.7	7.8	7.7	7.8	7.2	7.2	7.2	7.8	7.7	7.8
16	7.7	7.6	7.7	8.0	7.8	7.9	7.5	7.5	7.5	7.8	7.7	7.8
17	7.7	7.6	7.7	8.0	7.4	7.7	7.6	7.5	7.5	7.8	7.7	7.8
18	7.7	7.6	7.6	7.4	7.4	7.4	7.6	7.5	7.5	7.8	7.6	7.7
19	7.8	7.6	7.7	7.5	7.4	7.4	7.5	7.5	7.5	7.9	7.7	7.8
20	7.7	7.6	7.7	7.4	7.4	7.4	7.6	7.5	7.5	7.9	7.8	7.9
21	7.8	7.7	7.8	7.4	7.4	7.4	7.6	7.6	7.6	7.8	7.7	7.8
22	7.8	7.7	7.8	7.5	7.3	7.4	7.6	7.5	7.6	7.8	7.8	7.8
23	7.8	7.7	7.8	7.5	7.4	7.5	7.6	7.6	7.6	7.8	7.8	7.8
24	7.8	7.7	7.7	7.5	7.4	7.5	7.6	7.5	7.5	7.8	7.8	7.8
25	7.8	7.7	7.7	7.5	7.4	7.4	7.5	7.4	7.5	8.2	7.7	7.9
26	7.8	7.7	7.7	7.5	7.4	7.4	7.5	7.4	7.4	8.1	8.0	8.1
27	7.8	7.7	7.8	7.5	7.4	7.5	7.5	7.4	7.5	8.1	8.0	8.0
28	7.8	7.8	7.8	7.5	7.4	7.5	7.4	7.4	7.4	8.3	8.1	8.2
29	7.8	7.8	7.8	7.5	7.4	7.4	7.4	7.4	7.4	8.4	8.3	8.3
30	7.8	7.8	7.8	7.5	7.4	7.5	8.0	7.4	7.7	8.3	8.2	8.2
31	7.8	7.8	7.8	---	---	---	8.1	8.0	8.0	8.3	8.2	8.2
MONTH	8.2	7.6	7.9	8.1	7.3	7.7	8.1	7.2	7.5	8.4	7.5	7.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	8.2	7.9	8.1	7.9	7.8	7.8	8.2	8.0	8.1	8.3	8.2	8.3
2	8.1	8.0	8.0	---	---	---	8.1	8.0	8.0	8.2	8.0	8.1
3	8.0	7.9	7.9	---	---	---	8.0	8.0	8.0	8.0	7.9	8.0
4	7.9	7.9	7.9	---	---	---	8.1	8.0	8.0	8.1	7.9	8.0
5	8.0	7.8	7.9	---	---	---	8.2	8.0	8.0	8.0	8.0	8.0
6	7.9	7.9	7.9	---	---	---	---	---	---	8.0	7.9	7.9
7	7.9	7.7	7.8	---	---	---	7.7	7.7	7.7	8.0	7.8	7.9
8	7.9	7.8	7.8	---	---	---	7.8	7.6	7.7	8.0	7.8	7.9
9	7.8	7.8	7.8	---	---	---	7.7	7.6	7.6	8.0	7.8	8.0
10	7.8	7.8	7.8	---	---	---	7.6	7.5	7.5	8.0	7.9	7.9
11	7.8	7.8	7.8	---	---	---	7.6	7.4	7.5	8.0	7.9	7.9
12	7.8	7.8	7.8	---	---	---	7.7	7.5	7.6	8.0	7.9	7.9
13	7.9	7.8	7.9	---	---	---	7.7	7.6	7.7	8.0	7.9	8.0
14	7.9	7.8	7.8	---	---	---	7.7	7.6	7.6	8.0	7.8	7.9
15	7.8	7.8	7.8	---	---	---	7.8	7.7	7.7	8.1	7.8	8.0
16	7.8	7.8	7.8	---	---	---	7.8	7.8	7.8	8.1	7.9	8.0
17	7.9	7.8	7.8	---	---	---	7.9	7.7	7.8	8.2	7.9	8.1
18	8.0	7.8	7.9	---	---	---	7.9	7.7	7.8	8.2	8.1	8.1
19	7.9	7.8	7.9	---	---	---	8.0	7.7	7.9	8.1	8.0	8.1
20	7.9	7.9	7.9	---	---	---	8.0	7.9	7.9	8.0	7.9	7.9
21	7.9	7.9	7.9	---	---	---	7.9	7.7	7.8	8.0	7.9	8.0
22	7.9	7.8	7.9	---	---	---	8.1	7.7	8.0	8.1	8.0	8.0
23	7.9	7.9	7.9	8.0	7.7	7.9	8.0	7.8	7.9	8.2	8.0	8.1
24	7.9	7.8	7.9	7.7	7.7	7.7	8.1	7.9	8.0	8.2	8.1	8.1
25	7.9	7.8	7.8	7.9	7.7	7.8	8.1	7.9	8.0	8.2	8.1	8.1
26	7.9	7.8	7.9	7.6	7.5	7.5	8.1	8.0	8.0	8.3	8.0	8.2
27	8.0	7.9	7.9	7.5	7.5	7.5	8.2	8.0	8.1	8.2	8.2	8.2
28	8.0	7.8	7.9	7.6	7.4	7.5	8.2	8.1	8.1	8.2	8.1	8.2
29	---	---	---	8.0	7.5	7.8	8.3	7.9	8.1	8.1	8.0	8.1
30	---	---	---	8.0	7.7	7.9	8.4	8.2	8.3	8.1	8.0	8.0
31	---	---	---	8.1	7.6	7.9	---	---	---	8.2	8.0	8.1
MONTH	8.2	7.7	7.9	---	---	---	---	---	---	8.3	7.8	8.0

## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.2	8.0	8.1	8.0	8.0	8.0	8.1	8.0	8.1	---	---	---
2	8.2	8.1	8.1	8.0	7.9	8.0	8.3	7.9	8.1	---	---	---
3	8.1	8.0	8.1	7.9	7.7	7.9	8.3	8.2	8.2	---	---	---
4	8.2	8.0	8.1	7.9	7.7	7.8	9.3	8.1	8.2	---	---	---
5	8.2	8.1	8.2	7.9	7.8	7.8	8.3	8.1	8.2	---	---	---
6	8.3	8.1	8.2	7.9	7.8	7.8	8.2	8.1	8.1	---	---	---
7	8.4	8.3	8.3	8.0	7.9	7.9	8.0	7.9	7.9	---	---	---
8	8.5	8.3	8.4	8.0	7.9	7.9	8.2	7.6	7.9	---	---	---
9	8.5	8.4	8.4	8.0	7.9	8.0	8.2	7.8	8.1	---	---	---
10	8.5	8.2	8.4	8.1	8.0	8.0	8.1	8.0	8.0	---	---	---
11	8.3	8.3	8.3	8.1	8.0	8.0	8.0	7.8	7.9	---	---	---
12	8.3	8.2	8.3	8.2	8.0	8.1	7.9	7.7	7.8	---	---	---
13	8.3	8.2	8.2	8.2	8.0	8.1	7.8	7.8	7.8	---	---	---
14	8.3	8.0	8.1	8.2	8.1	8.1	7.9	7.7	7.8	---	---	---
15	8.2	8.0	8.1	8.2	8.0	8.1	8.0	7.7	7.9	---	---	---
16	8.1	8.0	8.1	8.1	7.9	8.1	8.2	7.9	8.0	---	---	---
17	---	---	---	7.9	7.7	7.9	8.2	7.7	7.9	---	---	---
18	---	---	---	8.0	7.6	7.8	7.7	7.5	7.6	---	---	---
19	---	---	---	7.9	7.8	7.9	7.7	7.7	7.7	---	---	---
20	---	---	---	8.0	7.8	7.9	7.7	7.6	7.7	---	---	---
21	8.2	8.1	8.1	8.0	7.9	7.9	7.7	7.5	7.6	---	---	---
22	8.1	8.1	8.1	8.1	7.9	8.0	7.8	7.4	7.6	---	---	---
23	8.1	8.0	8.1	8.1	8.0	8.0	7.9	7.6	7.8	---	---	---
24	8.1	8.1	8.1	8.1	8.0	8.0	7.9	7.7	7.8	---	---	---
25	---	---	---	8.1	8.0	8.0	7.7	7.4	7.5	---	---	---
26	---	---	---	8.1	8.0	8.0	7.8	7.2	7.5	---	---	---
27	---	---	---	8.0	8.0	8.0	7.7	7.4	7.6	8.1	7.9	8.0
28	8.1	8.1	8.1	8.0	7.9	8.0	---	---	---	8.2	7.7	8.0
29	8.1	8.0	8.1	8.1	7.9	8.0	---	---	---	8.1	7.8	7.9
30	8.1	8.0	8.0	8.1	8.0	8.0	---	---	---	8.3	7.7	8.0
31	---	---	---	8.2	8.1	8.1	---	---	---	---	---	---
MONTH	---	---	---	8.2	7.6	8.0	---	---	---	---	---	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	15.5	15.0	15.0	6.5	6.5	6.5	2.0	1.5	1.5	1.0	1.0	1.0
2	15.0	15.0	15.0	7.5	6.0	7.0	2.5	1.5	2.0	1.0	1.0	1.0
3	15.0	14.5	15.0	7.0	6.0	6.5	2.5	2.0	2.0	1.0	1.0	1.0
4	15.0	14.0	14.5	6.0	4.5	5.0	2.0	2.0	2.0	1.0	1.0	1.0
5	15.5	13.5	15.0	4.5	3.5	4.0	1.5	1.0	1.5	1.0	1.0	1.0
6	16.0	15.5	15.5	3.5	3.0	3.0	1.0	.5	1.0	1.0	1.0	1.0
7	15.5	15.0	15.0	3.0	2.5	3.0	.5	.0	.5	1.0	.5	1.0
8	15.0	13.5	14.0	3.0	2.5	2.5	.5	.0	.0	1.0	.5	1.0
9	13.5	12.5	13.0	3.0	2.5	3.0	.5	.0	.0	1.0	.5	1.0
10	12.0	11.5	12.0	3.0	2.5	3.0	.0	.0	.0	1.0	1.0	1.0
11	11.5	11.0	11.0	2.5	2.5	2.5	.5	.0	.0	1.0	.5	1.0
12	10.5	10.5	10.5	3.0	1.5	2.5	.5	.0	.5	1.0	.5	.5
13	10.0	9.0	9.5	2.0	1.0	1.5	.5	.5	.5	1.0	.5	1.0
14	9.5	9.0	9.5	1.5	1.0	1.5	.5	.5	.5	1.0	.5	1.0
15	9.5	9.0	9.0	2.0	2.0	2.0	.5	.5	.5	1.0	.5	1.0
16	8.5	8.0	8.5	2.5	1.5	2.0	.5	.5	.5	1.0	1.0	1.0
17	8.0	7.5	7.5	2.0	1.0	1.5	.5	.5	.5	1.0	.5	1.0
18	7.5	7.0	7.5	3.0	2.0	2.5	1.0	.5	.5	1.0	.5	.5
19	9.5	7.0	8.5	4.0	3.0	3.5	1.0	.5	.5	.5	.5	.5
20	8.5	7.0	7.5	4.0	3.5	4.0	.5	.5	.5	.5	.5	.5
21	7.0	6.5	7.0	3.5	3.0	3.5	.5	.5	.5	.5	.5	.5
22	6.5	6.0	6.5	3.0	1.0	2.0	1.0	.5	.5	.5	.5	.5
23	6.5	6.0	6.0	1.0	.5	1.0	1.0	1.0	1.0	1.0	.5	.5
24	6.5	6.0	6.0	1.0	.5	.5	1.0	1.0	1.0	1.0	.5	.5
25	7.0	6.0	6.5	.5	.0	.0	1.0	.5	1.0	.5	.5	.5
26	9.0	6.5	8.0	.0	.0	.0	.5	.0	.5	.5	.5	.5
27	8.5	8.5	8.5	.5	.0	.0	.5	.0	.5	.5	.5	.5
28	8.5	7.0	8.0	.5	.0	.5	.0	.0	.0	.5	.5	.5
29	7.5	7.0	7.0	1.0	.5	.5	.0	.0	.0	1.0	.5	1.0
30	7.0	7.0	7.0	1.5	1.0	1.0	.5	.0	.5	.5	.5	.5
31	7.0	6.5	6.5	---	---	---	1.0	.5	1.0	1.0	.5	.5
MONTH	16.0	6.0	10.0	7.5	.0	2.5	2.5	.0	.5	1.0	.5	1.0

## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.5	.5	.5	2.0	2.0	2.0	4.5	4.0	4.5	14.5	14.0	14.0
2	.5	.5	.5	---	---	---	5.0	4.5	4.5	14.0	13.5	13.5
3	.5	.5	.5	---	---	---	5.5	5.0	5.0	13.5	13.0	13.0
4	.5	.5	.5	---	---	---	6.0	5.0	5.5	14.5	13.5	14.0
5	.5	.5	.5	---	---	---	6.0	5.0	5.5	15.5	14.0	14.5
6	.5	.5	.5	---	---	---	---	---	---	15.5	15.0	15.0
7	.5	.5	.5	---	---	---	5.0	4.5	5.0	15.0	14.5	15.0
8	.5	.0	.0	---	---	---	5.5	4.5	5.0	15.5	14.0	14.5
9	.5	.0	.0	---	---	---	5.0	5.0	5.0	16.0	14.0	15.0
10	.0	.0	.0	---	---	---	5.0	4.5	5.0	16.5	15.0	15.5
11	.0	.0	.0	---	---	---	6.0	4.5	5.0	17.0	16.5	16.5
12	.0	.0	.0	---	---	---	6.0	5.5	6.0	17.0	17.0	17.0
13	.0	.0	.0	---	---	---	6.0	5.5	5.5	18.0	17.0	17.5
14	.0	.0	.0	---	---	---	5.5	4.0	4.5	17.5	16.5	17.0
15	.5	.0	.0	---	---	---	4.5	3.5	4.0	16.5	16.0	16.0
16	.5	.5	.5	---	---	---	5.0	4.0	4.5	16.5	15.5	16.0
17	1.0	.5	.5	---	---	---	5.5	4.5	5.0	16.5	15.5	16.0
18	1.0	.5	.5	---	---	---	6.0	5.0	5.5	16.0	15.5	16.0
19	1.0	.5	1.0	---	---	---	7.0	5.5	6.0	15.5	15.0	15.5
20	1.0	1.0	1.0	---	---	---	7.5	6.5	7.0	15.5	14.5	15.0
21	1.0	1.0	1.0	---	---	---	8.5	7.0	8.0	16.0	14.5	15.5
22	2.0	1.0	1.5	---	---	---	9.0	8.0	9.0	16.5	15.5	16.0
23	2.0	1.5	1.5	3.0	2.0	2.5	10.5	9.0	9.5	17.5	16.0	16.5
24	2.0	1.5	1.5	3.5	2.5	2.5	11.5	10.0	10.5	18.5	17.0	17.5
25	1.5	1.0	1.5	3.5	2.5	3.0	13.0	11.0	12.0	18.5	17.0	17.5
26	1.0	1.0	1.0	3.0	3.0	3.0	14.0	12.5	13.0	19.0	17.5	18.0
27	1.5	1.0	1.5	3.0	2.5	3.0	14.5	13.0	13.5	19.0	18.0	18.5
28	2.0	1.5	2.0	3.5	2.5	3.0	14.0	13.5	14.0	18.5	18.0	18.5
29	---	---	---	3.5	3.0	3.5	14.5	13.5	14.0	18.0	17.5	18.0
30	---	---	---	4.0	3.5	4.0	14.5	13.5	14.0	17.5	17.0	17.0
31	---	---	---	4.5	4.0	4.0	---	---	---	18.0	16.5	17.0
MONTH	2.0	.0	.5	---	---	---	---	---	---	19.0	13.0	16.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	17.5	17.0	17.5	23.5	22.0	22.5	27.0	26.0	26.5	27.0	26.0	26.5
2	18.5	17.5	18.0	24.0	22.5	23.0	26.5	26.0	26.5	27.5	26.0	26.5
3	19.0	18.0	18.5	23.5	23.0	23.5	27.0	26.0	26.5	26.5	26.0	26.0
4	19.5	18.0	19.0	23.5	22.5	23.0	27.5	26.5	27.0	25.5	25.5	25.5
5	19.5	19.0	19.0	23.0	22.0	22.5	28.5	27.0	27.5	25.0	24.0	24.5
6	20.0	18.5	19.0	23.0	22.0	22.5	29.0	28.0	28.5	24.0	22.5	23.5
7	20.0	18.5	19.5	23.5	22.5	23.0	28.5	28.0	28.5	22.5	22.0	22.0
8	20.5	19.0	20.0	24.5	23.0	24.0	28.5	28.0	28.0	23.0	22.0	22.5
9	21.5	20.0	20.5	25.5	24.5	25.0	28.5	27.0	28.0	23.5	22.5	23.0
10	21.5	20.0	20.5	26.5	25.5	26.0	27.5	26.5	27.0	23.5	22.5	23.0
11	22.0	21.0	21.5	27.0	26.0	26.5	26.5	25.5	25.5	22.5	22.0	22.0
12	22.0	21.5	21.5	27.0	26.0	26.5	25.0	24.5	25.0	22.0	21.0	21.5
13	22.5	22.0	22.0	27.0	26.0	26.5	25.0	24.5	25.0	21.0	20.0	20.5
14	22.5	22.0	22.0	27.5	26.5	27.0	26.0	24.5	25.0	20.0	19.0	19.0
15	22.0	21.5	21.5	27.5	27.0	27.0	26.0	25.0	25.5	19.0	17.5	18.0
16	21.5	20.5	21.0	27.5	27.0	27.0	26.5	25.5	26.0	17.5	17.0	17.0
17	20.5	19.5	20.0	27.0	26.5	26.5	26.0	25.5	26.0	17.0	16.5	16.5
18	20.0	19.5	20.0	26.5	26.0	26.0	26.0	25.5	25.5	17.0	16.0	16.5
19	20.5	19.5	20.0	26.0	25.5	26.0	26.0	25.5	25.5	16.5	15.5	16.0
20	21.0	20.0	20.0	27.0	26.0	26.5	26.0	25.0	25.5	15.5	15.0	15.5
21	21.5	21.0	21.5	27.5	26.5	27.0	25.5	25.5	25.5	15.0	14.0	14.5
22	22.5	21.0	21.5	28.5	27.0	28.0	25.5	24.5	25.0	14.0	12.5	13.5
23	23.5	21.5	22.5	29.0	28.0	28.5	25.0	24.5	25.0	13.0	12.0	12.5
24	23.5	23.0	23.0	28.5	27.5	28.0	25.0	24.5	24.5	13.0	12.0	12.5
25	---	---	---	28.0	27.0	27.5	26.0	24.5	25.0	13.5	12.5	13.0
26	---	---	---	27.5	27.0	27.0	26.0	25.0	25.5	14.5	12.5	13.5
27	---	---	---	27.0	26.5	26.5	27.0	25.5	26.5	15.5	14.0	14.5
28	23.0	22.5	23.0	26.5	26.0	26.5	27.5	26.0	27.0	16.5	15.5	16.0
29	22.5	21.5	22.0	27.0	26.0	26.5	27.5	26.0	27.0	17.0	16.5	16.5
30	22.5	21.5	22.0	27.5	26.5	27.0	27.5	26.5	27.0	18.0	17.0	17.5
31	---	---	---	27.5	27.0	27.0	27.5	26.0	27.0	---	---	---
MONTH	---	---	---	29.0	22.0	26.0	29.0	24.5	26.0	27.5	12.0	19.0

## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	9.3	6.7	8.1	9.8	9.5	9.7	13.9	13.1	13.5	13.0	12.6	12.8
2	8.8	8.2	8.6	9.8	9.3	9.6	13.4	12.2	12.8	13.0	12.7	12.8
3	8.4	7.3	7.9	9.7	9.2	9.5	13.1	12.4	12.8	13.0	12.8	12.9
4	9.2	8.0	8.6	9.9	9.5	9.8	13.2	12.7	13.0	13.1	12.7	12.9
5	9.6	8.3	9.1	10.3	9.7	10.0	12.9	12.5	12.8	13.6	12.8	13.2
6	10.2	9.4	9.8	10.9	10.1	10.4	13.1	12.5	12.8	13.8	13.4	13.5
7	9.8	8.9	9.4	11.0	10.5	10.7	13.1	12.7	12.9	13.7	13.0	13.4
8	9.0	8.2	8.7	10.9	10.6	10.7	13.1	12.6	12.8	13.3	12.8	13.0
9	8.6	7.9	8.3	12.6	10.5	11.8	12.8	12.5	12.6	13.2	12.8	13.0
10	8.2	7.7	8.0	12.5	11.5	12.0	12.8	12.4	12.6	13.3	12.8	13.1
11	8.8	7.7	8.2	12.7	11.9	12.2	13.1	12.5	12.8	13.1	12.5	12.8
12	8.9	8.5	8.7	13.2	12.1	12.7	13.1	12.6	12.9	13.4	10.5	12.5
13	10.2	8.5	9.3	13.6	12.7	13.2	13.0	12.6	12.8	11.0	10.1	10.5
14	9.7	9.4	9.6	13.3	12.9	13.1	13.1	12.7	12.9	13.5	10.5	11.8
15	10.3	9.7	10.0	13.4	12.6	12.9	13.1	12.9	13.0	13.5	12.8	13.1
16	10.2	9.9	10.0	12.6	12.2	12.4	13.0	12.7	12.9	13.2	12.9	13.1
17	10.1	9.7	9.9	12.5	12.1	12.3	13.0	12.6	12.8	13.1	12.7	12.9
18	10.4	9.9	10.1	12.2	11.8	12.0	13.3	12.7	13.0	13.0	12.4	12.7
19	10.3	9.4	9.7	12.8	12.1	12.4	13.6	13.3	13.5	13.2	12.4	12.8
20	10.3	9.6	10.1	12.4	11.8	12.0	13.5	12.8	13.0	13.7	12.9	13.3
21	10.7	10.3	10.5	12.4	12.1	12.3	13.0	12.6	12.8	13.5	13.0	13.3
22	11.0	10.3	10.6	12.9	12.4	12.6	12.8	12.5	12.7	13.5	13.0	13.2
23	11.1	10.3	10.7	12.9	12.4	12.7	12.7	12.4	12.5	13.5	13.2	13.4
24	11.4	11.0	11.2	12.7	12.2	12.6	12.7	12.2	12.5	13.4	12.6	13.1
25	11.2	10.0	10.8	13.0	12.4	12.7	12.4	11.8	12.2	13.0	12.3	12.7
26	10.5	9.8	10.2	13.1	12.8	12.9	12.7	12.1	12.4	13.0	12.4	12.7
27	10.4	10.0	10.3	13.7	13.0	13.4	12.6	12.2	12.4	12.8	12.3	12.6
28	10.4	9.4	9.9	13.4	12.5	12.8	12.6	12.0	12.4	12.7	12.4	12.5
29	9.6	9.3	9.4	13.3	12.6	13.0	12.6	12.0	12.3	12.8	12.4	12.6
30	9.8	9.5	9.6	14.0	13.3	13.6	13.0	12.0	12.5	13.0	12.5	12.7
31	9.8	9.5	9.6	---	---	---	12.9	12.5	12.7	13.0	12.6	12.8
MONTH	11.4	6.7	9.5	14.0	9.2	11.9	13.9	11.8	12.8	13.8	10.1	12.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	13.0	12.3	12.6	11.9	11.8	11.9	15.7	12.4	13.9	9.3	8.5	8.8
2	12.6	12.1	12.3	10.7	9.3	9.8	17.0	15.8	16.5	9.3	8.3	8.9
3	12.3	12.0	12.2	11.4	9.4	10.3	17.0	16.7	16.9	8.9	8.6	8.7
4	12.4	12.0	12.2	11.3	10.3	10.7	17.0	16.8	16.9	8.6	7.1	7.7
5	12.3	11.9	12.0	11.5	11.3	11.4	17.6	17.0	17.2	9.5	8.5	9.0
6	12.1	11.7	11.9	11.6	11.1	11.3	---	---	---	9.5	8.3	9.0
7	12.1	11.4	11.8	11.4	10.1	10.9	9.1	9.0	9.1	8.8	7.9	8.4
8	12.4	11.6	12.2	---	---	---	9.2	9.1	9.1	8.7	7.8	8.1
9	12.3	11.9	12.0	---	---	---	9.4	9.0	9.2	9.2	9.0	9.1
10	12.0	11.8	11.9	---	---	---	9.3	9.0	9.2	9.0	8.5	8.7
11	12.0	11.8	11.9	---	---	---	10.4	9.3	9.8	8.8	7.8	8.2
12	12.2	11.7	11.9	---	---	---	11.2	10.5	10.9	8.8	8.1	8.5
13	12.3	11.7	12.0	---	---	---	10.9	10.5	10.7	8.1	7.4	7.7
14	12.2	11.7	12.0	---	---	---	10.9	10.7	10.8	8.0	7.6	7.8
15	12.1	11.6	11.8	---	---	---	10.8	10.5	10.7	7.8	7.5	7.7
16	12.1	11.6	11.8	---	---	---	11.3	9.9	10.7	8.8	7.3	8.0
17	12.2	11.8	12.0	---	---	---	11.2	11.0	11.1	9.1	8.5	8.7
18	12.2	11.7	11.9	---	---	---	11.3	10.8	11.1	8.7	8.3	8.5
19	12.0	11.5	11.7	---	---	---	11.3	10.8	11.0	8.8	7.9	8.4
20	12.0	11.5	11.8	---	---	---	10.9	10.4	10.8	9.1	8.3	8.6
21	12.2	11.5	11.8	---	---	---	11.1	10.2	10.7	9.4	8.2	8.8
22	11.9	11.0	11.3	---	---	---	11.1	10.3	10.9	9.0	8.5	8.8
23	11.3	10.9	11.1	---	---	---	11.2	10.7	10.9	8.8	8.2	8.5
24	11.3	11.0	11.2	---	---	---	10.8	9.8	10.3	8.9	7.8	8.2
25	11.3	10.9	11.2	11.0	7.3	8.6	10.8	9.4	10.1	8.3	7.9	8.1
26	11.6	11.1	11.3	8.2	7.7	8.0	10.7	10.0	10.3	8.9	7.5	8.0
27	11.6	11.1	11.4	9.4	8.5	9.0	10.4	9.9	10.1	8.7	7.1	7.9
28	11.8	11.4	11.6	12.5	9.4	10.6	10.4	9.4	9.9	8.3	7.6	8.0
29	---	---	---	11.4	11.2	11.3	10.3	9.1	9.7	7.5	6.9	7.3
30	---	---	---	---	---	---	10.1	9.5	9.8	8.8	6.6	7.6
31	---	---	---	13.3	11.2	12.0	---	---	---	8.3	7.9	8.1
MONTH	13.0	10.9	11.8	---	---	---	---	---	---	9.5	6.6	8.3

## MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.6	7.7	8.3	6.9	5.9	6.3	7.5	6.2	6.9	5.7	5.0	5.3
2	8.7	7.5	8.1	6.6	5.9	6.3	7.7	6.7	7.1	7.0	4.7	5.8
3	7.7	7.1	7.4	6.2	5.6	5.9	7.1	6.0	6.7	6.3	4.5	5.5
4	8.8	7.1	7.9	6.5	5.6	6.1	6.2	5.5	5.9	4.4	3.7	4.0
5	8.4	7.5	8.0	7.4	6.0	6.6	6.1	4.9	5.6	3.7	2.8	3.3
6	8.6	7.2	7.9	7.4	6.9	7.2	5.0	3.9	4.7	5.8	2.8	4.4
7	8.8	7.8	8.4	7.2	6.7	6.9	3.8	2.8	3.4	6.6	5.4	6.0
8	9.3	8.7	9.0	6.7	5.6	6.2	6.8	2.3	5.0	6.6	5.9	6.2
9	8.9	8.0	8.5	5.9	4.7	5.4	8.8	4.4	6.4	6.7	5.2	6.0
10	9.7	8.1	9.0	4.7	4.3	4.4	6.5	5.9	6.2	6.2	5.4	5.8
11	9.0	8.2	8.8	5.9	4.3	4.9	6.3	5.8	6.0	5.8	5.3	5.5
12	8.4	7.0	7.6	6.3	5.0	5.7	6.5	5.8	6.2	6.3	5.3	5.7
13	8.7	6.7	7.8	6.3	5.5	6.0	6.4	5.8	6.1	6.8	6.0	6.4
14	8.2	6.6	7.3	5.9	5.0	5.3	6.0	5.2	5.5	7.0	6.1	6.6
15	6.9	5.8	6.4	5.8	4.9	5.5	7.1	5.0	6.2	6.7	5.8	6.5
16	6.5	6.1	6.3	5.9	3.8	5.3	7.0	6.4	6.7	8.5	4.9	7.0
17	7.5	6.5	7.2	4.8	3.8	3.3	7.0	3.6	4.8	8.8	8.1	8.4
18	7.0	5.9	6.5	6.0	4.8	5.4	5.3	2.4	3.9	9.5	8.8	9.2
19	6.7	6.4	6.6	5.9	5.4	5.7	5.5	5.0	5.3	9.7	9.3	9.5
20	6.5	6.2	6.3	6.3	5.8	6.0	5.6	5.0	5.3	9.6	6.5	8.5
21	7.4	6.7	7.0	6.3	5.8	6.0	5.2	4.1	4.5	8.5	8.0	8.2
22	7.2	6.5	6.8	6.1	5.6	5.8	6.4	4.0	5.4	8.8	8.1	8.5
23	6.9	6.2	6.5	6.0	5.3	5.7	6.6	5.7	6.2	9.8	8.5	9.3
24	6.4	5.6	6.0	5.9	4.8	5.4	6.5	5.7	6.2	10.1	9.5	9.8
25	---	---	---	5.6	4.6	4.9	5.4	4.6	5.1	10.2	9.8	10.0
26	---	---	---	6.4	5.2	5.8	5.3	3.2	4.6	10.2	9.6	10.0
27	---	---	---	6.5	5.6	6.1	5.3	3.2	4.3	9.9	8.9	9.5
28	7.4	6.8	7.1	5.7	5.1	5.5	4.4	3.8	4.1	9.1	8.3	8.8
29	7.3	6.7	6.9	7.1	5.0	6.2	5.6	3.8	4.6	8.5	7.8	8.1
30	6.9	6.1	6.6	6.9	6.5	6.7	5.8	4.6	5.1	7.7	6.4	7.0
31	---	---	---	7.1	6.7	6.9	5.8	4.8	5.4	---	---	---
MONTH	---	---	---	7.4	3.8	5.8	8.8	2.3	5.5	10.2	2.8	7.2

## MISSISSIPPI RIVER MAIN STEM

05331570 MISSISSIPPI RIVER AT NININGER, MN  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

LOCATION.--Lat 44°46'22", long 92°54'07", in NW¼NE¼ sec.18, T.115 N., R.17 W., Dakota County, Hydrologic Unit 07010206, on right bank at the end of Jason Avenue, and at mile 817.8 (1,316 km) upstream from Ohio River.

DRAINAGE AREA.--37,000 mi<sup>2</sup> (95,800 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--January 1977 to current year.

REMARKS.--Water-discharge computed on the basis of discharge for Mississippi River at St. Paul (station 05331000) adjusted for inflow and travel time. Letter K indicates non-ideal colony count.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
NOV 18...	1130	19100	680	664	8.3	8.1	7.5	1.0	20	--	12.3
FEB 08...	1130	12300	671	655	7.8	7.7	-15.0	.5	2.5	750	12.0
APR 05...	1045	3570	600	637	8.3	8.2	6.5	5.5	25	756	12.8
AUG 24...	0945	8620	460	470	8.3	7.9	27.0	22.0	2.1	746	5.4

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 18...	--	K1900	K3800	88	31	15	3.5	234	73	26	.30
FEB 08...	85	3500	3900	70	27	19	3.4	241	63	28	.20
APR 05...	103	100	1100	73	30	14	3.5	208	75	22	.20
AUG 24...	63	K40	K130	52	21	17	3.0	173	40	21	.20



## MISSISSIPPI RIVER MAIN STEM

05331570 MISSISSIPPI RIVER AT NININGER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 18...	17	427	7.80	.450	1.6	.190	.130	.130	59	3030	84
FEB 08...	15	379	2.70	1.10	1.6	.160	.150	.130	14	465	77
APR 05...	14	379	6.10	.270	.90	.170	.080	.070	67	646	98
AUG 24...	14	307	.520	.550	1.8	.250	.160	.160	81	1890	96

DATE	TIME	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
NOV 18...	1130	<10	2	79	<1	<1	<1	<3	--	23	--
FEB 08...	1130	<10	2	78	<1	<1	--	<3	10	34	3
APR 05...	1045	<10	2	71	<1	2	<1	<3	3	38	2
AUG 24...	0945	50	3	87	<.5	<1	<1	<3	5	8	5

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 18...	25	26	.1	20	--	2	<1	240	<6	5
FEB 08...	10	52	.4	<10	10	<1	<1	190	<6	16
APR 05...	19	20	.1	<10	4	2	<1	210	<6	16
AUG 24...	12	37	.2	<10	5	<1	<1	140	<6	16

## MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN

LOCATION.--Lat 44°45'37", long 92°52'02", in SE¼SW¼ sec.16, T.115 N., R.17 W., Dakota County, Hydrologic Unit 07010206, in old lock house at lock and dam and at mile 815.2 (1,312 km) upstream from Ohio River.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1974 to current year.

pH: October 1974 to current year.

WATER TEMPERATURES: October 1974 to current year.

DISSOLVED OXYGEN: October 1974 to current year.

INSTRUMENTATION.--Water-quality monitor since October 1974.

REMARKS.--Water discharge computed on the basis of discharge for Mississippi River at St. Paul (station 05331000) adjusted for inflow and travel time. Extremes are published for those years with 80 percent or more daily record.

COOPERATION.--Samples collected and water-quality monitor operated by the Metropolitan Waste Control Commission, St. Paul, MN.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1980, 1982): Maximum, 799 micromhos June 27, July 6, 20, 1980; minimum, 341 micromhos Aug. 3, 1980.

pH (water years 1980, 1982): Maximum, 8.9 units Aug. 1, 1980; minimum, 6.7 units Jan. 23, 27, 1982.

WATER TEMPERATURES (water years 1980, 1983): Maximum, 32.5°C July 10, 1980; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN (water years 1980, 1982): Maximum, 19.2 mg/L Oct. 16, 1979; minimum, 1.7 mg/L June 4, 1980.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 30.0°C Aug. 6, 7; minimum, 0.0°C several days during winter.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	513	507	509	---	---	---	---	---	---	600	594	597
2	506	502	504	---	---	---	582	566	573	598	590	594
3	599	498	523	---	---	---	581	563	573	590	582	585
4	599	419	514	---	---	---	565	562	564	581	572	577
5	519	419	492	---	---	---	567	563	565	577	573	574
6	589	486	502	---	---	---	579	556	564	590	572	582
7	581	472	481	---	---	---	556	553	554	590	582	587
8	579	472	486	---	---	---	558	553	556	590	581	585
9	484	480	483	---	---	---	579	558	565	590	589	590
10	479	474	477	---	---	---	576	568	572	589	582	586
11	479	457	465	---	---	---	587	575	581	589	586	588
12	460	449	456	---	---	---	587	580	581	590	582	589
13	453	443	450	---	---	---	580	566	575	588	582	585
14	450	442	446	---	---	---	578	556	565	587	582	585
15	446	442	444	---	---	---	556	553	554	591	586	589
16	538	432	451	---	---	---	557	551	555	592	586	588
17	532	420	441	575	568	572	579	550	566	587	584	585
18	---	---	---	585	575	580	569	560	564	587	585	586
19	---	---	---	593	583	588	576	566	572	594	587	591
20	---	---	---	597	587	594	580	576	578	596	592	593
21	---	---	---	593	586	588	616	580	601	595	591	593
22	---	---	---	589	583	586	615	611	614	597	592	593
23	---	---	---	583	562	570	612	608	609	593	587	590
24	---	---	---	---	---	---	609	605	607	599	583	592
25	---	---	---	---	---	---	605	596	601	611	600	602
26	---	---	---	---	---	---	596	589	593	607	599	604
27	---	---	---	---	---	---	590	585	587	603	600	603
28	---	---	---	---	---	---	591	586	589	604	600	603
29	---	---	---	---	---	---	597	590	593	607	602	605
30	---	---	---	---	---	---	598	597	597	605	597	600
31	---	---	---	---	---	---	597	592	594	603	593	599
MONTH	---	---	---	---	---	---	---	---	---	611	572	591

## MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	604	601	602	---	---	---	635	630	632	654	640	647
2	602	593	597	---	---	---	626	624	625	643	631	637
3	600	596	598	---	---	---	618	610	614	650	633	641
4	600	592	597	---	---	---	608	602	605	650	627	637
5	600	596	598	---	---	---	603	597	600	638	632	634
6	603	598	601	---	---	---	596	582	589	635	629	632
7	605	599	602	---	---	---	587	579	583	628	616	622
8	602	599	600	---	---	---	584	573	579	636	616	625
9	598	595	597	---	---	---	583	573	578	640	626	630
10	596	594	595	---	---	---	590	578	584	638	623	630
11	595	593	594	---	---	---	602	586	594	634	597	615
12	594	591	592	---	---	---	603	597	600	606	596	602
13	595	589	591	---	---	---	606	550	576	599	592	595
14	592	590	591	---	---	---	549	527	535	592	576	582
15	592	591	592	---	---	---	569	549	554	594	575	584
16	---	---	---	---	---	---	586	566	575	604	589	596
17	---	---	---	---	---	---	606	586	602	604	598	601
18	---	---	---	---	---	---	622	607	614	602	597	600
19	---	---	---	---	---	---	635	621	628	603	595	599
20	---	---	---	---	---	---	642	634	638	617	601	609
21	---	---	---	---	---	---	648	630	639	640	616	624
22	---	---	---	---	---	---	649	633	641	644	627	631
23	---	---	---	---	---	---	658	643	650	642	625	634
24	---	---	---	---	---	---	668	645	656	647	635	641
25	---	---	---	---	---	---	673	652	653	644	636	640
26	---	---	---	---	---	---	681	666	681	645	634	639
27	---	---	---	---	---	---	672	637	654	650	637	642
28	---	---	---	---	---	---	648	644	646	643	635	638
29	---	---	---	---	---	---	650	640	645	635	624	629
30	---	---	---	641	639	640	657	645	651	623	614	617
31	---	---	---	639	635	636	---	---	---	626	609	618
MONTH	---	---	---	---	---	---	681	527	614	654	575	622
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	626	620	623	564	553	559	586	575	580	547	539	543
2	623	615	619	556	544	550	584	578	581	558	542	549
3	616	606	612	551	534	546	593	576	583	566	554	560
4	623	606	614	527	510	515	675	588	620	561	554	557
5	623	618	620	512	504	508	624	612	618	554	542	546
6	618	602	611	512	499	504	621	614	618	543	526	535
7	616	602	608	518	505	512	616	602	612	526	518	523
8	631	602	618	530	512	521	606	592	598	531	518	524
9	659	620	635	547	529	537	594	579	587	546	529	537
10	651	634	639	579	544	554	582	566	575	545	537	541
11	643	636	639	581	561	571	579	558	562	543	532	536
12	648	640	643	597	576	585	578	551	555	533	523	527
13	650	646	648	607	589	597	550	540	545	533	526	528
14	649	640	643	719	603	618	579	540	557	528	520	524
15	639	622	632	627	596	620	572	568	570	518	501	511
16	624	619	622	602	586	593	574	563	570	502	496	499
17	621	613	616	587	585	586	568	549	559	497	490	494
18	615	596	605	---	---	---	555	534	545	506	491	497
19	605	594	599	606	593	599	533	518	527	507	491	501
20	605	593	599	596	586	591	532	517	524	492	480	487
21	619	597	609	599	589	593	523	517	521	481	476	479
22	633	615	625	601	593	596	529	518	524	483	474	477
23	620	612	616	604	594	598	528	515	521	491	478	483
24	610	600	605	601	588	595	524	518	521	492	482	487
25	636	606	617	603	588	596	534	519	526	501	489	494
26	624	614	620	594	586	591	556	528	538	514	493	500
27	649	595	612	591	554	574	563	551	557	514	502	507
28	623	593	608	579	553	559	577	562	569	516	512	514
29	593	592	592	577	560	567	585	567	573	---	---	---
30	604	569	586	579	562	572	581	553	568	---	---	---
31	---	---	---	588	574	582	560	548	553	---	---	---
MONTH	659	569	618	---	---	---	675	515	563	---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.2	8.0	8.0	---	---	---	---	---	---	7.8	7.8	7.8
2	8.1	8.0	8.0	---	---	---	7.9	7.8	7.9	7.8	7.8	7.8
3	8.1	7.9	8.0	---	---	---	7.9	7.9	7.9	7.8	7.8	7.8
4	8.1	7.9	8.0	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
5	8.1	8.0	8.1	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
6	8.1	7.9	8.0	---	---	---	8.0	7.9	7.9	7.8	7.7	7.8
7	8.0	7.9	8.0	---	---	---	8.0	7.9	7.9	7.8	7.7	7.8
8	8.3	7.9	8.1	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
9	8.2	8.0	8.1	---	---	---	7.9	7.9	7.9	7.8	7.8	7.8
10	8.0	7.9	8.0	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
11	8.0	7.8	7.9	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
12	7.9	7.9	7.9	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
13	7.9	7.8	7.9	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
14	7.9	7.8	7.9	---	---	---	7.9	7.8	7.9	7.8	7.7	7.8
15	7.9	7.8	7.9	---	---	---	7.8	7.8	7.8	7.8	7.7	7.8
16	7.9	7.8	7.9	---	---	---	7.8	7.7	7.8	7.8	7.7	7.8
17	7.8	7.6	7.8	8.0	7.9	7.9	7.8	7.7	7.7	7.8	7.7	7.7
18	---	---	---	8.0	7.9	8.0	7.9	7.8	7.8	7.8	7.7	7.7
19	---	---	---	8.1	8.0	8.0	7.9	7.8	7.9	7.8	7.7	7.7
20	---	---	---	8.2	8.1	8.1	7.9	7.9	7.9	7.7	7.6	7.7
21	---	---	---	8.2	8.2	8.2	7.9	7.9	7.9	7.8	7.7	7.7
22	---	---	---	8.2	8.2	8.2	7.9	7.9	7.9	7.8	7.7	7.7
23	---	---	---	8.2	8.0	8.1	7.9	7.9	7.9	7.8	7.7	7.8
24	---	---	---	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
25	---	---	---	---	---	---	7.9	7.9	7.9	7.8	7.7	7.7
26	---	---	---	---	---	---	8.0	7.9	7.9	7.7	7.7	7.7
27	---	---	---	---	---	---	8.0	7.9	7.9	7.7	7.6	7.7
28	---	---	---	---	---	---	7.9	7.9	7.9	7.7	7.6	7.7
29	---	---	---	---	---	---	7.9	7.8	7.9	7.7	7.6	7.7
30	---	---	---	---	---	---	7.9	7.8	7.9	7.7	7.7	7.7
31	---	---	---	---	---	---	7.9	7.8	7.8	7.7	7.7	7.7
MONTH	---	---	---	---	---	---	---	---	---	7.8	7.6	7.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.7	7.7	7.7	---	---	---	8.2	8.2	8.2	8.1	8.0	8.0
2	7.7	7.6	7.7	---	---	---	8.2	8.2	8.2	8.0	7.9	8.0
3	7.7	7.6	7.7	---	---	---	8.2	8.2	8.2	8.0	7.9	8.0
4	7.7	7.6	7.7	---	---	---	8.2	8.2	8.2	8.0	7.9	7.9
5	7.7	7.7	7.7	---	---	---	8.2	8.1	8.2	8.0	7.9	7.9
6	7.7	7.6	7.6	---	---	---	8.2	8.2	8.2	7.9	7.9	7.9
7	---	---	---	---	---	---	8.2	8.2	8.2	7.9	7.8	7.9
8	---	---	---	---	---	---	8.2	8.1	8.2	7.9	7.8	7.9
9	---	---	---	---	---	---	8.2	8.1	8.2	7.9	7.8	7.8
10	---	---	---	---	---	---	8.2	8.2	8.2	7.9	7.8	7.8
11	---	---	---	---	---	---	8.2	8.1	8.2	7.8	7.8	7.8
12	---	---	---	---	---	---	8.2	8.2	8.2	7.8	7.7	7.8
13	---	---	---	---	---	---	8.2	7.9	8.0	7.8	7.7	7.8
14	---	---	---	---	---	---	8.0	7.9	7.9	7.8	7.7	7.7
15	---	---	---	---	---	---	8.0	7.9	7.9	7.8	7.8	7.8
16	---	---	---	---	---	---	8.0	7.9	7.9	7.8	7.8	7.8
17	---	---	---	---	---	---	7.9	7.9	7.9	7.8	7.7	7.8
18	---	---	---	---	---	---	7.9	7.9	7.9	8.1	7.7	8.0
19	---	---	---	---	---	---	7.9	7.8	7.9	8.1	8.0	8.0
20	---	---	---	---	---	---	7.9	7.8	7.8	8.1	8.0	8.1
21	---	---	---	---	---	---	7.9	7.8	7.8	8.1	8.0	8.1
22	---	---	---	---	---	---	7.9	7.8	7.8	8.1	8.0	8.1
23	---	---	---	---	---	---	7.9	7.8	7.9	8.2	8.1	8.2
24	---	---	---	---	---	---	7.9	7.8	7.9	8.2	8.1	8.2
25	---	---	---	---	---	---	8.0	7.8	7.9	8.3	8.1	8.2
26	---	---	---	---	---	---	8.0	7.9	8.0	8.2	8.2	8.2
27	---	---	---	---	---	---	8.1	8.0	8.0	8.2	8.1	8.2
28	---	---	---	---	---	---	8.1	8.0	8.1	8.2	8.1	8.1
29	---	---	---	---	---	---	8.1	8.0	8.1	8.1	8.1	8.1
30	---	---	---	8.2	8.2	8.2	8.1	8.0	8.1	8.1	8.0	8.1
31	---	---	---	8.2	8.2	8.2	---	---	---	8.2	8.0	8.1
MONTH	---	---	---	---	---	---	8.2	7.8	8.0	8.3	7.7	8.0

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

[illegible]

## MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	.5	.5	.5	---	---	---	5.0	5.0	5.0	15.0	13.5	14.0
2	.5	.5	.5	---	---	---	5.5	5.0	5.5	14.0	12.5	13.0
3	.5	.5	.5	---	---	---	5.5	5.0	5.5	15.0	13.0	14.0
4	.5	.5	.5	---	---	---	7.0	5.0	6.0	14.5	13.0	13.5
5	.5	.5	.5	---	---	---	7.0	6.5	6.5	15.0	14.0	14.5
6	.5	.5	.5	---	---	---	6.5	5.5	6.0	14.5	14.0	14.5
7	.5	.5	.5	---	---	---	5.5	5.0	5.5	14.0	13.0	13.5
8	.5	.5	.5	---	---	---	6.5	4.5	6.0	15.0	13.0	14.0
9	.5	.5	.5	---	---	---	6.5	4.5	5.5	15.0	13.5	14.5
10	.5	.5	.5	---	---	---	6.0	5.0	5.5	15.5	13.5	14.5
11	.5	.5	.5	---	---	---	7.0	5.0	6.0	17.5	15.0	16.0
12	.5	.5	.5	---	---	---	6.5	5.5	6.0	17.5	16.5	17.0
13	.5	.5	.5	---	---	---	6.5	6.0	6.0	18.5	16.5	17.5
14	.5	.5	.5	---	---	---	5.5	3.0	4.0	18.0	16.0	16.5
15	.5	.5	.5	---	---	---	5.5	3.5	4.5	17.0	15.5	16.0
16	---	---	---	---	---	---	6.0	4.0	5.0	17.5	16.0	16.5
17	---	---	---	---	---	---	6.5	4.5	5.5	17.0	16.0	16.5
18	---	---	---	---	---	---	7.0	5.0	6.0	16.5	15.5	16.0
19	---	---	---	---	---	---	7.5	5.5	6.5	15.0	15.0	15.0
20	---	---	---	---	---	---	8.5	6.0	8.0	16.5	15.0	15.5
21	---	---	---	---	---	---	9.5	7.0	8.0	17.5	15.5	16.5
22	---	---	---	---	---	---	9.5	8.0	9.0	17.0	16.5	17.0
23	---	---	---	---	---	---	11.0	8.5	9.5	18.0	16.0	17.0
24	---	---	---	---	---	---	12.0	9.5	10.5	19.0	17.5	18.0
25	---	---	---	---	---	---	13.0	10.5	12.0	18.5	17.5	18.0
26	---	---	---	---	---	---	14.0	12.0	13.0	19.5	17.5	18.5
27	---	---	---	---	---	---	14.5	12.0	13.5	19.5	18.0	18.5
28	---	---	---	---	---	---	14.0	13.5	13.5	19.0	18.0	18.5
29	---	---	---	---	---	---	14.5	13.0	14.0	18.0	17.0	17.5
30	---	---	---	4.5	4.0	4.5	15.0	13.5	14.5	17.0	16.5	16.5
31	---	---	---	5.0	4.5	4.5	---	---	---	18.0	16.0	17.0
MONTH	---	---	---	---	---	---	15.0	3.0	7.5	19.5	12.5	16.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	19.0	17.5	18.0	24.5	22.5	23.5	28.0	25.5	26.5	27.0	26.0	26.5
2	19.0	17.5	18.5	24.5	23.0	24.0	27.0	26.0	26.5	28.0	26.5	27.0
3	19.5	18.0	19.0	24.5	23.5	24.0	28.0	26.0	27.0	27.5	26.5	26.5
4	20.5	19.0	19.5	23.5	22.0	23.0	29.5	27.0	28.0	26.0	25.5	25.5
5	19.5	19.0	19.0	23.5	21.5	22.5	29.5	27.0	28.0	25.5	25.0	25.0
6	20.5	18.5	19.0	24.0	21.5	23.0	30.0	28.0	28.5	24.5	22.5	24.0
7	21.0	19.0	20.0	24.5	22.5	23.5	30.0	28.0	29.0	23.5	22.0	22.5
8	21.0	19.0	20.0	26.0	23.0	24.5	29.0	28.0	28.5	24.0	22.5	23.0
9	22.0	19.5	20.5	26.5	24.5	25.5	28.0	27.0	27.5	26.0	24.0	24.5
10	21.5	20.5	21.0	27.5	25.5	26.5	27.0	26.0	26.5	25.0	23.0	24.5
11	22.5	21.0	21.5	27.5	26.0	27.0	26.0	25.0	25.5	23.5	22.0	22.5
12	22.5	22.0	22.0	28.0	25.5	27.0	26.0	24.5	25.0	22.0	20.5	21.0
13	22.5	22.0	22.5	28.0	26.0	27.0	26.0	24.5	25.0	21.0	20.0	20.5
14	23.0	22.0	22.5	28.5	26.5	27.5	29.5	24.5	26.5	20.5	19.5	20.0
15	22.5	21.5	22.0	28.0	26.0	27.5	27.5	25.5	26.5	19.5	17.5	18.5
16	21.5	20.5	21.0	27.5	26.0	27.0	26.5	26.0	26.0	17.5	17.0	17.0
17	21.5	20.0	21.0	26.5	26.5	26.5	26.0	25.0	25.5	17.5	16.5	17.0
18	21.0	20.0	20.5	---	---	---	26.0	25.0	25.5	18.0	17.0	17.5
19	21.5	19.5	20.5	27.5	25.5	26.5	27.0	25.5	26.5	18.0	15.5	17.0
20	21.5	20.5	21.0	28.0	26.5	27.5	26.5	25.0	25.5	15.5	13.5	14.5
21	22.0	21.0	21.5	29.0	27.5	28.0	25.5	24.5	25.0	13.5	12.5	13.0
22	24.0	22.0	23.0	29.5	28.0	29.0	26.0	24.5	25.0	13.0	12.0	12.5
23	24.5	23.0	23.5	29.5	28.5	29.0	25.5	24.5	25.0	13.0	12.0	12.5
24	24.0	23.0	23.5	29.0	28.5	28.5	25.0	24.5	24.5	13.5	12.0	13.0
25	26.0	23.5	24.5	29.5	27.5	28.5	26.5	24.5	25.5	16.0	13.5	14.5
26	26.0	25.0	25.5	28.5	27.5	28.0	27.5	25.5	26.5	17.5	14.0	15.5
27	26.5	23.5	24.5	28.0	26.0	26.5	27.5	26.0	27.0	16.5	15.5	16.0
28	24.5	24.5	24.5	27.5	25.5	26.0	27.5	26.5	27.0	16.5	16.5	16.5
29	24.0	22.5	23.0	29.0	26.0	27.0	29.0	25.5	26.5	---	---	---
30	25.0	22.5	23.5	28.0	27.0	27.5	27.0	25.5	26.5	---	---	---
31	---	---	---	27.5	26.0	26.5	28.5	25.5	26.5	---	---	---
MONTH	26.5	17.5	21.5	---	---	---	30.0	24.5	26.5	---	---	---

## MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	10.6	6.5	9.5	---	---	---	---	---	---	12.7	12.5	12.6
2	7.2	6.6	6.9	---	---	---	12.9	12.3	12.6	12.9	12.7	12.8
3	9.2	6.5	7.2	---	---	---	12.6	12.4	12.5	13.1	12.9	13.0
4	8.8	6.9	7.8	---	---	---	12.5	12.2	12.4	13.2	13.0	13.1
5	9.5	8.5	8.9	---	---	---	12.2	12.0	12.1	13.4	13.1	13.1
6	9.3	8.2	8.7	---	---	---	12.2	11.8	12.0	13.3	12.9	13.1
7	11.6	8.8	11.1	---	---	---	12.2	12.0	12.1	13.2	12.8	12.9
8	12.6	8.0	10.8	---	---	---	13.3	12.0	12.5	13.4	12.8	13.1
9	9.8	9.1	9.5	---	---	---	13.6	12.9	13.3	13.5	12.9	13.2
10	9.3	8.8	9.0	---	---	---	13.5	13.0	13.4	13.5	13.1	13.2
11	11.3	8.4	9.3	---	---	---	13.5	13.2	13.3	13.4	12.9	13.1
12	9.7	6.4	8.8	---	---	---	13.5	13.2	13.4	13.5	12.9	13.1
13	12.6	8.6	9.6	---	---	---	13.5	13.1	13.4	13.6	13.1	13.3
14	10.8	10.0	10.4	---	---	---	13.4	12.8	13.2	13.7	13.2	13.4
15	12.6	10.0	11.0	---	---	---	13.2	12.7	12.9	13.6	13.0	13.4
16	11.6	10.5	11.1	---	---	---	12.7	12.2	12.5	13.7	13.1	13.3
17	10.5	4.5	8.8	13.1	12.6	12.9	12.5	12.2	12.4	13.8	13.2	13.4
18	---	---	---	13.1	12.9	13.0	13.0	12.4	12.7	13.7	13.2	13.4
19	---	---	---	13.1	12.3	12.8	12.9	12.5	12.7	13.8	13.3	13.6
20	---	---	---	12.4	11.8	12.1	13.0	12.4	12.7	13.9	13.2	13.6
21	---	---	---	12.0	11.7	11.9	13.2	12.7	13.0	14.1	13.3	13.6
22	---	---	---	11.8	11.5	11.6	13.4	13.0	13.2	14.0	13.4	13.7
23	---	---	---	12.3	8.5	11.7	13.3	12.9	13.1	13.9	13.3	13.6
24	---	---	---	---	---	---	13.0	12.5	12.8	13.9	13.3	13.5
25	---	---	---	---	---	---	13.4	12.5	12.7	13.9	13.2	13.4
26	---	---	---	---	---	---	13.2	12.4	12.8	13.6	13.1	13.3
27	---	---	---	---	---	---	13.1	12.4	12.8	13.6	13.1	13.3
28	---	---	---	---	---	---	13.3	12.6	12.9	13.5	13.1	13.2
29	---	---	---	---	---	---	15.9	12.4	13.0	13.3	12.9	13.1
30	---	---	---	---	---	---	12.9	12.3	12.7	13.3	12.8	13.0
31	---	---	---	---	---	---	12.8	12.0	12.6	13.4	12.8	13.0
MONTH	---	---	---	---	---	---	---	---	---	14.1	12.5	13.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	13.5	12.9	13.2	---	---	---	13.4	10.9	12.1	9.9	8.2	8.9
2	13.5	12.9	13.1	---	---	---	11.3	10.8	11.0	11.1	7.6	9.8
3	13.2	12.6	12.8	---	---	---	11.1	10.7	10.9	11.1	9.9	10.5
4	12.7	12.4	12.5	---	---	---	11.2	10.6	10.9	10.1	9.6	9.9
5	12.5	12.3	12.4	---	---	---	10.8	10.6	10.7	9.8	9.3	9.6
6	12.4	12.2	12.3	---	---	---	10.3	10.1	10.2	9.5	9.2	9.3
7	12.2	12.1	12.2	---	---	---	10.2	9.9	10.1	9.5	8.0	9.2
8	12.2	12.1	12.1	---	---	---	10.4	10.0	10.2	9.7	9.0	9.4
9	12.2	12.0	12.1	---	---	---	10.2	10.0	10.1	9.8	9.3	9.6
10	12.1	11.9	12.0	---	---	---	10.3	9.9	10.1	9.7	9.3	9.5
11	12.1	11.8	11.9	---	---	---	10.5	9.9	10.2	9.5	7.9	9.2
12	12.0	11.9	11.9	---	---	---	10.3	9.9	10.1	9.0	8.3	8.6
13	12.1	11.9	11.9	---	---	---	10.1	9.7	9.9	9.2	8.0	8.6
14	12.0	11.7	11.8	---	---	---	10.4	9.9	10.2	9.4	8.5	8.9
15	12.0	11.7	11.9	---	---	---	11.4	10.4	10.9	9.4	8.4	8.9
16	---	---	---	---	---	---	11.3	10.9	11.1	9.1	8.1	8.6
17	---	---	---	---	---	---	11.3	11.1	11.2	8.9	7.0	8.5
18	---	---	---	---	---	---	11.3	11.0	11.1	9.5	8.1	8.9
19	---	---	---	---	---	---	11.5	11.0	11.3	8.8	7.9	8.4
20	---	---	---	---	---	---	12.3	11.5	11.8	9.9	7.7	9.0
21	---	---	---	---	---	---	12.0	11.6	11.8	9.9	8.9	9.4
22	---	---	---	---	---	---	11.9	11.3	11.6	8.9	6.9	8.4
23	---	---	---	---	---	---	11.9	11.2	11.6	11.2	7.6	9.3
24	---	---	---	---	---	---	11.8	11.1	11.4	10.9	9.7	10.3
25	---	---	---	---	---	---	12.5	10.6	11.6	10.1	9.3	9.7
26	---	---	---	---	---	---	12.2	11.0	11.6	10.2	9.1	9.7
27	---	---	---	---	---	---	11.5	10.4	11.0	9.3	8.5	8.9
28	---	---	---	---	---	---	11.1	9.8	10.6	8.5	7.8	8.2
29	---	---	---	---	---	---	10.9	9.5	10.2	8.0	7.5	7.8
30	---	---	---	13.2	12.3	13.0	10.7	9.3	10.0	7.6	7.2	7.4
31	---	---	---	13.5	13.1	13.3	---	---	---	9.5	7.0	8.5
MONTH	---	---	---	---	---	---	13.4	9.3	10.9	11.2	6.9	9.1

## MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	9.4	8.5	9.0	7.7	7.3	7.1	9.3	4.6	6.5	5.4	4.1	4.8
2	9.4	8.2	8.8	7.7	7.3	7.5	7.5	6.2	6.6	6.2	4.0	4.9
3	9.1	8.1	8.6	7.6	7.0	7.3	7.7	5.2	6.6	5.1	4.0	4.6
4	8.4	7.7	8.0	7.5	7.0	7.3	8.4	5.4	6.6	4.1	3.2	3.6
5	8.5	7.2	7.9	7.5	7.2	7.2	7.2	4.7	5.6	3.3	2.8	3.1
6	9.5	7.4	8.6	7.4	7.1	7.2	5.9	4.5	5.2	5.9	2.9	4.6
7	9.7	8.4	9.2	7.4	7.1	7.3	5.9	4.4	5.1	6.5	5.1	5.7
8	9.6	8.4	9.2	7.2	6.7	7.0	6.0	4.7	5.4	6.5	5.6	6.0
9	11.8	8.2	10.2	6.7	6.0	6.3	6.0	4.8	5.3	7.4	6.1	6.5
10	10.8	8.9	9.7	6.1	5.3	5.6	5.8	5.2	5.5	6.3	5.6	5.9
11	9.4	6.7	7.9	5.8	5.2	5.5	6.4	5.1	5.7	6.4	5.0	5.7
12	7.1	5.3	5.8	8.2	4.7	6.9	6.6	4.9	5.6	5.6	4.9	5.2
13	5.7	4.8	5.3	8.0	6.8	7.6	6.5	4.9	5.6	7.4	4.8	6.1
14	6.1	4.8	5.4	7.5	6.5	7.0	8.8	4.5	5.9	6.7	6.1	6.4
15	6.6	5.4	6.0	6.7	4.7	6.1	7.0	4.5	5.7	7.9	6.5	7.2
16	7.0	5.9	6.4	6.9	4.7	5.9	6.3	5.0	5.6	7.9	7.1	7.6
17	8.8	6.9	7.9	6.1	6.0	6.1	6.9	5.3	5.8	7.6	6.7	7.2
18	8.0	6.8	7.3	---	---	---	5.5	4.2	4.8	7.7	6.8	7.3
19	6.8	6.3	6.6	---	---	---	4.3	3.4	3.8	8.4	6.6	7.4
20	6.4	5.9	6.1	6.9	5.0	6.2	4.0	3.0	3.4	9.4	8.4	9.0
21	7.5	5.8	6.6	6.9	4.5	6.3	3.9	3.1	3.5	9.5	8.7	9.1
22	7.7	7.2	7.3	7.1	6.0	6.6	3.6	2.8	3.2	9.4	8.7	9.0
23	7.3	6.6	6.8	7.3	6.4	6.7	6.5	2.9	4.5	9.2	8.7	9.0
24	6.6	6.3	6.5	6.8	6.0	6.4	6.3	4.6	5.4	9.4	8.9	9.1
25	6.3	5.9	6.1	9.1	5.5	7.1	5.5	4.3	4.9	9.2	8.6	8.9
26	6.0	5.5	5.8	7.7	6.5	7.0	5.8	4.3	4.9	10.0	8.0	9.2
27	6.5	5.5	6.0	7.2	6.0	6.4	5.2	3.5	4.1	10.5	9.5	9.9
28	6.6	6.0	6.3	7.5	5.6	6.0	4.4	3.1	3.8	10.1	9.4	9.8
29	7.4	6.0	6.6	7.1	5.2	6.0	7.3	3.8	4.5	---	---	---
30	7.9	7.4	7.6	6.5	5.3	5.8	6.7	3.8	5.2	---	---	---
31	---	---	---	5.5	4.5	4.9	8.3	4.5	5.8	---	---	---
MONTH	11.8	4.8	7.3	---	---	---	9.3	2.8	5.2	---	---	---



## ST. CROIX RIVER BASIN

207

05336700 KETTLE RIVER BELOW SANDSTONE, MN

LOCATION.--Lat 46°06'20", long 92°51'50", in NW¼SW¼ sec.22, T.42 N., R.20 W., Pine County, Hydrologic Unit 07030003, on Sandstone Federal Correctional Institution property, on left bank about 900 ft (274 m) downstream from abandoned powerplant dam, 1.8 mi (2.9 km) south of Sandstone.

DRAINAGE AREA.--863 mi<sup>2</sup> (2,240 km<sup>2</sup>).

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 931.50 ft (283.921 m) National Geodetic Vertical Datum of 1929. (Minnesota Department of Transportation bench mark).

REMARKS.--Records good except those for winter periods, which are fair.

AVERAGE DISCHARGE.--16 years, 710 ft<sup>3</sup>/s (20.11 m<sup>3</sup>/s), 11.17 in/yr (284 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,200 ft<sup>3</sup>/s (487 m<sup>3</sup>/s) July 23, 1972, gage height, 15.38 ft (4.688 m); minimum, 25 ft<sup>3</sup>/s (0.71 m<sup>3</sup>/s) Nov. 11-12, 1977, gage height, 3.37 ft (1.027 m) result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1965 reached a stage of 12.96 ft (3.950 m) from flood marks, discharge, 13,400 ft<sup>3</sup>/s (379 m<sup>3</sup>/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 3,600 ft<sup>3</sup>/s (102 m<sup>3</sup>/s) and maximum (\*)

Date	Time	Discharge		Gage height	
		(ft <sup>3</sup> /s)	(m <sup>3</sup> /s)	(ft)	(m)
Oct. 11	0845	*5,320	151	*8.73	2.661
Nov. 21	1300	3,690	105	7.72	2.353
Mar. 8	1400	3,820	108	7.79	2.374
Apr. 6	1345	3,710	105	7.72	2.353
Apr. 23	2000	3,630	103	7.67	2.338
July 4	1600	4,030	114	7.85	2.393

Minimum discharge, 184 ft<sup>3</sup>/s (5.21 m<sup>3</sup>/s) Feb. 26, gage height 4.23 ft (1.289 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	346	642	911	221	221	255	1390	1880	717	421	272	237
2	389	620	1020	221	221	267	2320	1630	668	496	276	218
3	621	619	1410	221	221	296	2880	1420	656	1430	557	211
4	757	640	1390	221	221	369	3040	1240	716	3770	980	228
5	711	665	1260	221	221	470	3220	1110	734	3740	1070	400
6	1420	665	1090	221	221	876	3580	988	676	3340	1020	480
7	3830	662	857	221	221	2560	3490	885	603	2870	885	496
8	4970	654	740	221	221	3680	3300	795	530	2430	761	481
9	4700	654	640	222	221	2960	3400	705	473	1890	613	429
10	4890	661	560	222	221	2510	3340	632	452	1450	547	451
11	5260	650	490	222	221	2340	3230	612	434	1150	513	1160
12	4890	635	450	222	221	2100	3430	571	408	885	478	1130
13	4210	541	415	222	221	1890	3540	720	393	712	436	1220
14	3590	545	380	222	222	1840	3430	945	408	591	398	1050
15	3000	550	350	222	222	1810	2860	894	489	496	359	955
16	2490	550	325	222	222	1780	2810	848	542	377	339	1400
17	2150	550	309	222	222	1620	2710	753	501	366	329	1720
18	1880	551	295	222	222	1420	2520	687	445	377	319	1450
19	1640	632	275	222	222	1240	2420	646	396	366	304	1220
20	1520	2120	265	222	222	1080	2560	632	360	345	282	1060
21	1440	3540	255	222	222	988	3050	660	351	319	269	902
22	1330	3320	248	222	222	866	3440	688	403	290	270	761
23	1220	2640	246	222	222	743	3570	654	394	268	259	654
24	1120	2270	238	222	222	661	3540	610	350	242	247	571
25	1030	1960	235	222	211	605	3380	558	376	230	227	502
26	939	1600	230	222	219	571	3160	509	396	214	214	455
27	866	1310	228	222	230	571	2870	468	382	202	204	411
28	809	1180	226	222	240	546	2580	447	356	199	196	372
29	766	1040	224	222	---	552	2380	483	319	202	228	400
30	731	980	222	222	---	626	2130	565	350	210	248	1050
31	685	---	221	220	---	753	---	659	---	238	250	---
TOTAL	64200	33646	16005	6872	6215	38847	89570	24894	14278	30116	13350	22074
MEAN	2071	1122	516	222	222	1253	2986	803	476	971	431	736
MAX	5260	3540	1410	222	240	3680	3580	1880	734	3770	1070	1720
MIN	346	541	221	220	211	255	1390	447	319	199	196	211
CFSM	2.40	1.30	.60	.26	.26	1.45	3.46	.93	.55	1.13	.50	.85
IN.	2.77	1.45	.69	.30	.27	1.67	3.86	1.07	.62	1.30	.58	.95
AC-FT	127300	66740	31750	13630	12330	77050	177700	49380	28320	59740	26480	43780

CAL YF 1982	TOTAL	343181	MEAN	940	MAX	11500	MIN	130	CFSM	1.09	IN	14.79	AC-FT	680700
WTR YR 1983	TOTAL	360067	MEAN	986	MAX	5260	MIN	196	CFSM	1.14	IN	15.52	AC-FT	714200

## ST. CROIX RIVER BASIN

05337050 KETTLE RIVER NEAR CLOVERDALE, MN

LOCATION.--Lat 45°54'13", long 92°43'47", in SW¼SW¼ sec. 33, T.40 N., R.19 W., Pine County, Hydrologic Unit 07030003, St. Croix National Scenic Riverway, 200 ft (61 m) west of Town Road, 8.0 mi (12.9 km) south of Cloverdale, Minnesota and 9.0 mi (14.5 km) northwest of Grahtsburg, Wisconsin.

DRAINAGE AREA.--1,050 mi<sup>2</sup> (2,720 km<sup>2</sup>).

PERIOD OF RECORD.--May 1975 to current year.

REMARKS.--Letter K indicates non-ideal colony count.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
APR 1983										
13...	1140	4160	77	7.3	--	3.0	12.3	--	50	260
AUG										
23...	1740	319	150	8.3	27.5	25.0	8.5	106	K16	K1500

DATE	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)
APR 1983									
13...	28	2.3	<.010	.060	.60	.040	.030	4	45
AUG									
23...	72	4.4	<.010	.080	.50	.120	.040	3	2.6

## ST. CROIX RIVER BASIN

05337400 KNIFE RIVER NEAR MORA, MN

LOCATION.--Lat 45°55'12", long 93°18'26", in SW¼SW¼ sec.26, T.40 N., R.24 W., Kanabec County, Hydrologic Unit 07030004, on left bank 400 ft (122 m) upstream from bridge on County Highway 77, 1.1 mi (1.8 km) upstream from mouth and 2.5 mi (4.0 km) north of Mora.

DRAINAGE AREA.--102 mi<sup>2</sup> (264 km<sup>2</sup>).

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1969-74; July 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 991.20 ft (302.118 m) National Geodetic Vertical Datum of 1929. (Kanabec County bench mark).

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--9 years, 58.7 ft<sup>3</sup>/s (1.662 m<sup>3</sup>/s), 7.82 in/yr (199 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,840 ft<sup>3</sup>/s (52.1 m<sup>3</sup>/s) May 10, 1979, gage height, 6.31 ft (1.923 m); maximum gage height, 6.69 ft (2.039 m) Nov. 24, 1977, from floodmark (backwater from ice); minimum daily discharge, 1.1 ft<sup>3</sup>/s (0.031 m<sup>3</sup>/s) Jan. 12 to Feb. 9, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 26, 1972, reached a stage of 14.0 ft (4.267 m), from information by local resident (discharge not determined). Result of dam failure and backwater from collapsed bridge.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 500 ft<sup>3</sup>/s (14.2 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	(m <sup>3</sup> /s)	Gage height (ft)	(m)
Mar. 8	1200	*1030	29.2	5.28	1.609
Mar. 9	0745	ice jam		*5.43	1.655
July 5	0130	608	17.2	4.52	1.378

Minimum discharge, 2.5 ft<sup>3</sup>/s (0.071 m<sup>3</sup>/s) Sept. 4; minimum gage height, 1.48 ft (0.451 m) Sept. 2-4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	22	50	32	22	20	48	129	117	47	40	24	3.1		
2	28	48	32	21	20	53	194	101	45	39	22	2.9		
3	37	46	31	21	20	67	256	84	50	137	25	2.8		
4	46	46	30	21	20	87	298	79	51	423	23	4.2		
5	53	42	30	21	20	142	321	73	48	581	19	23		
6	94	38	30	21	20	311	346	71	44	442	17	34		
7	156	38	29	20	20	716	350	72	41	307	14	35		
8	216	39	29	20	20	994	336	55	37	226	12	18		
9	241	39	29	20	20	748	333	50	33	174	10	5.5		
10	262	42	28	20	20	622	340	46	30	132	11	36		
11	277	43	28	20	20	469	330	44	27	101	11	66		
12	267	43	27	20	20	361	327	48	26	81	8.5	68		
13	241	43	27	20	20	294	348	81	25	67	7.6	68		
14	211	43	27	20	21	257	388	102	32	55	7.3	63		
15	186	45	26	20	21	235	361	108	33	49	7.3	68		
16	156	42	26	20	21	222	325	103	32	41	9.5	69		
17	138	39	26	20	22	209	294	91	31	40	14	69		
18	121	35	25	20	24	195	281	83	29	44	13	70		
19	114	36	25	20	30	173	269	81	27	43	13	72		
20	109	37	25	20	34	153	261	72	25	54	14	72		
21	95	38	24	20	36	138	252	69	35	54	13	70		
22	87	37	24	20	37	124	242	69	41	47	16	70		
23	81	36	24	20	37	111	228	66	43	38	14	68		
24	74	35	23	20	37	100	209	64	52	31	12	42		
25	70	35	23	20	42	89	190	57	59	26	11	6.2		
26	65	34	23	20	40	81	173	48	64	22	11	4.6		
27	61	34	22	20	41	79	150	45	69	19	11	4.4		
28	58	34	22	20	46	76	140	42	52	19	11	7.3		
29	55	33	22	20	---	73	132	44	43	21	12	74		
30	53	32	22	20	---	74	123	48	42	24	12	76		
31	51	---	22	20	---	92	---	49	---	26	4.0	---		
TOTAL	3725	1182	813	627	749	7393	7926	2162	1213	3403	409.2	1272.0		
MEAN	120	39.4	26.2	20.2	26.8	238	264	69.7	40.4	110	13.2	42.4		
MAX	277	50	32	22	46	994	388	117	69	581	25	76		
MIN	22	32	22	20	20	48	123	42	25	19	4.0	2.8		
CFSM	1.18	.39	.26	.20	.26	2.33	2.59	.68	.40	1.08	.13	.42		
IN.	1.36	.43	.30	.23	.27	2.70	2.89	.79	.44	1.24	.15	.46		
AC-FT	7390	2340	1610	1240	1490	14660	15720	4290	2410	6750	812	2520		
CAL YR 1982	TOTAL	26626.4	MEAN	72.9	MAX	1350	MIN	4.9	CFSM	.72	IN	9.71	AC-FT	52810
WTR YR 1983	TOTAL	30874.2	MEAN	84.6	MAX	994	MIN	2.8	CFSM	.83	IN	11.26	AC-FT	61240

## ST. CROIX RIVER BASIN

05338500 SNAKE RIVER NEAR PINE CITY, MN

LOCATION.--Lat 45°50'30", long 92°56'00", in SE¼NW¼ sec.26, T.39 N., R.21 W., Pine County, Hydrologic Unit 07030004, on left bank, at site of former powerplant and dam, 0.5 mi (0.8 km) downstream from Cross Lake, and 1.5 mi (2.4 km) northeast of Pine City.

DRAINAGE AREA.--958 mi<sup>2</sup> (2,480 km<sup>2</sup>),

PERIOD OF RECORD.--Water years 1963, 1965, 1967-68, 1975 to current year.

REMARKS.--Letter K indicates non-ideal colony count.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
APR 1983									
12...	1515	2410	110	7.3	4.5	11.1	--	K9	160
AUG									
23...	1315	197	190	8.2	26.0	7.9	100	K13	K5100

DATE	TIME	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L) AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L) AS K) (00935)	ALKA- LINITY LAB (MG/L) AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L) AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L) AS F) (00950)	SILICA, DIS- SOLVED (MG/L) AS SiO2) (00955)
APR 1983										
12...	12	4.2	2.4	1.5	46	10	2.5	<.10	7.9	
AUG										
23...	25	8.8	3.6	1.3	94	10	3.3	<.10	9.5	

DATE	TIME	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE TOTAL (MG/L) AS N) (00615)	NITRO- GEN, AMMONIA TOTAL (MG/L) AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	PHOS- PHORUS, DIS- SOLVED (MG/L) AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L) AS P) (00666)	SEDI- MENT, DIS- SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- SUS- PENDE (MG/L) (80155)
APR 1983										
12...	86	68	.020	.020	.70	.050	.020	4	26	
AUG										
23...	155	120	.040	.060	1.3	.050	1.00	6	3.2	

DATE	TIME	ARSENIC TOTAL (UG/L) AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L) AS BA) (01007)	BORON, TOTAL RECOV- ERABLE (UG/L) AS B) (01022)	CADMIUM TOTAL RECOV- ERABLE (UG/L) AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L) AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L) AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L) AS FE) (01045)
AUG 1983								
23...	1315	2	200	70	1	20	4	760

DATE	TIME	LEAD, TOTAL RECOV- ERABLE (UG/L) AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L) AS MN) (01055)	MERCURY TOTAL RECOV- ERABLE (UG/L) AS HG) (71900)	NICKEL, TOTAL RECOV- ERABLE (UG/L) AS NI) (01067)	SILVER, TOTAL RECOV- ERABLE (UG/L) AS AG) (01077)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L) AS SE) (01147)	ZINC, TOTAL RECOV- ERABLE (UG/L) AS ZN) (01092)	CYANIDE TOTAL (MG/L) AS CN) (00720)
AUG 1983									
23...	3	150	<.1	3	<1	<1	20	<.01	

## ST. CROIX RIVER BASIN

05340050 SUNRISE RIVER NEAR LINDSTROM, MN

LOCATION.--Lat 45°27'00", long 92°53'10", in SW¼NE¼ sec.7, T.34 N., R.20 W., Chisago County, Hydrologic Unit 07030005, on left bank 20 ft (6 m) downstream from highway bridge and 4.5 mi (7.2 km) northwest of Lindstrom.

DRAINAGE AREA.--231 mi<sup>2</sup> (598 km<sup>2</sup>).

PERIOD OF RECORD.--July 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is 846.10 ft (257.891 m) National Geodetic Vertical Datum of 1929. (Chisago County bench mark).

REMARKS.--Records good except those for winter period, which are fair. Some regulation by Minnesota Game and Fish Wildlife Refuge ponds above the station. At high stages a small part of flow discharges into the Rum River and Coon Creek basins from West Arm of Coon Lake and South Coon Lake, respectively.

AVERAGE DISCHARGE.--18 years, 97.9 ft<sup>3</sup>/s (2.773 m<sup>3</sup>/s), 5.76 in/yr (146 mm/yr); median of yearly mean discharges, 102 ft<sup>3</sup>/s (2.89 m<sup>3</sup>/s), 6.00 in/yr (152 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 745 ft<sup>3</sup>/s (21.1 m<sup>3</sup>/s) July 3, 1975, gage height, 7.65 ft (2.332 m); minimum, 1.9 ft<sup>3</sup>/s (0.054 m<sup>3</sup>/s) Sept. 19, 20, 21, 1976; minimum gage height, 1.98 ft (0.604 m) Oct. 3, 1971.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 586 ft<sup>3</sup>/s (16.6 m<sup>3</sup>/s) Mar. 11, gage height, 7.36 ft (2.243 m); minimum, 17 ft<sup>3</sup>/s (0.48 m<sup>3</sup>/s) Sept. 15, gage height, 2.70 ft (0.823 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	35	113	130	129	60	88	262	302	93	189	148	109		
2	45	107	132	128	60	105	269	289	92	184	138	103		
3	49	105	132	131	60	136	271	278	96	197	111	78		
4	47	103	130	128	60	194	275	267	94	241	98	67		
5	46	97	128	122	60	242	280	260	78	240	105	61		
6	57	95	122	98	60	298	286	274	69	225	101	58		
7	79	93	118	96	60	367	297	278	63	219	90	51		
8	76	89	112	91	60	388	303	268	60	219	101	46		
9	76	86	108	93	59	430	313	256	69	217	102	53		
10	84	96	100	90	59	511	321	235	66	213	94	47		
11	88	107	96	100	59	534	327	214	65	207	82	38		
12	91	123	90	108	59	506	328	196	66	199	70	35		
13	92	129	86	118	59	488	347	200	70	187	61	22		
14	92	122	84	110	59	471	371	190	96	181	55	18		
15	88	119	83	104	59	453	379	177	100	175	51	21		
16	81	111	81	96	58	440	381	166	90	168	60	25		
17	81	111	80	90	58	424	382	157	84	180	39	22		
18	79	111	80	83	58	409	392	149	80	193	31	21		
19	79	118	79	78	59	393	398	142	79	195	30	21		
20	114	130	78	73	62	377	405	139	78	214	43	22		
21	130	140	76	67	65	357	399	134	86	217	49	23		
22	138	145	74	64	67	341	393	127	107	206	52	24		
23	148	150	74	63	70	323	390	119	107	195	50	26		
24	155	150	73	62	70	304	383	114	109	188	48	27		
25	156	150	83	61	72	287	377	106	117	182	47	27		
26	151	149	93	61	72	274	370	101	121	170	49	28		
27	145	148	98	60	70	267	357	97	136	177	68	28		
28	139	140	97	60	79	257	344	96	144	171	121	28		
29	134	135	113	60	---	250	333	99	159	162	162	29		
30	129	132	120	60	---	246	319	95	185	152	164	30		
31	119	---	130	60	---	250	---	94	---	147	138	---		
TOTAL	3023	3604	3080	2744	1753	10410	10252	5619	2859	6010	2558	1188		
MEAN	97.5	120	99.4	88.5	62.6	336	342	181	95.3	194	82.5	39.6		
MAX	156	150	132	131	79	534	405	302	185	241	164	109		
MIN	35	86	73	60	58	88	262	94	60	147	30	18		
CFSM	.42	.52	.43	.38	.27	1.46	1.48	.78	.41	.84	.36	.17		
IN.	.49	.58	.50	.44	.28	1.68	1.65	.90	.46	.97	.41	.19		
AC-FT	6000	7150	6110	5440	3480	20650	20330	11150	5670	11920	5070	2360		
CAL YR 1982	TOTAL	36304	MEAN	99.4	MAX	439	MIN	15	CFSM	.43	IN	5.85	AC-FT	72010
WTR YR 1983	TOTAL	53100	MEAN	145	MAX	534	MIN	18	CFSM	.63	IN	8.55	AC-FT	105300

## ST. CROIX RIVER BASIN

05340500 ST. CROIX RIVER AT ST. CROIX FALLS, WI  
(National stream-quality accounting network station)

LOCATION.--Lat 45°24'25", long 92°38'49", in SW¼NW¼ sec.30, T.34 N., R.18 W., Polk County, Hydrologic Unit 07030005, St. Croix National Scenic Riverway, on left bank, 1,500 ft (457 m) downstream from powerplant of Northern States Power Co., in St. Croix Falls, and at mile 52.2 (84.0 km).

DRAINAGE AREA.--6,240 mi<sup>2</sup> (16,160 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1902 to current year. Prior to January 1910, monthly discharge only, published in WSP 1308. Prior to October 1939, published as "near St. Croix Falls."

REVISED RECORDS.--WSP 1115: 1929. WDR WI-82-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 689.94 ft (210.294 m) National Geodetic Vertical Datum of 1929. Prior to July 1905, gage heights and discharge measurements were used by Loweth and Wolff, consulting engineers of St. Paul, Minn., to determine the flow. July 1905 to February 1940, records were computed from power generation at the St. Croix Falls Powerplant. February 1940 to Sept. 30, 1979, water-stage recorder at site 300 ft (91 m) downstream at same datum.

REMARKS.--Records are good. Diurnal fluctuation caused by St. Croix Falls Powerplant 1,500 ft (457 m) upstream.

AVERAGE DISCHARGE.--81 years, 4,235 ft<sup>3</sup>/s (119.9 m<sup>3</sup>/s), 9.22 in/yr (234 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 54,900 ft<sup>3</sup>/s (1,550 m<sup>3</sup>/s) May 8, 1950, gage height, 25.19 ft (7.678 m); minimum daily, 75 ft<sup>3</sup>/s (2.12 m<sup>3</sup>/s) July 17, 1910.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,700 ft<sup>3</sup>/s (671 m<sup>3</sup>/s) Mar. 9, gage height, 11.30 ft (3.444 m); minimum daily, 2,510 ft<sup>3</sup>/s (71.1 m<sup>3</sup>/s) Aug. 28.

RATING TABLE (gage height, in feet, and discharge, in cubic feet per second).

3.0	2,350	9.0	18,200
4.0	4,950	12.0	25,400
6.0	10,700		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	3000	5630	8180	3910	2880	3890	6060	10900	4470	4570	3130	3430		
2	2970	5800	10900	3620	3150	4860	8230	9740	4790	4300	2990	3520		
3	3500	5580	10700	3650	3080	5130	10000	9080	4780	4720	3540	3370		
4	4290	5350	9340	3530	2950	6620	11700	8410	5020	9080	6030	2980		
5	4660	5680	9170	3970	3020	8190	12200	7900	4830	15700	6890	2990		
6	4870	5630	9380	3940	2710	12400	13000	7420	5030	18700	9040	3830		
7	5980	5160	5650	3770	2820	18400	13800	7240	5100	19000	8840	4890		
8	9630	5340	4070	3650	2720	22200	13800	6390	4830	16700	7180	4440		
9	13000	5290	3210	3650	3040	23300	14000	6260	4380	12800	5640	4250		
10	14400	5170	3480	3700	2710	22400	13700	4990	4190	9840	4430	4210		
11	15200	5200	3360	3800	2810	20900	14000	5300	3850	8440	4410	4160		
12	15500	6520	3600	3670	2830	19400	14200	4840	3650	7440	4890	5410		
13	15400	5460	3320	3360	2860	17800	15100	4970	3700	6420	4360	5200		
14	14200	4230	3760	3450	2750	15900	16400	5620	3900	5990	4400	6190		
15	12900	3830	3790	3330	3080	14300	17100	6110	4630	5020	4090	6150		
16	11500	4280	4250	3500	2970	13400	16700	5930	4280	4480	4120	6070		
17	10200	4530	4090	3040	2940	12800	16500	6030	4380	4160	4240	6390		
18	9430	5490	4030	3470	3040	11800	16400	5740	3910	3980	3910	7650		
19	8990	6220	3720	3160	3120	11000	15800	5260	3830	4070	3990	7600		
20	9130	8050	3610	3480	3080	9930	15500	5350	3440	4960	4040	7300		
21	9060	11500	3740	3100	3430	9220	15300	5000	3540	4550	3340	6450		
22	8970	14900	3430	3240	3200	8580	15300	5050	3850	4360	3460	5990		
23	8840	15700	3660	3190	3850	8250	15900	4950	4180	4010	3550	5280		
24	8350	11800	3720	3100	3720	7990	16200	4920	4030	3580	3130	5010		
25	7890	9290	3960	3190	3540	6380	16300	4780	3990	3360	3100	4640		
26	7390	8570	3950	3080	3650	5250	15900	4430	4260	2990	3090	4600		
27	6670	7590	3780	2920	3480	4930	15000	4530	3900	3210	2600	3790		
28	6680	6950	3430	2800	3360	5320	14000	4360	3850	2910	2510	3930		
29	6350	6960	3150	2800	---	5900	12400	3880	3480	3100	3140	3950		
30	6440	7520	3280	2990	---	5640	12000	4430	3970	3070	3990	3970		
31	6300	---	4430	2970	---	5940	---	4400	---	3160	3820	---		
TOTAL	271690	209220	152140	105030	86790	348020	422490	184210	126040	208670	135890	147640		
MEAN	8764	6974	4908	3388	3100	11230	14080	5942	4201	6731	4384	4921		
MAX	15500	15700	10900	3970	3850	23300	17100	10900	5100	19000	9040	7650		
MIN	2970	3830	3150	2800	2710	3890	6060	3880	3440	2910	2510	2980		
CFSM	1.40	1.12	.79	.54	.50	1.80	2.26	.95	.67	1.08	.70	.79		
IN.	1.62	1.25	.91	.63	.52	2.07	2.52	1.10	.75	1.24	.81	.88		
AC-FT	538900	415000	301800	208300	172100	690300	838000	365400	250000	413900	269500	292800		
CAL YR 1982	TOTAL	2108300	MEAN	5776	MAX	29400	MIN	1650	CFSM	.93	IN	12.57	AC-FT	4182000
WTR YR 1983	TOTAL	2397830	MEAN	6569	MAX	23300	MIN	2510	CFSM	1.05	IN	14.29	AC-FT	4756000

## ST. CROIX RIVER BASIN

05340500 ST. CROIX RIVER AT ST. CROIX FALLS, WI---Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967-68, 1974 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March 1975 to September 1981 (discontinued).

WATER TEMPERATURES: March 1975 to September 1981 (discontinued).

REMARKS.--Letter K indicates non-ideal colony count.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 02...	1030	6350	137	132	7.6	7.6	7.5	3.0	11.1	K11	95
APR 12...	1150	13900	105	90	7.6	7.4	5.0	3.0	11.8	K21	230
MAY 24...	1100	6320	146	144	7.9	7.5	14.0	2.4	9.5	24	140
JUL 06...	0745	18600	93	93	7.2	7.1	19.5	4.6	7.4	420	1700

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)
NOV 02...	16	5.4	2.5	.30	62	5.0	3.3	<.10	11
APR 12...	11	3.8	2.3	1.1	43	10	2.4	<.10	9.2
MAY 24...	18	5.8	2.8	.90	66	4.0	3.0	<.10	7.6
JUL 06...	13	4.1	2.0	1.0	43	11	2.4	.10	7.6

## ST. CROIX RIVER BASIN

05340500 ST. CROIX RIVER AT ST. CROIX FALLS, WI--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L) AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L) AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L) AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L) AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L) AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L) AS BA) (01005)
NOV 02...	102	.120	.020	.60	.050	.060	<.010	20	1	21
APR 12...	80	.110	<.010	.40	.040	.020	<.010	40	1	46
MAY 24...	125	<.100	.020	.60	.010	<.010	<.010	10	1	23
JUL 06...	91	.150	.050	1.0	.060	.050	.020	20	1	47

DATE	BERYL- LIUM, DIS- SOLVED (UG/L) AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L) AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L) AS CR) (01030)	COBALT, DIS- SOLVED (UG/L) AS CO) (01035)	COPPER, DIS- SOLVED (UG/L) AS CU) (01040)	IRON, DIS- SOLVED (UG/L) AS FE) (01046)	LEAD, DIS- SOLVED (UG/L) AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L) AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L) AS MN) (01056)	MERCURY DIS- SOLVED (UG/L) AS HG) (71890)
NOV 02...	1	1	2	3	6	430	<1	4	18	<.1
APR 12...	<.5	<1	3	<3	2	480	6	<4	16	.1
MAY 24...	<.5	<1	<1	<3	5	320	<1	<4	26	<.1
JUL 06...	<.5	1	<1	<3	1	700	2	5	36	.1

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L) AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L) AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L) AS SE) (01145)	SILVER, DIS- SOLVED (UG/L) AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L) AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L) AS V) (01085)	ZINC, DIS- SOLVED (UG/L) AS ZN) (01090)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 02...	10	<1	<1	<1	33	6	4	5	86	84
APR 12...	<10	3	<1	<1	26	<6	4	4	150	96
MAY 24...	10	<1	<1	<1	36	<6	<3	5	85	97
JUL 06...	<10	2	<1	<1	29	<6	4	24	1210	96









## MISSISSIPPI RIVER MAIN STEM

05344500 MISSISSIPPI RIVER AT PRESCOTT, WI

LOCATION.--Lat 44°44'45", long 92°48'00", in sec.9, T.26 N., R.20 W., Pierce County, Hydrologic Unit 07040001, on left bank at Prescott, 200 ft (61 m) downstream from St. Croix River, 300 ft (91 m) south of Chicago, Burlington & Quincy Railroad bridge, 800 ft (244 m) south of bridge on U.S. Highway 10, and at mile 811.4 (1,306 km) upstream from Ohio River.

DRAINAGE AREA.--44,800 mi<sup>2</sup> (116,000 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--June 1928 to current year.

REVISED RECORDS.--WSP 1508: 1941. WRD MN-74: 1973.

GAGE.--Water-stage recorder. Datum of gage is 649.50 ft (197.968 m) National Geodetic Vertical Datum of 1929. Prior to Aug. 2, 1932, nonrecording gage at railroad bridge 300 ft (91 m) upstream at following datums: June 3, 1928, to Sept. 30, 1929, 19.27 ft (5.873 m) higher; Oct. 1, 1929, to Sept. 30, 1930, 17.68 ft (5.389 m) higher; Oct. 1, 1930, to Aug. 1, 1932, 19.28 ft (5.877 m) higher. Aug. 2, 1932, to Oct. 30, 1938, water-stage recorder at present site at datum 19.28 ft (5.877 m) higher; Nov. 1, 1938, to Sept. 7, 1971, water-stage recorder at present site at datum 50.00 ft (15.240 m) lower. Auxiliary water-stage recorder 10.7 mi (17.2 km) downstream from base gage.

REMARKS.--Records good. Some regulation by reservoirs, navigation dams, and powerplants at low and medium stages. Flood flow not materially affected by artificial storage.

AVERAGE DISCHARGE.--55 years, 16,600 ft<sup>3</sup>/s (470.1 m<sup>3</sup>/s), 5.03 in/yr (128 mm/yr); median of yearly mean discharges, 14,700 ft<sup>3</sup>/s (416 m<sup>3</sup>/s), 4.46 in/yr (113 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 228,000 ft<sup>3</sup>/s (6,460 m<sup>3</sup>/s) Apr. 18, 1965, gage height, 43.11 ft (13.140 m); minimum daily, 1,380 ft<sup>3</sup>/s (39.1 m<sup>3</sup>/s) July 13, 1940; minimum gage height, 15.08 ft (4.596 m) Aug. 29, 1934, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 84,200 ft<sup>3</sup>/s (2,380 m<sup>3</sup>/s) Mar. 12, gage height, 34.34 ft (10.467 m); minimum daily, 10,600 ft<sup>3</sup>/s (300 m<sup>3</sup>/s) Oct. 4 and Aug. 26; minimum gage height, 24.76 ft (7.547 m) Oct. 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10700	23900	28400	16200	14200	27100	32000	51400	22600	41900	18200	12900
2	10700	22800	29700	16900	13200	28400	32900	50100	22100	43200	18500	13200
3	11100	22600	31000	17600	13400	31900	34100	46800	22800	42800	17400	13500
4	10600	21900	31700	17100	12100	36400	36200	43000	22900	45800	17400	13300
5	11700	20400	31600	17000	11800	46000	39100	40400	22300	51700	18800	12600
6	13400	20100	30900	18000	11900	51700	42600	39200	20800	62100	19500	12800
7	16800	20100	30000	18200	11900	56400	45500	38700	20200	67300	21400	13600
8	18200	19800	27500	18200	12000	65800	49000	36900	20000	73300	21600	13100
9	20900	19300	25200	17600	11800	75600	53400	35600	19300	74100	20300	12800
10	25900	20000	21100	16400	12000	80500	57400	35300	17500	68400	18400	13300
11	28800	20800	17700	16200	12900	82800	59900	34400	16800	63500	16900	12500
12	30900	21100	17600	16800	12300	84000	61400	33800	16300	58600	16200	12700
13	33300	21900	15400	16500	12400	83900	63500	34600	15600	54100	15300	13900
14	34400	23500	14000	15400	12400	82400	65900	35400	16000	49300	14900	13700
15	35100	23800	16200	15100	12500	79500	66700	35800	16900	44800	14000	15000
16	34600	23300	19200	16400	12700	75900	68100	36900	17200	41900	14200	16000
17	33900	23600	20700	16800	13600	71700	68800	37500	22800	38700	14500	14900
18	33100	24000	20600	16900	13000	67800	70200	37900	25700	35200	15200	16000
19	32200	24800	19300	17000	12500	63800	71700	37800	28000	31900	14900	17300
20	31600	26600	18400	16300	13000	59600	73000	36900	29200	29800	14300	18300
21	31100	27900	18000	15900	13100	55800	74300	35500	30400	28600	13600	17600
22	30000	30000	18100	15800	14800	51800	74600	34300	30900	26900	12800	16600
23	29300	33500	17900	15500	15100	48400	74400	32800	34300	25600	12600	16400
24	29700	35000	18000	14700	17800	45500	72700	31400	36000	24500	12500	15200
25	30000	33100	20500	14800	20400	43400	70800	30100	36400	22700	11300	13900
26	29900	30500	21400	14800	22300	39900	68200	28500	36800	20900	10600	13300
27	29300	27600	20000	15000	23900	37300	65200	27300	38400	20500	11900	13200
28	27800	25700	18600	14100	25400	35100	61300	25900	43400	19800	11400	13500
29	26500	25300	16600	12900	---	33500	58700	25300	43400	18900	11500	12300
30	26000	26600	14700	13400	---	32400	55400	24200	41300	18100	13000	11400
31	25200	---	15200	14300	---	31100	---	23300	---	18400	13300	---
TOTAL	792700	739500	665200	497800	404400	1705400	1767000	1097000	786300	1263300	476400	424800
MEAN	25570	24650	21460	16060	14440	55010	58900	35390	26210	40750	15370	14160
MAX	35100	35000	31700	18200	25400	84000	74600	51400	43400	74100	21600	18300
MIN	10600	19300	14000	12900	11800	27100	32000	23300	15600	18100	10600	11400
CFSM	.57	.55	.48	.36	.32	1.23	1.32	.79	.59	.91	.34	.32
IN.	.66	.61	.55	.41	.34	1.42	1.47	.91	.65	1.05	.40	.35
AC-FT	1572000	1467000	1319000	987400	802100	3383000	3505000	2176000	1560000	2506000	944900	842600

CAL YR 1982	TOTAL	8674660	MEAN	23770	MAX	86300	MIN	7250	CFSM	.53	IN	7.20	AC-FT	17210000
WTR YR 1983	TOTAL	10619800	MEAN	29100	MAX	84000	MIN	10600	CFSM	.65	IN	8.82	AC-FT	21060000







## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN

LOCATION.--Lat 44°40'00", long 93°03'17", in SW¼NW¼ sec.24, T.114 N., R.19 W., Dakota County, Hydrologic Unit 07040001, on right bank and just downstream from County Road 79, 2 mi (3.2 km) west of Empire and 4 mi (6.4 km) northeast of Farmington.

DRAINAGE AREA.--110 mi<sup>2</sup> (285 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1942 to June 1945 (no record during July, August, and September 1944), September 1969 to September 1973 (discharge measurements only), October 1973 to current year. Prior to October 1975 published as "near Empire City".

GAGE.--Water-stage recorder. Datum of gage is 851.99 ft (259.687 m) National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). April 12, 1942, to June 30, 1944, and October 1, 1944, to July 7, 1945, nonrecording gage at same site and present datum.

REMARKS.--Records good. Some regulation at low flow by sewage plant upstream.

AVERAGE DISCHARGE.--11 years (water years 1943, 1974-83), 48.5 ft<sup>3</sup>/s (1.374 m<sup>3</sup>/s), 5.99 in/yr (152 mm/yr), 35,140 acre-ft/yr (43.3 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,030 ft<sup>3</sup>/s (57.5 m<sup>3</sup>/s) Sept. 18, 1942; maximum gage height, 7.16 ft (2.182 m) Mar. 20, 1980; minimum daily discharge, 8.4 ft<sup>3</sup>/s (0.24 m<sup>3</sup>/s) Jan. 15, 1975; minimum gage height, 1.63 ft (0.497 m) Oct. 14, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1965, reached a stage of 7.5 ft (2.286 m) from information by local resident, discharge 6,200 ft<sup>3</sup>/s (176 m<sup>3</sup>/s) from rating extended above 2,100 ft<sup>3</sup>/s (59.5 m<sup>3</sup>/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 200 ft<sup>3</sup>/s (5.66 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Discharge (m <sup>3</sup> /s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft <sup>3</sup> /s)	Discharge (m <sup>3</sup> /s)	Gage height (ft)	Gage height (m)
Dec. 27	1730	342	9.69	5.88	1.792	May 3	0815	282	7.99	5.51	1.679
Mar. 4	2000	512	14.5	6.39	1.948	May 8	0715	*562	15.9	*6.40	1.951
Apr. 2	1030	339	9.60	5.70	1.737	May 14	1030	304	8.61	5.63	1.716
Apr. 14	1300	361	10.2	5.80	1.768						

Minimum discharge, 24 ft<sup>3</sup>/s (0.68 m<sup>3</sup>/s) Feb. 2, gage height 2.29 ft (0.698 m); minimum gage height, 2.28 ft (0.695 m) Oct. 1.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	45	54	73	38	248	246	138	100	86	56	43
2	29	49	57	65	38	372	331	208	95	83	54	40
3	29	49	61	59	38	405	306	271	113	80	55	36
4	28	45	58	57	38	472	256	221	154	91	57	35
5	28	44	56	56	38	465	210	176	143	89	55	43
6	33	43	55	56	38	437	189	189	121	80	53	42
7	40	42	52	55	38	480	196	350	108	73	50	40
8	40	41	48	55	37	421	193	508	98	69	49	42
9	37	41	45	53	36	316	181	355	91	65	48	42
10	36	67	46	51	36	223	181	264	85	62	49	38
11	37	89	44	50	36	175	187	214	80	60	48	35
12	35	116	45	46	36	150	186	186	77	56	47	35
13	34	111	43	48	36	133	220	213	76	54	45	34
14	34	91	43	47	37	125	329	292	93	52	44	34
15	33	80	42	48	37	122	295	254	96	51	44	44
16	32	73	42	45	38	117	284	208	85	52	43	58
17	31	68	43	44	38	114	302	178	79	60	49	54
18	33	66	42	45	40	118	297	157	76	80	46	49
19	40	76	41	41	41	121	282	156	74	84	45	47
20	78	97	41	41	46	116	288	176	72	85	42	57
21	82	95	41	40	51	107	324	174	82	76	43	55
22	72	83	41	40	65	100	358	153	122	68	43	51
23	63	74	41	40	79	94	334	134	112	64	41	46
24	57	62	48	40	98	90	284	121	90	60	40	44
25	53	62	124	40	97	87	238	114	90	58	41	42
26	50	58	268	39	91	86	206	106	85	56	43	41
27	48	53	307	39	90	87	179	101	79	56	42	40
28	47	54	135	39	130	87	156	98	77	61	41	38
29	48	53	92	40	---	92	151	100	79	63	42	38
30	46	52	84	39	---	96	144	101	86	61	50	38
31	44	---	78	38	---	127	---	103	---	59	47	---
TOTAL	1324	1979	2217	1469	1461	6183	7333	6019	2818	2094	1452	1281
MEAN	42.7	66.0	71.5	47.4	52.2	199	244	194	93.9	67.5	46.8	42.7
MAX	82	116	307	73	130	480	358	508	154	91	57	58
MIN	27	41	41	38	36	86	144	98	72	51	40	34
CFSM	.39	.60	.65	.43	.48	1.81	2.22	1.76	.85	.61	.43	.39
IN.	.45	.67	.75	.50	.49	2.09	2.48	2.04	.95	.71	.49	.43
AC-FT	2630	3930	4400	2910	2900	12260	14550	11940	5590	4150	2880	2540
CAL YR 1982	TOTAL	19666	MEAN 53.9	MAX 425	MIN 20	CFSM .49	IN 6.65	AC-FT 39010				
WTR YR 1983	TOTAL	35630	MEAN 97.6	MAX 508	MIN 27	CFSM .89	IN 12.05	AC-FT 70670				



## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1973 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: February 1974 to current year.

pH: February 1974 to current year.

WATER TEMPERATURES: February 1974 to current year.

DISSOLVED OXYGEN: February 1974 to current year.

INSTRUMENTATION.--Water quality monitor since February 1974.

REMARKS.--Water is pumped to a monitor that is inside a heated shelter; water temperature during the winter may be affected. Extremes are for those years with 80 percent or more record.

COOPERATION.--Water-quality monitor is operated by the Metropolitan Waste Control Commission, St. Paul, MN.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1979-82): Maximum, 997 micromhos Jan. 7, 1982; minimum, 236 micromhos June 8, 1980.

pH (water years 1979-82): Maximum, 9.3 units Nov. 11, 1978; minimum, 6.7 units Mar. 20, 1980.

WATER TEMPERATURES (water years 1979-82): Maximum, 27.0oC Aug. 6, 1979; minimum 0.0oC many days during winter.

DISSOLVED OXYGEN (water years 1979-82): Maximum, 14.6 mg/L Nov. 21, 1981; minimum, 1.5 mg/L Nov. 14, 1979.

## SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	852	721	806	---	---	---	---	---	---	754	680	710
2	867	662	776	---	---	---	---	---	---	754	687	720
3	891	718	789	---	---	---	---	---	---	754	668	726
4	878	806	839	---	---	---	---	---	---	758	707	732
5	---	---	---	---	---	---	---	---	---	757	636	722
6	---	---	---	---	---	---	751	683	640	747	686	722
7	---	---	---	---	---	---	752	670	710	814	698	743
8	---	---	---	---	---	---	740	689	709	769	683	732
9	---	---	---	---	---	---	732	670	694	826	697	755
10	---	---	---	---	---	---	739	682	707	820	764	795
11	---	---	---	---	---	---	726	669	694	788	709	752
12	---	---	---	---	---	---	728	649	691	810	703	745
13	---	---	---	---	---	---	745	665	712	983	814	900
14	---	---	---	---	---	---	759	689	729	974	871	916
15	---	---	---	---	---	---	765	688	732	940	841	900
16	---	---	---	---	---	---	750	700	723	965	844	907
17	---	---	---	639	578	616	760	691	725	937	856	903
18	---	---	---	663	596	629	808	687	748	941	865	895
19	---	---	---	660	614	635	801	698	762	918	842	881
20	---	---	---	639	593	610	802	734	771	958	858	910
21	---	---	---	617	578	595	803	697	750	984	873	878
22	---	---	---	605	568	590	781	694	755	982	858	920
23	---	---	---	---	---	---	798	715	765	976	887	934
24	---	---	---	---	---	---	798	701	748	965	876	931
25	---	---	---	---	---	---	---	---	---	957	831	902
26	---	---	---	---	---	---	---	---	---	936	825	884
27	---	---	---	---	---	---	---	---	---	948	840	886
28	---	---	---	---	---	---	---	---	---	920	842	886
29	---	---	---	---	---	---	---	---	---	954	834	894
30	---	---	---	---	---	---	634	594	607	986	830	891
31	---	---	---	---	---	---	702	594	629	919	806	859
MONTH	---	---	---	---	---	---	---	---	---	986	636	836

## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	883	741	827	---	---	---	549	495	520	665	627	653
2	865	741	823	---	---	---	509	481	494	625	564	591
3	973	827	880	---	---	---	510	482	497	608	555	583
4	875	788	833	---	---	---	574	510	539	631	589	609
5	883	772	830	---	---	---	573	543	558	662	612	634
6	873	768	831	---	---	---	590	544	570	649	594	618
7	892	802	848	---	---	---	613	562	585	594	477	525
8	892	791	841	---	---	---	623	570	598	492	414	454
9	912	819	866	---	---	---	635	562	595	557	490	521
10	909	808	865	---	---	---	590	559	571	657	556	599
11	929	827	885	---	---	---	642	573	610	644	613	632
12	976	827	893	---	---	---	622	567	586	648	626	639
13	987	809	898	---	---	---	573	523	551	656	561	596
14	949	790	896	---	---	---	539	447	486	559	526	540
15	986	827	915	590	557	578	540	475	506	577	533	553
16	976	800	915	602	538	564	547	484	507	605	566	583
17	959	798	892	625	558	594	582	491	524	617	590	604
18	877	780	828	640	612	627	607	514	560	630	600	609
19	863	775	828	618	594	610	626	574	599	623	600	612
20	816	707	752	600	578	589	614	553	588	---	---	---
21	742	657	703	635	593	618	610	553	584	---	---	---
22	685	598	644	666	602	637	599	545	567	---	---	---
23	632	576	611	682	634	649	593	552	571	---	---	---
24	595	563	579	647	628	638	620	571	589	---	---	---
25	601	558	576	666	610	636	656	602	622	---	---	---
26	704	557	643	647	613	629	660	630	646	---	---	---
27	708	668	691	681	578	612	660	623	642	---	---	---
28	702	603	647	675	597	633	665	610	638	---	---	---
29	---	---	---	679	625	646	649	606	626	---	---	---
30	---	---	---	677	643	654	667	633	647	---	---	---
31	---	---	---	648	546	600	---	---	---	---	---	---
MONTH	987	557	794	---	---	---	667	447	573	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	713	666	693	660	624	648	---	---	---
2	---	---	---	736	674	703	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	591	557	578	---	---	---	---	---	---	---	---	---
7	625	580	596	697	649	675	---	---	---	---	---	---
8	688	592	627	723	670	690	---	---	---	---	---	---
9	720	660	684	---	---	---	---	---	---	---	---	---
10	718	661	698	---	---	---	---	---	---	---	---	---
11	782	649	706	---	---	---	---	---	---	---	---	---
12	762	703	731	---	---	---	---	---	---	829	710	765
13	771	697	740	---	---	---	---	---	---	973	707	780
14	713	682	696	---	---	---	---	---	---	856	709	754
15	710	689	699	---	---	---	---	---	---	778	582	695
16	697	667	685	---	---	---	---	---	---	697	599	644
17	741	678	708	---	---	---	---	---	---	750	636	679
18	742	689	715	652	558	599	---	---	---	753	660	717
19	747	684	717	662	621	645	---	---	---	746	650	696
20	738	690	718	683	600	634	---	---	---	689	612	639
21	743	570	681	730	656	687	---	---	---	671	592	627
22	695	628	659	717	662	685	---	---	---	710	620	665
23	710	674	689	725	669	697	---	---	---	808	645	689
24	719	670	697	703	659	682	---	---	---	780	632	699
25	733	662	697	711	651	679	---	---	---	777	671	733
26	717	682	700	717	646	684	---	---	---	788	695	737
27	699	645	671	703	646	670	---	---	---	830	716	759
28	673	623	645	662	611	636	---	---	---	823	718	762
29	652	613	630	703	636	665	---	---	---	817	741	777
30	688	616	654	695	642	670	---	---	---	852	746	789
31	---	---	---	690	647	668	---	---	---	---	---	---

## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	7.6	7.4	7.5	---	---	---	---	---	---	7.9	7.8	7.8
2	7.5	7.3	7.4	---	---	---	---	---	---	7.9	7.8	7.9
3	---	---	---	---	---	---	---	---	---	7.8	7.8	7.8
4	---	---	---	---	---	---	---	---	---	7.9	7.8	7.8
5	---	---	---	---	---	---	---	---	---	7.9	7.8	7.8
6	---	---	---	---	---	---	8.0	7.8	7.8	7.9	7.8	7.9
7	---	---	---	---	---	---	7.8	7.7	7.8	7.9	7.8	7.9
8	---	---	---	---	---	---	7.7	6.8	7.7	7.9	7.8	7.8
9	---	---	---	---	---	---	7.7	7.6	7.6	8.0	7.8	7.9
10	---	---	---	---	---	---	7.8	7.6	7.7	8.0	7.9	8.0
11	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.8	7.8
12	---	---	---	---	---	---	7.7	7.6	7.6	8.1	7.7	7.8
13	---	---	---	---	---	---	7.8	7.6	7.7	8.2	7.4	7.8
14	---	---	---	---	---	---	7.9	7.8	7.8	7.6	7.4	7.5
15	---	---	---	---	---	---	7.9	7.8	7.8	7.5	7.3	7.4
16	---	---	---	---	---	---	7.8	7.7	7.8	7.5	7.3	7.4
17	---	---	---	7.8	7.5	7.6	7.8	7.7	7.7	7.9	7.3	7.7
18	---	---	---	7.7	7.5	7.6	7.9	7.8	7.8	7.8	7.7	7.7
19	---	---	---	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.8
20	---	---	---	7.7	7.6	7.7	7.9	7.7	7.8	7.9	7.7	7.8
21	---	---	---	7.6	7.5	7.5	7.8	7.7	7.7	8.0	7.8	7.9
22	---	---	---	7.5	7.4	7.5	7.9	7.7	7.8	7.9	7.7	7.8
23	---	---	---	---	---	---	7.8	7.8	7.8	8.0	7.8	7.9
24	---	---	---	---	---	---	7.8	7.7	7.8	7.9	7.8	7.8
25	---	---	---	---	---	---	---	---	---	7.8	7.7	7.7
26	---	---	---	---	---	---	---	---	---	7.8	7.6	7.7
27	---	---	---	---	---	---	---	---	---	7.7	7.6	7.6
28	---	---	---	---	---	---	---	---	---	7.8	7.6	7.7
29	---	---	---	---	---	---	---	---	---	7.9	7.7	7.8
30	---	---	---	---	---	---	7.9	7.7	7.8	7.9	7.7	7.8
31	---	---	---	---	---	---	7.8	7.7	7.7	7.9	7.7	7.7
MONTH	---	---	---	---	---	---	---	---	---	8.2	7.3	7.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.8	7.6	7.7	---	---	---	7.6	7.5	7.5	7.9	7.3	7.6
2	7.8	7.6	7.7	---	---	---	7.6	7.4	7.5	8.3	7.1	7.7
3	7.6	7.5	7.5	---	---	---	7.6	7.5	7.6	8.6	7.7	8.1
4	7.6	7.5	7.5	---	---	---	7.8	7.5	7.6	8.3	7.7	8.0
5	7.7	7.5	7.5	---	---	---	7.7	7.5	7.6	8.4	7.6	8.0
6	7.7	7.5	7.6	---	---	---	7.7	7.5	7.6	---	---	---
7	7.6	7.5	7.5	---	---	---	7.6	7.4	7.5	---	---	---
8	7.7	7.4	7.6	---	---	---	7.7	7.3	7.5	---	---	---
9	7.8	7.6	7.7	---	---	---	7.6	7.4	7.5	---	---	---
10	7.9	7.6	7.7	---	---	---	7.6	7.3	7.4	---	---	---
11	7.9	7.7	7.8	---	---	---	8.2	7.3	7.8	---	---	---
12	8.0	7.7	7.8	---	---	---	7.8	7.6	7.7	---	---	---
13	7.9	7.7	7.8	---	---	---	7.6	7.5	7.6	---	---	---
14	8.0	7.6	7.8	---	---	---	8.3	7.5	7.6	---	---	---
15	8.0	7.7	7.8	---	---	---	7.8	7.4	7.6	---	---	---
16	7.9	7.7	7.8	---	---	---	7.8	7.4	7.6	---	---	---
17	8.0	7.6	7.8	7.7	7.6	7.7	7.9	7.4	7.6	---	---	---
18	7.9	7.6	7.7	7.7	7.6	7.7	8.0	7.4	7.7	---	---	---
19	7.9	7.6	7.8	7.8	7.6	7.7	8.0	7.3	7.6	---	---	---
20	7.8	7.6	7.7	7.7	7.6	7.6	8.2	7.3	7.7	---	---	---
21	7.8	7.6	7.7	7.9	7.5	7.7	8.2	7.3	7.8	---	---	---
22	7.7	7.5	7.6	7.9	7.6	7.8	8.2	7.4	7.8	---	---	---
23	7.6	7.4	7.5	7.9	7.6	7.8	8.2	7.3	7.8	---	---	---
24	7.5	7.4	7.4	7.9	7.7	7.8	8.3	7.2	7.8	---	---	---
25	7.5	7.3	7.4	7.9	7.7	7.8	8.4	7.3	7.9	---	---	---
26	7.6	7.3	7.5	7.8	7.7	7.8	8.4	7.8	8.1	---	---	---
27	7.7	7.6	7.7	7.8	7.7	7.8	8.1	7.5	7.9	---	---	---
28	7.7	7.4	7.6	8.0	7.6	7.8	8.0	7.6	7.8	---	---	---
29	---	---	---	7.9	7.7	7.8	8.0	7.4	7.7	---	---	---
30	---	---	---	7.8	7.7	7.8	8.0	7.4	7.7	---	---	---
31	---	---	---	7.8	7.6	7.7	---	---	---	---	---	---
MONTH	8.0	7.3	7.7	---	---	---	8.4	7.2	7.7	---	---	---

## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	8.5	7.9	8.1	8.3	7.8	8.0	---	---	---
2	---	---	---	8.4	7.8	8.1	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	8.1	7.7	7.9	---	---	---	---	---	---	---	---	---
7	8.4	7.4	7.9	8.7	8.0	8.4	---	---	---	---	---	---
8	8.5	7.7	8.1	8.3	8.1	8.2	---	---	---	---	---	---
9	8.5	7.8	8.1	---	---	---	---	---	---	---	---	---
10	8.6	7.9	8.2	---	---	---	---	---	---	---	---	---
11	8.7	8.1	8.4	---	---	---	---	---	---	---	---	---
12	8.7	8.3	8.5	---	---	---	---	---	---	8.1	7.7	7.9
13	8.7	8.4	8.5	---	---	---	---	---	---	8.1	7.4	7.8
14	8.4	8.2	8.3	---	---	---	---	---	---	8.0	7.0	7.5
15	8.4	8.0	8.2	---	---	---	---	---	---	7.4	6.4	6.9
16	8.2	7.9	8.0	---	---	---	---	---	---	7.0	6.8	6.9
17	8.3	7.6	7.9	---	---	---	---	---	---	7.4	7.1	7.2
18	8.1	7.8	8.0	8.3	7.9	8.1	---	---	---	8.0	7.7	7.9
19	8.7	7.8	8.2	8.6	7.9	8.2	---	---	---	8.2	7.7	7.9
20	8.6	8.1	8.3	8.8	7.9	8.3	---	---	---	7.7	7.5	7.6
21	8.4	7.9	8.1	9.0	8.3	8.7	---	---	---	7.6	7.3	7.4
22	8.4	7.9	8.1	9.0	8.4	8.7	---	---	---	7.4	7.0	7.2
23	8.5	8.0	8.2	8.9	8.3	8.6	---	---	---	7.1	6.7	6.9
24	8.2	7.9	8.0	8.6	8.0	8.3	---	---	---	7.3	6.8	7.0
25	8.6	7.7	8.2	8.5	7.9	8.2	---	---	---	7.7	7.0	7.3
26	8.7	8.1	8.4	8.4	7.7	8.1	---	---	---	8.2	7.5	7.9
27	8.2	7.7	8.0	8.2	7.8	8.0	---	---	---	8.5	8.1	8.3
28	7.7	7.5	7.6	8.5	7.8	8.1	---	---	---	8.9	8.3	8.6
29	7.7	7.4	7.5	8.8	8.0	8.4	---	---	---	8.7	8.5	8.6
30	8.5	7.5	8.0	8.8	8.1	8.5	---	---	---	8.9	8.3	8.6
31	---	---	---	8.7	8.1	8.4	---	---	---	---	---	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	14.5	13.0	13.5	---	---	---	---	---	---	2.5	1.0	1.5
2	13.5	12.5	13.0	---	---	---	---	---	---	2.0	1.0	1.5
3	14.0	11.0	12.5	---	---	---	---	---	---	2.5	1.0	1.5
4	12.5	11.0	11.5	---	---	---	---	---	---	3.0	2.0	2.5
5	---	---	---	---	---	---	---	---	---	3.0	1.5	2.0
6	---	---	---	---	---	---	2.5	2.5	2.5	3.0	2.5	2.5
7	---	---	---	---	---	---	2.5	1.5	2.0	2.5	1.5	2.0
8	---	---	---	---	---	---	1.5	.5	1.0	2.5	1.5	2.0
9	---	---	---	---	---	---	.5	.0	.0	4.0	2.0	3.0
10	---	---	---	---	---	---	1.5	.5	1.0	4.0	3.0	4.0
11	---	---	---	---	---	---	.5	.0	.0	3.0	1.0	2.0
12	---	---	---	---	---	---	.5	.0	.5	5.0	.5	2.0
13	---	---	---	---	---	---	3.0	.5	1.5	5.5	1.0	3.5
14	---	---	---	---	---	---	3.5	3.0	3.5	2.5	1.5	2.0
15	---	---	---	---	---	---	3.5	3.0	3.5	1.5	.0	1.0
16	---	---	---	---	---	---	3.0	1.5	2.0	1.5	.0	1.0
17	---	---	---	3.5	2.0	3.0	3.0	1.5	2.0	1.5	.0	1.0
18	---	---	---	5.0	2.5	3.5	4.0	2.5	3.5	1.5	.5	1.0
19	---	---	---	6.5	5.0	5.5	4.0	3.0	3.0	2.0	.5	1.5
20	---	---	---	7.0	5.5	6.5	3.5	2.5	3.0	3.0	1.5	2.5
21	---	---	---	5.0	3.5	4.0	3.0	2.0	2.5	3.5	2.5	3.0
22	---	---	---	3.5	3.0	3.5	4.5	2.5	3.0	3.5	1.5	2.5
23	---	---	---	---	---	---	5.0	4.0	4.5	4.5	3.5	4.0
24	---	---	---	---	---	---	5.0	3.5	4.5	4.5	3.0	3.5
25	---	---	---	---	---	---	---	---	---	2.5	1.5	2.0
26	---	---	---	---	---	---	---	---	---	1.5	.5	1.0
27	---	---	---	---	---	---	---	---	---	1.0	.5	.5
28	---	---	---	---	---	---	---	---	---	4.0	1.0	2.5
29	---	---	---	---	---	---	---	---	---	4.5	3.0	4.0
30	---	---	---	---	---	---	.5	.0	.5	3.0	2.0	2.5
31	---	---	---	---	---	---	1.5	.0	1.0	2.5	1.0	2.0
MONTH	---	---	---	---	---	---	---	---	---	5.5	.0	2.0

## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	2.0	.5	1.5	---	---	---	3.5	3.0	3.0	11.0	9.0	10.0
2	2.0	.0	1.0	---	---	---	4.5	2.5	3.5	11.0	7.0	8.5
3	.0	.0	.0	---	---	---	4.0	3.0	3.5	13.0	8.0	10.5
4	.0	.0	.0	---	---	---	5.5	2.5	4.0	12.5	9.0	11.0
5	.5	.0	.0	---	---	---	5.5	4.0	5.0	12.5	9.5	11.0
6	1.0	.0	.5	---	---	---	4.5	3.0	4.0	12.0	10.5	11.0
7	.5	.0	.0	---	---	---	4.0	3.0	3.5	12.0	8.0	10.0
8	2.0	.0	1.0	---	---	---	6.5	2.5	4.5	14.5	8.0	11.0
9	3.0	2.0	2.5	---	---	---	6.0	3.0	4.5	13.5	9.5	11.5
10	4.0	2.5	3.0	---	---	---	4.5	2.5	3.5	14.5	10.0	12.0
11	4.0	3.0	3.5	---	---	---	8.0	3.5	6.0	15.5	11.0	13.5
12	4.5	3.5	4.0	---	---	---	7.0	4.5	5.5	14.5	13.0	14.0
13	4.5	3.5	4.0	---	---	---	4.5	4.0	4.5	14.5	11.0	13.0
14	6.0	3.5	4.5	---	---	---	5.0	.0	1.0	13.5	10.0	11.5
15	6.0	5.0	5.5	5.0	1.5	3.5	4.5	.0	2.0	13.0	8.5	10.5
16	5.5	5.0	5.5	3.5	1.0	2.5	6.0	1.5	3.5	13.5	9.5	11.5
17	6.0	4.0	5.0	4.0	3.0	3.5	6.0	1.5	4.0	15.0	12.5	14.0
18	5.5	4.0	5.0	4.0	3.0	3.5	7.0	2.5	5.0	14.0	12.5	13.0
19	6.0	4.5	5.5	3.5	2.5	3.0	8.5	3.5	6.0	12.5	12.0	12.0
20	5.5	4.5	5.0	2.5	1.5	2.0	9.5	4.5	7.0	---	---	---
21	5.5	4.0	5.0	3.5	1.0	2.0	11.5	6.0	9.0	---	---	---
22	5.0	3.5	4.0	4.5	1.5	3.0	11.5	8.0	10.0	---	---	---
23	3.5	2.5	3.0	5.0	1.5	3.5	12.0	8.5	10.0	---	---	---
24	3.0	1.5	2.0	5.0	2.5	3.5	12.5	8.0	10.5	---	---	---
25	3.0	.5	1.5	5.0	2.5	4.0	13.5	9.5	11.5	---	---	---
26	4.0	1.0	3.0	4.5	2.0	3.5	13.0	10.0	12.0	---	---	---
27	5.5	4.0	4.5	3.5	1.5	2.5	12.5	9.5	11.0	---	---	---
28	5.5	3.5	4.5	6.0	2.0	4.0	11.0	9.5	10.0	---	---	---
29	---	---	---	4.5	3.5	4.0	11.5	8.0	9.5	---	---	---
30	---	---	---	4.5	3.0	4.0	12.5	9.0	10.5	---	---	---
31	---	---	---	4.5	3.5	4.0	---	---	---	---	---	---
MONTH	6.0	.0	3.0	---	---	---	13.5	.0	6.5	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	21.0	18.5	19.5	19.0	17.0	18.0	---	---	---
2	---	---	---	21.5	18.5	20.0	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	16.5	14.0	16.0	---	---	---	---	---	---	---	---	---
7	17.5	14.0	16.0	21.5	18.0	19.5	---	---	---	---	---	---
8	17.5	15.0	16.5	19.5	19.0	19.0	---	---	---	---	---	---
9	19.0	15.0	17.0	---	---	---	---	---	---	---	---	---
10	19.0	15.5	17.5	---	---	---	---	---	---	---	---	---
11	19.5	16.5	18.0	---	---	---	---	---	---	---	---	---
12	19.5	17.0	18.0	---	---	---	---	---	---	16.5	14.0	15.0
13	19.0	17.5	18.0	---	---	---	---	---	---	15.5	12.5	14.0
14	19.0	17.0	18.0	---	---	---	---	---	---	14.0	12.0	13.0
15	18.5	16.0	17.5	---	---	---	---	---	---	13.0	12.0	12.5
16	17.0	15.5	16.0	---	---	---	---	---	---	13.5	12.5	13.0
17	17.5	13.5	15.5	---	---	---	---	---	---	15.0	12.0	13.5
18	16.5	15.0	15.5	20.5	19.0	20.0	---	---	---	16.5	14.0	15.0
19	19.0	14.5	16.5	23.0	19.0	21.0	---	---	---	14.0	11.5	12.5
20	18.5	16.0	17.5	23.5	19.5	21.5	---	---	---	11.5	10.5	11.0
21	19.5	16.5	18.0	24.0	21.0	22.5	---	---	---	10.5	9.5	10.0
22	22.5	19.0	21.0	24.5	21.5	23.0	---	---	---	10.0	9.0	9.5
23	22.0	19.5	21.0	23.5	20.5	22.0	---	---	---	12.0	8.0	10.0
24	20.5	18.0	19.0	21.5	19.0	20.5	---	---	---	13.5	9.5	11.5
25	22.0	17.5	19.5	21.5	18.0	20.0	---	---	---	15.0	11.5	13.5
26	22.0	19.5	20.5	21.0	17.5	19.5	---	---	---	16.5	12.5	14.5
27	20.0	16.5	18.0	20.0	17.5	18.5	---	---	---	17.5	14.0	15.5
28	16.5	16.0	16.0	19.5	17.0	18.0	---	---	---	17.5	15.0	16.0
29	16.0	15.5	15.5	22.0	17.5	19.5	---	---	---	16.5	15.5	16.0
30	20.5	15.5	18.0	21.5	18.5	20.0	---	---	---	18.0	15.0	16.5
31	---	---	---	21.0	18.0	19.5	---	---	---	---	---	---

## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.2	7.8	8.5	---	---	---	---	---	---	12.4	12.1	12.3
2	8.7	7.8	8.2	---	---	---	---	---	---	12.4	11.9	12.2
3	9.3	8.0	8.7	---	---	---	---	---	---	12.2	10.9	11.7
4	8.6	8.1	8.4	---	---	---	---	---	---	10.9	9.3	10.1
5	---	---	---	---	---	---	---	---	---	10.6	8.6	9.3
6	---	---	---	---	---	---	11.9	11.6	11.8	10.1	9.5	9.8
7	---	---	---	---	---	---	12.1	11.6	11.8	9.7	9.2	9.5
8	---	---	---	---	---	---	12.6	11.5	12.0	12.0	9.0	9.9
9	---	---	---	---	---	---	12.7	12.1	12.4	11.8	10.8	11.4
10	---	---	---	---	---	---	12.1	11.8	12.0	12.9	10.4	11.8
11	---	---	---	---	---	---	12.8	12.0	12.3	12.7	9.6	10.6
12	---	---	---	---	---	---	12.6	12.0	12.3	13.2	9.7	10.1
13	---	---	---	---	---	---	12.6	11.9	12.2	13.8	12.7	13.1
14	---	---	---	---	---	---	11.9	11.6	11.7	13.0	12.6	12.8
15	---	---	---	---	---	---	12.1	11.5	11.8	14.1	13.0	13.3
16	---	---	---	---	---	---	12.6	11.7	12.2	13.7	13.1	13.2
17	---	---	---	12.5	11.8	12.1	12.3	11.4	12.1	13.5	13.0	13.2
18	---	---	---	12.0	11.1	11.7	11.8	11.4	11.5	13.2	12.7	13.0
19	---	---	---	11.0	10.3	10.7	12.2	11.5	11.8	13.3	11.9	12.6
20	---	---	---	10.4	9.9	10.2	12.3	11.7	11.9	12.8	12.0	12.5
21	---	---	---	12.0	10.4	11.4	12.5	11.7	12.1	12.2	11.7	12.0
22	---	---	---	11.7	11.2	11.5	12.2	11.4	11.7	12.1	11.2	11.7
23	---	---	---	---	---	---	11.6	11.1	11.3	12.0	11.1	11.5
24	---	---	---	---	---	---	11.5	11.0	11.3	12.3	11.4	11.9
25	---	---	---	---	---	---	---	---	---	13.0	12.4	12.7
26	---	---	---	---	---	---	---	---	---	13.4	12.6	12.9
27	---	---	---	---	---	---	---	---	---	13.4	12.6	13.1
28	---	---	---	---	---	---	---	---	---	12.8	11.7	12.3
29	---	---	---	---	---	---	---	---	---	12.1	11.8	11.9
30	---	---	---	---	---	---	12.4	12.2	12.3	13.4	12.0	12.9
31	---	---	---	---	---	---	12.5	12.3	12.4	13.6	13.2	13.4
MONTH	---	---	---	---	---	---	---	---	---	14.1	8.6	11.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	13.3	12.5	13.0	---	---	---	11.3	11.1	11.2	12.3	8.4	10.0
2	13.8	12.5	13.1	---	---	---	12.1	11.0	11.5	10.9	8.0	9.1
3	13.6	13.1	13.3	---	---	---	12.3	11.1	11.7	11.7	7.3	9.2
4	13.4	12.9	13.1	---	---	---	12.8	11.2	12.0	13.2	6.9	9.8
5	13.9	12.8	13.1	---	---	---	12.7	10.7	11.7	12.3	7.7	9.8
6	13.9	13.4	13.7	---	---	---	12.7	11.1	11.9	11.2	7.1	8.3
7	13.5	13.0	13.3	---	---	---	13.5	11.0	12.3	11.4	7.4	9.1
8	13.0	12.2	12.8	---	---	---	13.6	11.5	12.5	9.9	7.3	8.5
9	13.4	12.0	12.5	---	---	---	13.5	10.5	11.9	12.0	7.0	9.3
10	13.6	12.7	13.1	---	---	---	14.0	11.8	12.7	12.2	6.5	9.1
11	13.5	12.5	12.9	---	---	---	13.8	11.1	12.4	11.9	6.0	8.8
12	13.4	12.4	12.7	---	---	---	12.6	10.2	11.4	10.2	5.9	7.5
13	13.3	12.5	12.8	---	---	---	12.0	10.4	11.2	10.6	5.9	7.7
14	13.5	12.4	12.8	---	---	---	13.5	11.1	12.4	12.1	5.7	8.6
15	13.1	11.9	12.5	11.2	10.1	10.7	14.1	12.2	13.0	14.1	7.7	10.3
16	13.1	11.8	12.3	11.9	11.0	11.4	14.2	11.7	12.7	12.2	7.3	9.5
17	13.8	12.9	13.3	11.6	10.6	11.1	14.8	11.1	12.9	11.4	6.9	9.0
18	13.5	12.3	13.0	11.5	10.6	11.0	14.2	11.2	12.6	10.5	7.2	8.5
19	13.1	12.2	12.6	12.4	10.8	11.5	14.1	10.3	12.1	9.0	7.9	8.3
20	13.4	12.4	12.9	12.8	11.4	12.1	14.6	9.4	12.0	---	---	---
21	13.2	12.4	12.8	13.0	11.7	12.3	14.4	9.2	11.6	---	---	---
22	12.8	12.2	12.5	12.6	11.7	12.1	13.8	7.9	10.7	---	---	---
23	13.5	12.2	12.6	12.8	11.6	12.1	14.5	7.6	11.0	---	---	---
24	13.4	13.0	13.1	12.7	11.8	12.2	13.7	7.9	10.8	---	---	---
25	13.3	12.5	12.9	12.7	11.5	12.0	11.3	6.6	8.9	---	---	---
26	13.5	11.2	11.9	12.8	11.2	11.9	10.0	6.0	7.8	---	---	---
27	11.5	10.4	11.0	12.9	11.8	12.3	11.1	6.5	8.6	---	---	---
28	---	---	---	12.8	11.6	12.2	10.8	7.7	9.1	---	---	---
29	---	---	---	12.8	11.3	12.0	11.6	7.8	9.5	---	---	---
30	---	---	---	13.2	11.4	12.2	11.9	7.7	9.7	---	---	---
31	---	---	---	12.0	11.3	11.6	---	---	---	---	---	---
MONTH	13.9	10.4	12.8	---	---	---	14.8	6.0	11.3	---	---	---

## VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	8.1	7.0	7.5	8.1	7.3	7.6	---	---	---
2	---	---	---	8.6	7.1	7.7	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	9.4	7.2	8.7	---	---	---	---	---	---	---	---	---
7	8.8	7.0	7.8	9.4	8.3	9.0	---	---	---	---	---	---
8	8.3	6.8	7.6	8.4	8.2	8.3	---	---	---	---	---	---
9	8.4	7.0	7.7	---	---	---	---	---	---	---	---	---
10	7.8	6.5	7.2	---	---	---	---	---	---	---	---	---
11	7.8	6.2	6.8	---	---	---	---	---	---	---	---	---
12	7.5	6.3	6.9	---	---	---	---	---	---	9.2	8.0	8.6
13	7.9	6.6	7.3	---	---	---	---	---	---	9.0	7.9	8.6
14	7.5	6.8	7.1	---	---	---	---	---	---	9.5	8.4	8.8
15	8.1	6.9	7.5	---	---	---	---	---	---	8.9	7.6	8.6
16	9.2	8.2	8.7	---	---	---	---	---	---	8.5	7.4	8.4
17	9.3	8.4	9.0	---	---	---	---	---	---	8.5	7.5	8.2
18	9.0	8.2	8.6	8.5	8.1	8.3	---	---	---	8.6	6.9	8.1
19	8.9	7.8	8.6	8.3	7.1	7.9	---	---	---	9.0	8.4	8.8
20	9.0	7.8	8.3	8.1	6.7	7.5	---	---	---	9.5	8.9	9.3
21	8.1	6.0	7.5	7.9	6.9	7.3	---	---	---	9.8	9.4	9.7
22	6.4	5.6	5.9	7.5	6.5	6.9	---	---	---	10.6	8.8	10.0
23	7.4	5.8	6.7	8.3	6.5	7.1	---	---	---	10.4	8.8	10.0
24	8.0	6.8	7.3	9.2	7.9	8.5	---	---	---	10.0	9.0	9.5
25	7.6	7.0	7.4	9.1	8.2	8.6	---	---	---	9.6	8.3	9.0
26	8.0	7.3	7.5	8.7	7.7	8.3	---	---	---	9.3	8.6	9.0
27	8.1	7.2	7.7	8.7	7.4	7.9	---	---	---	8.8	7.7	8.3
28	8.4	7.9	8.1	9.0	7.8	8.4	---	---	---	8.6	8.1	8.4
29	9.2	7.6	8.3	8.6	7.7	8.1	---	---	---	9.3	8.1	8.9
30	9.0	7.4	8.5	8.3	7.2	7.7	---	---	---	9.1	8.6	8.9
31	---	---	---	8.6	7.7	8.1	---	---	---	---	---	---

## CANNON RIVER BASIN

05353800 STRAIGHT RIVER NEAR FARIBAULT, MN

LOCATION.--Lat 44°15'29", long 93°13'51", in W½SE¼ sec.9, T.109 N., R.20 W., Rice County, Hydrologic Unit 07040002, on right bank 15 ft (5 m) downstream from highway bridge, 2.8 mi (4.5 km) upstream from Falls Creek and 3.2 mi (5.1 km) southeast of Faribault.

DRAINAGE AREA.--442 mi<sup>2</sup> (1,145 km<sup>2</sup>).

PERIOD OF RECORD.--October 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,034.58 ft (315.340 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--18 years, 257 ft<sup>3</sup>/s (7.278 m<sup>3</sup>/s), 7.90 in/yr (201 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,990 ft<sup>3</sup>/s (170 m<sup>3</sup>/s) May 1, 1973, gage height, 11.20 ft (3.414 m); maximum gage height, 12.74 ft (3.883 m) Mar. 5, 1974 (backwater from ice); minimum discharge, 10 ft<sup>3</sup>/s (0.28 m<sup>3</sup>/s) Oct. 27, 1976; minimum gage height, 3.66 ft (1.116 m) Nov. 27, 1976.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 1,500 ft<sup>3</sup>/s (42.5 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Mar. 3	0330	3,020 85.5	8.90 2.713	May 7	1130	2,130 60.3	7.83 2.387
Apr. 2	0115	2,140 60.6	7.84 2.390	*July 1	1500	*5,840 165	*11.11 3.386
Apr. 14	0845	2,340 66.3	8.09 2.466	Sept. 20	1045	2,050 58.1	7.72 2.353
Apr. 22	0300	2,650 75.0	8.46 2.579				

Minimum discharge, 38 ft<sup>3</sup>/s (1.08 m<sup>3</sup>/s) Aug. 20, gage height, 3.95 ft (1.204 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	238	300	310	238	130	1900	1990	622	429	4420	89	276
2	382	282	347	227	130	2740	2080	751	396	4790	83	206
3	492	252	387	220	130	2930	1870	799	382	3380	81	160
4	513	257	398	215	130	2800	1620	745	355	2960	77	131
5	480	244	377	205	130	2530	1410	649	333	2600	73	130
6	457	234	376	195	130	2410	1320	720	320	2170	69	126
7	478	228	386	190	130	2520	1360	1820	308	1760	65	127
8	451	219	379	185	130	2250	1290	1620	298	1460	60	111
9	418	217	319	175	130	1720	1200	1320	293	1220	59	108
10	371	634	310	172	130	1370	1180	1040	285	958	56	95
11	332	1080	300	170	130	1150	1310	837	273	731	54	94
12	304	1360	297	167	130	954	1320	728	264	570	51	88
13	281	1330	280	163	130	835	1910	770	253	475	50	86
14	265	1190	278	160	130	766	2270	731	265	405	48	82
15	252	999	254	157	133	739	2170	662	243	349	47	110
16	232	839	250	152	138	701	2040	582	223	308	46	171
17	216	699	250	150	147	653	1920	526	204	280	46	173
18	209	590	256	150	165	646	1770	489	200	259	45	159
19	216	604	204	150	180	703	1680	568	196	245	43	192
20	630	758	193	150	225	716	1820	691	198	243	41	1780
21	962	772	195	150	390	629	2280	721	196	211	46	1890
22	967	691	199	150	650	547	2540	641	191	187	44	1660
23	852	604	181	150	1000	501	2280	553	179	170	43	1390
24	720	529	215	150	990	477	1880	494	166	154	42	1140
25	604	471	761	147	940	475	1530	450	160	143	391	923
26	508	412	824	144	920	469	1280	414	158	132	240	755
27	442	389	680	140	920	454	1050	448	159	123	323	621
28	396	353	415	135	1360	428	869	461	171	121	321	502
29	372	359	272	130	---	459	766	475	198	117	271	408
30	340	346	270	130	---	484	682	478	292	107	415	335
31	314	---	262	130	---	1100	---	463	---	98	333	---
TOTAL	13694	17242	10425	5147	9978	37056	48687	22268	7588	31146	3652	14029
MEAN	442	575	336	166	356	1195	1623	718	253	1005	118	468
MAX	967	1360	824	238	1360	2930	2540	1820	429	4790	415	1890
MIN	209	217	181	130	130	428	682	414	158	98	41	82
CFSM	1.00	1.30	.76	.38	.81	2.70	3.67	1.62	.57	2.27	.27	1.06
IN.	1.15	1.45	.88	.43	.84	3.12	4.10	1.87	.64	2.62	.31	1.18
AC-FT	27160	34200	20680	10210	19790	73500	96570	44170	15050	61780	7240	27830
CAL YR 1982	TOTAL	137392	MEAN 376	MAX 2600	MIN 40	CFSM .85	IN 11.56	AC-FT 272500				
WTR YR 1983	TOTAL	220912	MEAN 605	MAX 4790	MIN 41	CFSM 1.37	IN 18.59	AC-FT 438200				



## ZUMBRO RIVER BASIN

05372995 SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN

LOCATION.--Lat 44°03'42", long 92°27'58", in NW¼NE¼ sec.23, T.107 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, on left bank 50 ft (15 m) downstream from 37th Street bridge, 0.2 mi (0.3 km) upstream from sewer plant, and 2.0 mi (3.2 km) downstream from Silver Lake Dam.

DRAINAGE AREA.--303 mi<sup>2</sup> (785 km<sup>2</sup>).

PERIOD OF RECORD.--March 1981 to current year.

GAGE.--Water-stage recorder. Datum of gage is 950.00 ft (289.560 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Slight regulation at times from Silver Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,450 ft<sup>3</sup>/s (154 m<sup>3</sup>/s) July 1, 1983, gage height, 14.93 ft (4.551 m); minimum discharge, 10 ft<sup>3</sup>/s (0.28 m<sup>3</sup>/s) Oct. 23, 1981, result of regulation; minimum gage height, 3.06 ft (0.933 m) Aug. 11, 1982.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 6, 1978, reached a stage of about 28.0 ft (8.53 m), on upstream side of bridge, discharge 30,500 ft<sup>3</sup>/s (864 m<sup>3</sup>/s). This is the highest known stage since at least 1908.

EXTREMES FOR CURRENT PERIOD.--Peak discharges above base of 1,300 ft<sup>3</sup>/s (36.8 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Mar. 4	0515	2,780 78.7	10.90 3.322	July 4	1130	3,300 93.5	11.79 3.594
Apr. 14	1700	1,940 54.9	9.16 2.792	Sept. 20	1815	2,250 63.7	9.76 2.975
July 1	2030	*5,450 154	*14.93 4.551				

Minimum discharge, 68 ft<sup>3</sup>/s (1.93 m<sup>3</sup>/s) Aug. 20-21, gage height, 3.32 ft (1.012 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	210	208	236	310	100	1330	913	407	280	2420	114	132
2	245	203	253	279	104	1790	877	669	264	2300	111	117
3	260	197	261	248	88	2010	797	574	272	895	109	106
4	240	194	240	251	97	2300	753	469	269	2210	104	100
5	230	182	305	229	103	1760	622	414	246	1040	100	151
6	219	174	411	229	112	1650	613	478	239	586	99	124
7	219	170	339	214	106	1730	718	757	226	485	94	111
8	223	167	275	199	109	1020	610	615	212	404	92	102
9	198	218	216	193	108	713	577	513	208	351	88	128
10	189	650	253	199	110	593	581	469	202	312	85	108
11	174	871	213	179	111	525	740	437	192	280	84	101
12	164	937	218	140	110	494	929	425	186	227	84	107
13	156	718	227	172	118	463	1100	594	187	227	82	97
14	149	478	233	171	124	451	1660	530	196	214	80	92
15	140	405	227	137	123	435	1410	435	189	200	77	131
16	133	368	215	138	125	420	1290	394	179	192	94	135
17	126	342	201	147	130	422	1100	366	173	185	88	141
18	123	324	210	119	138	511	997	359	176	181	80	126
19	236	332	205	133	173	513	947	448	177	185	76	374
20	787	357	194	134	254	461	930	496	178	183	71	1510
21	881	341	182	135	389	408	863	436	176	168	103	1020
22	480	304	188	130	534	373	768	384	168	157	86	494
23	372	285	186	133	684	352	673	348	161	151	77	376
24	322	275	301	131	646	343	597	321	155	143	73	308
25	289	250	455	118	457	337	548	305	152	140	287	254
26	266	238	367	105	352	335	501	289	148	134	222	223
27	247	220	323	100	317	337	462	310	161	130	176	203
28	249	245	994	118	501	326	438	332	183	130	146	184
29	267	236	599	135	---	334	430	316	204	144	127	170
30	243	234	401	125	---	342	398	311	243	133	169	163
31	218	---	363	112	---	479	---	305	---	121	158	---
TOTAL	8255	10123	9291	5163	6323	23557	23842	13506	6002	14628	3436	7388
MEAN	266	337	300	167	226	760	795	436	200	472	111	246
MAX	881	937	994	310	684	2300	1660	757	280	2420	287	1510
MIN	123	167	182	100	88	326	398	289	148	121	71	92
CFSM	.88	1.11	.99	.55	.75	2.51	2.62	1.44	.66	1.56	.37	.81
IN.	1.01	1.24	1.14	.63	.78	2.89	2.93	1.66	.74	1.80	.42	.91
AC-FT	16370	20080	18430	10240	12540	46730	47290	26790	11900	29010	6820	14650
CAL YR 1982	TOTAL	100823	MEAN 276	MAX 1700	MIN 19	CFSM .91	IN 12.38	AC-FT 200000				
WTR YR 1983	TOTAL	131514	MEAN 360	MAX 2420	MIN 71	CFSM 1.19	IN 16.15	AC-FT 260900				

## ZUMBRO RIVER BASIN

05374900 ZUMBRO RIVER AT KELLOGG, MN

LOCATION.--Lat 44°18'43", long 92°00'14", in SW¼ sec.22, T.110 N., R.10 W., Wabasha County, Hydrologic Unit 07040004, on right bank at downstream side of bridge on U.S. Highway 61, and 4 mi (6.4 km) above mouth.

DRAINAGE AREA.--1,400 mi<sup>2</sup> (3,630 km<sup>2</sup>).

PERIOD OF RECORD.--August 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 669.47 ft (204.054 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period and those for periods of no gage-height record, which are fair. Some regulation by powerplant upstream from station.

AVERAGE DISCHARGE.--8 years, 805 ft<sup>3</sup>/s (22.80 m<sup>3</sup>/s), 7.81 in/yr (198 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,800 ft<sup>3</sup>/s (476 m<sup>3</sup>/s) July 8, 1978, gage height, 13.70 ft (4.176 m); minimum daily, 140 ft<sup>3</sup>/s (3.96 m<sup>3</sup>/s) Dec. 3, 1980; minimum gage height, 1.69 ft (0.515 m) Dec. 2, 1980, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--A discharge of 33,000 ft<sup>3</sup>/s (935 m<sup>3</sup>/s) occurred on July 22, 1951, at station 05374500, 20 mi (32 km) upstream; this was the greatest since 1938.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 3,500 ft<sup>3</sup>/s (99.1 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage Height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Nov. 13	2000	4,500 127	7.23 2.204	Apr. 15	1900	5,490 155	8.31 2.533
Dec. 28	1245	3,590 102	6.49 1.978	May 9	0130	5,170 146	8.07 2.460
*Mar. 5	1015	*10,700 303	*11.13 3.392	July 6	0215	6,070 172	8.70 2.652
Apr. 3	0545	4,110 116	7.18 2.188	Sept. 22	1345	4,860 138	7.82 2.384

Minimum discharge, 468 ft<sup>3</sup>/s (13.3 m<sup>3</sup>/s) Aug. 13, gage height, 2.61 ft. (0.796 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	728	1010	1080	1350	580	2500	1790	1720	1260	1020	683	931
2	936	969	1060	1260	580	4960	3550	1700	1230	2100	675	901
3	1600	935	1050	1160	580	7390	3990	1980	1210	5060	675	844
4	1640	902	1060	1140	580	9670	3520	2000	1230	5310	678	791
5	1500	870	1090	1070	590	10300	3110	1810	1220	5500	668	757
6	1300	839	1120	1030	590	7000	2740	1770	1160	5290	653	739
7	1200	817	1210	978	590	5680	2580	2380	1110	3260	567	734
8	1110	775	1260	914	590	5500	2790	4210	1080	2490	544	719
9	1100	770	1180	898	590	4070	2650	4330	1050	2070	539	719
10	1100	938	1070	857	600	2860	2440	2850	1000	1710	544	712
11	1030	1440	1030	845	610	2310	2370	2410	979	1500	558	698
12	976	3090	980	822	610	2000	2770	2170	951	1370	612	686
13	922	4040	940	802	620	1850	3310	2100	937	1240	523	677
14	833	3770	910	770	640	1700	4210	2240	923	1130	553	667
15	821	2790	880	750	660	1600	5300	2190	930	1050	552	681
16	791	2200	851	730	680	1550	4770	1970	919	1000	611	714
17	773	1760	817	710	700	1550	4290	1820	886	1030	583	711
18	762	1700	785	690	720	1650	3910	1710	868	1030	561	722
19	752	1630	758	675	740	2000	3550	1660	851	956	556	749
20	913	1570	749	660	900	1900	3420	1740	849	970	547	1380
21	1580	1680	717	645	1200	1570	3670	1830	848	970	573	3390
22	2550	1710	683	630	1700	1440	4030	1750	839	881	581	4640
23	2280	1680	671	625	2200	1340	3920	1630	829	822	560	3500
24	1760	1540	748	620	2500	1240	3310	1550	794	794	562	2660
25	1510	1380	1320	610	2300	1180	2860	1460	775	776	575	2100
26	1360	1290	1770	600	1900	1170	2510	1370	767	753	637	1740
27	1210	1240	1710	590	1600	1160	2210	1330	771	739	1110	1460
28	1180	1130	2640	580	1500	1150	2030	1150	859	726	990	1300
29	1130	1100	2310	580	---	1150	1900	1300	829	726	961	1270
30	1090	1110	1770	580	---	1180	1810	1250	895	701	976	1170
31	1050	---	1470	580	---	1190	---	1280	---	694	962	---
TOTAL	37487	46675	35689	24751	27650	91810	95310	60660	28849	53668	20369	38762
MEAN	1209	1556	1151	798	988	2962	3177	1957	962	1731	657	1292
MAX	2550	4040	2640	1350	2500	10300	5300	4330	1260	5500	1110	4640
MIN	728	770	671	580	580	1150	1790	1150	767	694	523	667
CFSM	.86	1.11	.82	.57	.71	2.12	2.27	1.40	.69	1.24	.47	.92
IN.	1.00	1.24	.95	.66	.73	2.44	2.53	1.61	.77	1.43	.54	1.03
AC-FT	74360	92580	70790	49090	54840	182100	189000	120300	57220	106500	40400	76880
CAL YR 1982	TOTAL	374127	MEAN	1025	MAX	4720	MIN	295	CFSM	.73	IN	9.94
WTR YR 1983	TOTAL	561680	MEAN	1539	MAX	10300	MIN	523	CFSM	1.10	IN	14.92
									AC-FT	742100		
									AC-FT	1114000		

## WHITEWATER RIVER BASIN

233

 05376000 NORTH FORK WHITEWATER RIVER NEAR ELBA, MN  
(Hydrologic bench-mark station)

LOCATION.--Lat 44°05'30", long 92°03'57", in sec.7, T.107 N., R.10 W., Winona County, Hydrologic Unit 07040003, on left bank 2.3 mi (3.7 km) upstream from Middle Fork, 2.4 mi (3.9 km) west of Elba, and 3.5 mi (5.6 km) upstream from confluence with South Fork.

DRAINAGE AREA.--101 mi<sup>2</sup> (262 km<sup>2</sup>).

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1939 to September 1941, July 1967 to current year.

REVISED RECORDS.--WRD MN-74: 1967(M), 1969(M), 1971(M), 1972(M), 1973(M). WRD MN-80-2: 1978.

GAGE.--Water-stage recorder. Datum of gage is 769.60 ft (234.574 m) National Geodetic Vertical Datum of 1929. Prior to Oct. 12, 1939, nonrecording gage at site 2 mi (3.2 km) downstream at different datum. Oct. 12, 1939, to Sept. 30, 1941, water-stage recorder at site 600 ft (183 m) downstream at present datum. Prior to July 6, 1978, water-stage recorder at same site and present datum (gage destroyed by flood of July 1978), July 6 to Oct. 30, 1978, nonrecording gage at same site and present datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--18 years (water years 1940-41, 1968-83), 45.9 ft<sup>3</sup>/s (1.300 m<sup>3</sup>/s), 6.17 in/yr (157 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,100 ft<sup>3</sup>/s (456 m<sup>3</sup>/s) June 21, 1974, gage height, 16.32 ft (4.974 m) from floodmark; minimum, 11 ft<sup>3</sup>/s (0.31 m<sup>3</sup>/s) Feb. 21, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 929 ft<sup>3</sup>/s (26.3 m<sup>3</sup>/s) Mar. 4, gage height, 6.41 ft (1.954 m), no other peak above base of 600 ft<sup>3</sup>/s (17.0 m<sup>3</sup>/s); minimum discharge, 29 ft<sup>3</sup>/s (0.82 m<sup>3</sup>/s) Feb. 6, gage height, 3.85 ft (1.173 m).

 DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	38	43	52	32	182	93	82	82	84	50	54
2	41	37	43	48	35	267	82	102	77	75	48	53
3	39	36	43	44	33	420	82	96	80	110	48	52
4	36	35	42	45	32	622	85	85	91	267	47	50
5	36	35	43	44	32	351	79	80	78	100	46	55
6	35	34	49	45	29	271	77	86	74	79	45	56
7	34	34	47	43	30	224	82	191	74	73	45	52
8	33	34	41	41	31	143	79	159	71	70	44	50
9	34	36	38	41	30	105	78	119	71	67	44	50
10	34	62	42	42	31	92	81	111	68	65	44	50
11	33	75	39	41	32	89	89	104	67	63	43	49
12	33	78	38	37	32	83	93	108	66	62	43	48
13	33	66	38	38	33	77	114	140	65	59	43	48
14	32	59	40	40	34	75	199	120	63	59	43	48
15	32	51	40	36	35	71	159	107	63	59	42	50
16	32	52	38	36	36	68	175	102	62	59	66	53
17	32	50	37	36	37	68	153	98	61	59	75	52
18	32	49	37	36	38	72	140	95	60	55	53	52
19	34	49	40	36	40	76	131	111	60	57	48	62
20	47	51	37	36	44	69	128	117	60	62	46	369
21	48	48	36	36	47	63	121	102	60	57	51	136
22	42	45	38	36	63	62	114	99	60	55	51	92
23	40	43	38	36	86	63	109	93	56	54	49	79
24	38	39	42	36	95	62	104	88	57	52	47	72
25	36	41	88	35	84	61	100	86	56	52	69	68
26	36	40	69	34	74	60	97	83	56	52	93	64
27	36	37	56	34	66	60	92	83	57	52	78	62
28	37	41	179	35	68	60	88	85	60	52	62	60
29	41	42	74	36	---	60	89	87	63	52	56	58
30	40	42	59	35	---	59	86	83	72	50	58	57
31	38	---	57	34	---	64	---	85	---	50	58	---
TOTAL	1135	1379	1551	1204	1259	4099	3199	3187	1990	2162	1635	2101
MEAN	36.6	46.0	50.0	38.8	45.0	132	107	103	66.3	69.7	52.7	70.0
MAX	48	78	179	52	95	622	199	191	91	267	93	369
MIN	32	34	36	34	29	59	77	80	56	50	42	48
CFSM	.36	.46	.50	.38	.45	1.31	1.06	1.02	.66	.69	.52	.69
IN.	.42	.51	.57	.44	.46	1.51	1.18	1.17	.73	.80	.60	.77
AC-FT	2250	2740	3080	2390	2500	8130	6350	6320	3950	4290	3240	4170

CAL YR 1982 TOTAL 17022 MEAN 46.6 MAX 278 MIN 23 CFSM .46 IN 6.27 AC-FT 33760  
WTR YR 1983 TOTAL 24901 MEAN 68.2 MAX 622 MIN 29 CFSM .68 IN 9.17 AC-FT 49390

## WHITEWATER RIVER BASIN

05376000 NORTH FORK WHITEWATER RIVER NEAR ELBA, MN--Continued  
(Hydrologic bench-mark station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967 to current year.

REMARKS.--Letter K indicates non-ideal colony count.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 13...	1200	33	563	581	8.2	8.0	11.5	10.5	2.4	746	12.8
DEC 14...	1230	42	580	578	8.1	8.0	5.0	3.0	2.4	741	13.5
MAR 05...	1030	331	--	--	--	--	--	3.5	--	--	--
08...	1230	140	545	525	8.1	7.9	-2.0	4.0	17	739	13.0
APR 06...	1030	77	570	580	8.2	8.0	4.0	5.0	2.6	747	13.8
JUN 15...	1600	63	580	597	8.5	7.6	25.0	19.0	4.0	735	11.4
AUG 02...	1130	49	530	584	8.5	7.8	26.5	18.0	3.1	743	11.6

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINEITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT 13...	117	54	120	74	26	8.1	1.9	273	17	12	.20
DEC 14...	103	57	930	78	28	7.0	1.4	252	18	14	<.10
MAR 05...	--	--	--	--	--	--	--	--	--	--	--
08...	102	460	11000	78	21	5.7	3.5	226	19	15	.20
APR 06...	110	K6	980	76	24	5.7	1.8	254	20	15	.10
JUN 15...	128	28	2000	81	26	6.0	1.7	275	18	14	.20
AUG 02...	126	K150	750	76	27	6.3	1.8	276	19	14	.20

DATE	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, DIS- CHARGE, SUS- PENDEED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN (70331)
OCT 13...	16	330	3.20	.030	.30	.250	.250	.300	19	1.7	89
DEC 14...	16	327	5.20	<.100	<.10	.150	.130	.130	26	3.0	41
MAR 05...	--	--	--	--	--	--	--	--	581	519	99
08...	16	297	6.30	.190	.80	.260	.150	.160	74	28	99
APR 06...	12	347	5.90	.030	.50	.130	.100	.100	98	20	90
JUN 15...	15	378	5.20	.040	--	--	--	.200	17	2.9	92
AUG 02...	14	373	4.70	.020	.50	.180	.170	.130	31	4.1	68

## WHITEWATER RIVER BASIN

05376000 NORTH FORK WHITEWATER RIVER NEAR ELBA, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
MAR 08...	1230	<10	1	87	<1	<1	7	<3	8	15	2
AUG 02...	1130	100	1	83	<.5	<1	<1	<3	4	13	2

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
MAR 08...	<4	42	.2	<10	3	1	<1	97	<6	<3
AUG 02...	<4	21	<.1	10	4	<1	<1	14	<6	<3

DATE	TIME	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)
AUG 02...	1130	<7.6	.4	<4.6	.4	<4.5	.4	.89	1.2

## WHITEWATER RIVER BASIN

05376800 WHITEWATER RIVER NEAR BEAVER, MN

LOCATION.--Lat 44°09'03", long 92°00'19", in SW¼SE¼ sec.15, T.108 N., R.10 W., Winona County, Hydrologic Unit 07040003, on left bank at downstream side of bridge on County Road No. 30, 0.5 mi (0.8 km) above mouth of Beaver Creek, and 4.7 mi (7.6 km) north of Elba.

DRAINAGE.--271 mi<sup>2</sup> (702 km<sup>2</sup>).

PERIOD OF RECORD.--May 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 692.01 ft (210.925 m) National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1976, at datum 2.00 ft (0.610 m) higher.

REMARKS.--Records fair except those for winter period, which are poor.

AVERAGE DISCHARGE.--8 years (water years 1976-83), 157 ft<sup>3</sup>/s (4.446 m<sup>3</sup>/s), 7.87 in/yr (200 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,400 ft<sup>3</sup>/s (436 m<sup>3</sup>/s) July 6, 1978, gage height, 12.88 ft (3.926 m), present datum; minimum daily, 53 ft<sup>3</sup>/s (1.50 m<sup>3</sup>/s) Feb. 20 to Mar. 20, 1978; minimum gage height, 1.90 ft (0.579 m) Sept. 12, 1978.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since at least 1939, 19,200 ft<sup>3</sup>/s (544 m<sup>3</sup>/s) June 21, 1974, gage height, 13.00 ft (3.962 m), present datum, determined by contracted-opening measurement.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,490 ft<sup>3</sup>/s (42.2 m<sup>3</sup>/s) Mar. 3, gage height, 6.78 ft (2.067 m), no peak above base of 2,000 ft<sup>3</sup>/s (56.6 m<sup>3</sup>/s); minimum recorded discharge, 106 ft<sup>3</sup>/s (3.00 m<sup>3</sup>/s) Oct. 16-17, but may have been less during period of no gage height record Jan. 26 to Feb. 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	131	138	170	120	255	211	204	212	207	157	176
2	132	129	138	163	120	391	202	245	205	205	153	174
3	124	128	140	155	120	683	206	242	205	198	154	174
4	117	124	135	146	120	1230	205	226	210	417	153	173
5	116	124	143	144	120	917	195	220	200	245	147	182
6	121	124	161	145	121	753	195	225	195	214	145	185
7	116	125	155	138	122	672	204	350	193	202	143	178
8	116	126	138	133	124	542	196	380	193	193	140	174
9	120	128	169	133	132	470	198	290	193	187	137	172
10	118	174	145	137	131	400	204	269	188	182	140	173
11	118	208	194	135	129	350	219	254	185	178	141	168
12	116	238	284	145	129	310	223	265	185	173	140	168
13	115	210	200	144	128	275	254	306	182	171	140	167
14	112	193	136	129	128	255	423	290	181	167	141	168
15	112	176	132	128	128	240	451	258	180	165	141	172
16	106	174	128	128	128	230	446	246	179	164	158	184
17	106	165	128	128	128	220	402	237	178	167	183	184
18	111	159	130	128	131	242	366	233	178	161	167	178
19	122	156	129	127	132	241	342	255	174	163	156	186
20	168	158	126	126	135	220	324	264	172	175	151	464
21	169	154	121	122	142	203	304	250	171	166	158	314
22	144	146	124	121	165	194	288	242	167	162	164	250
23	134	144	126	122	198	187	273	232	165	161	156	224
24	132	131	147	122	208	184	255	225	165	160	153	210
25	129	136	213	121	184	181	242	223	163	157	182	200
26	126	137	168	120	171	177	232	216	163	157	232	194
27	126	127	244	120	165	178	222	215	174	157	203	187
28	128	139	529	120	170	172	214	217	177	159	187	184
29	140	142	279	120	---	172	215	219	177	161	177	181
30	145	142	239	120	---	169	209	216	194	168	180	179
31	136	---	188	120	---	176	---	216	---	159	182	---
TOTAL	3915	4548	5427	4110	3929	10889	7920	7730	5504	5701	4961	5923
MEAN	126	152	175	133	140	351	264	249	183	184	160	197
MAX	169	238	529	170	208	1230	451	380	212	417	232	464
MIN	106	124	121	120	120	169	195	204	163	157	137	167
CFSM	.47	.56	.65	.49	.52	1.30	.97	.92	.68	.68	.59	.73
IN.	.54	.62	.74	.56	.54	1.49	1.09	1.06	.76	.78	.68	.81
AC-FT	7770	9020	10760	8150	7790	21600	15710	15330	10920	11310	9840	11750
CAL YR 1982	TOTAL	55966	MEAN 153	MAX 578	MIN 92	CFSM .57	IN 7.68	AC-FT 111000				
WTR YR 1983	TOTAL	70557	MEAN 193	MAX 1230	MIN 106	CFSM .71	IN 9.69	AC-FT 139900				

## GARVIN BROOK BASIN

05378220 GARVIN BROOK AT STOCKTON, MN

LOCATION.--Lat 44°01'24", long 91°47'06", in SW¼SE¼ sec. 33, T.107 N., R.8 W., Winona County, Hydrologic Unit 07040003, on left bank 7 ft (2.1 m) downstream from Chicago and Northwestern Railroad bridge, 1.0 mi (1.6 km) west of Stockton, 0.9 mi (1.4 km) upstream from Stockton Valley Creek.

PERIOD OF RECORD.--March to September 1982 and February to August 1983.

GAGE.--Water-stage recorder with peak stage indicator. Datum of gage is 756 ft (230 m) National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good.

EXTREMES FOR CURRENT PERIOD.--February to August 1983: Maximum discharge during period, 168 ft<sup>3</sup>/s (4.76 m<sup>3</sup>/s) July 3, gage height, 4.15 ft (1.265 m); minimum discharge, 10 ft<sup>3</sup>/s (0.28 m<sup>3</sup>/s) Feb. 17, 18, 19; minimum gage height, 2.06 ft (0.628 m) May 10, 11, 12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13				---	14	15	16	13	18	16	
2	12				---	16	16	17	13	15	16	
3	12				---	44	15	16	13	29	---	
4	11				---	35	15	15	13	17	---	
5	11				---	19	15	15	13	15	---	
6	11				---	19	15	20	13	14	---	
7	---				---	18	15	17	13	13	---	
8	---				---	17	15	13	13	13	---	
9	---				---	17	16	12	13	13	---	
10	---				---	16	18	12	13	13	---	
11	---				---	16	18	12	13	13	---	
12	---				---	15	17	14	13	13	---	
13	---				---	15	18	14	13	13	---	
14	---				---	15	21	13	13	13	---	
15	---				---	15	18	13	13	13	---	
16	---				---	15	17	13	13	15	---	
17	---				10	15	16	13	13	15	---	
18	---				10	15	16	13	14	15	---	
19	---				11	15	16	14	14	16	---	
20	---				11	15	15	13	14	16	---	
21	---				11	15	15	13	14	15	---	
22	---				12	15	15	13	14	15	---	
23	---				12	15	15	13	14	15	---	
24	---				11	15	15	13	14	15	---	
25	---				11	14	15	12	14	15	---	
26	---				12	14	15	12	16	15	---	
27	---				13	14	15	13	16	16	---	
28	---				13	14	15	13	16	16	---	
29	---				---	14	15	13	16	17	---	
30	---				---	14	15	13	17	16	---	
31	---				---	15	---	13	---	16	---	
TOTAL	---				---	525	477	426	414	473	---	
MEAN	---				---	16.9	15.9	13.7	13.8	15.3	---	
MAX	---				---	44	21	20	17	29	---	
MIN	---				---	14	15	12	13	13	---	
AC-FT	---				---	1040	946	845	821	938	---	

## GARVIN BROOK BASIN

05378230 STOCKTON VALLEY CREEK AT STOCKTON, MN

LOCATION.--Lat 44°00'56", long 91°45'36", in SE¼NE¼, sec. 3, T.106 N., R.8 W., Winona County, Hydrologic Unit 07040003, on left bank at driveway to abandoned farmstead 100 ft (30 m) east of County Road, 0.9 mi (1.4 km) above mouth and 1.0 mi (1.6 km) south of Stockton.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1982 to August 1983 (no winter records).

GAGE.--Water-stage recorder. Datum of gage is 750 ft (229 m) National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 180 ft<sup>3</sup>/s (5.10 m<sup>3</sup>/s) May 31, gage height, 5.00 ft (1.524 m); minimum discharge, 7.3 ft<sup>3</sup>/s (0.21 m<sup>3</sup>/s) Aug. 12, gage height, 1.96 ft (0.597 m).

EXTREMES FOR CURRENT PERIOD.--October 1982 to August 1983: Maximum discharge during period, 98 ft<sup>3</sup>/s (2.78 m<sup>3</sup>/s) Mar. 3, gage height, 3.86 ft (1.177 m); minimum, 8.6 ft<sup>3</sup>/s (0.24 m<sup>3</sup>/s) June 19, gage height, 2.01 ft (0.613 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15				---	14	12	12	12	16	13	
2	12				---	15	13	13	12	14	13	
3	11				---	31	13	12	12	20	---	
4	11				---	23	12	11	12	16	---	
5	11				---	17	12	11	12	14	---	
6	11				---	18	12	13	11	14	---	
7	---				---	16	12	16	11	13	---	
8	---				---	15	12	13	11	13	---	
9	---				---	14	13	12	11	13	---	
10	---				---	14	14	12	11	13	---	
11	---				---	13	13	12	11	13	---	
12	---				---	13	13	14	11	13	---	
13	---				---	13	13	14	11	13	---	
14	---				---	13	17	13	11	13	---	
15	---				---	13	15	12	11	13	---	
16	---				10	13	14	12	11	13	---	
17	---				11	13	14	12	11	14	---	
18	---				10	13	13	12	12	14	---	
19	---				12	13	13	13	11	14	---	
20	---				12	12	12	12	12	16	---	
21	---				12	12	12	12	11	14	---	
22	---				14	12	12	13	12	13	---	
23	---				14	12	12	12	12	13	---	
24	---				12	12	12	13	12	13	---	
25	---				12	12	12	12	12	13	---	
26	---				11	12	12	12	14	13	---	
27	---				12	12	12	12	14	13	---	
28	---				14	12	12	12	13	13	---	
29	---				---	12	12	12	14	14	---	
30	---				---	12	12	12	14	13	---	
31	---				---	12	---	12	---	13	---	
TOTAL	---				---	438	382	385	355	427	---	
MEAN	---				---	14.1	12.7	12.4	11.8	13.8	---	
MAX	---				---	31	17	16	14	20	---	
MIN	---				---	12	12	11	11	13	---	
AC-FT	---				---	869	758	764	704	847	---	



## GARVIN BROOK BASIN

05378230 STOCKTON VALLEY CREEK AT STOCKTON, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--February 1982 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: February 1982 to September 1982.

COOPERATION.--Minnesota Pollution Control Agency.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
OCT					
06...	1230	9.7	16.0	480	69
06...	1317	9.7	16.0	--	12
06...	1319	9.7	16.0	--	18
06...	1321	9.7	16.0	--	25
06...	1333	9.7	16.0	--	31
FEB					
17...	1330	11	5.5	--	70
17...	1355	11	5.5	--	108
24...	1020	13	4.0	--	14
28...	1645	19	6.0	--	294
28...	1647	19	6.0	--	374

## GARVIN BROOK BASIN

05378235 GARVIN BROOK NEAR MINNESOTA CITY, MN

LOCATION.--Lat 44°04'16", long 91°45'51", in SE¼NE¼ sec. 15, T.107 N., R.8 W., Winona County, Hydrologic Unit 07040003, on left bank, 20 ft (6.1 m) downstream from County 23 bridge, 1.8 mi (2.9 km) south of Minnesota City, and 2.3 mi (3.7 km) upstream from Rollingstone Creek.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1982 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Records good except those for winter period, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 471 ft<sup>3</sup>/s (13.3 m<sup>3</sup>/s) Dec. 28, 1982, gage height, 3.53 ft (1.076 m); minimum 15 ft<sup>3</sup>/s (0.42 m<sup>3</sup>/s) Mar. 9, 1982, gage height, 0.75 ft (0.229 m), result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 471 ft<sup>3</sup>/s (13.3 m<sup>3</sup>/s) Dec. 28, gage height, 3.53 ft (1.076 m); minimum discharge, 16 ft<sup>3</sup>/s (0.45 m<sup>3</sup>/s) Dec. 14, 15, Apr. 5; minimum gage height, 0.82 ft (0.250 m) Jan. 18, Apr. 5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	31	30	30	30	49	36	36	34	43	35	36
2	30	31	30	30	30	51	36	40	34	38	34	36
3	29	30	29	29	30	98	39	37	34	59	36	37
4	28	30	28	30	30	93	37	36	34	63	35	38
5	28	29	34	29	30	57	30	37	33	57	35	42
6	29	29	34	30	30	50	27	40	33	40	36	40
7	30	30	31	28	30	46	35	53	33	37	36	40
8	29	29	29	28	30	42	35	42	33	37	37	40
9	29	31	29	29	30	40	37	40	33	36	37	40
10	30	51	28	30	30	37	40	40	32	35	37	38
11	29	39	28	28	31	37	40	39	32	35	38	38
12	29	72	28	27	30	37	38	45	33	35	37	39
13	30	39	27	27	31	37	41	45	33	34	39	39
14	29	36	27	27	31	36	54	40	33	34	40	40
15	30	35	26	28	31	37	45	39	32	34	38	42
16	29	34	27	31	32	37	42	39	33	34	38	44
17	29	34	27	33	33	38	41	38	32	38	41	42
18	30	33	27	32	34	40	40	38	33	35	40	41
19	31	34	27	32	38	36	40	40	33	36	38	82
20	68	33	27	32	43	35	39	38	32	44	37	58
21	40	31	26	31	42	35	39	37	32	39	40	52
22	36	30	26	31	62	34	38	38	32	38	40	48
23	35	30	27	31	56	34	38	36	32	37	38	45
24	34	29	30	31	42	34	38	37	33	36	39	43
25	33	29	36	30	34	35	38	36	32	36	44	40
26	33	29	29	30	34	35	38	35	34	35	45	39
27	32	28	34	31	37	34	36	36	38	36	42	38
28	33	30	130	31	58	34	36	36	36	29	40	37
29	35	30	43	31	---	34	37	37	36	27	39	37
30	31	30	37	31	---	34	36	35	39	36	40	36
31	31	---	31	30	---	35	---	35	---	35	39	---
TOTAL	1004	1006	1022	928	999	1311	1146	1200	1003	1188	1190	1267
MEAN	32.4	33.5	33.0	29.9	35.7	42.3	38.2	38.7	33.4	38.3	38.4	42.2
MAX	68	72	130	33	62	98	54	53	39	63	45	82
MIN	28	28	26	27	30	34	27	35	32	27	34	36
AC-FT	1990	2000	2030	1840	1980	2600	2270	2380	1990	2360	2360	2510
WTR YR 1983	TOTAL	13264	MEAN 36.3	MAX 130	MIN 26	AC-FT	26310					

## GARVIN BROOK BASIN

05378235 GARVIN BROOK NEAR MINNESOTA CITY, MN--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--March 1982 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March 1982 to September 1982.

COOPERATION.--Minnesota Pollution Control Agency.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
OCT				
20...	0830	79	5.0	516
20...	1130	102	--	719
FEB				
24...	1045	41	4.0	110
28...	1710	83	--	750
28...	1712	83	--	518

## GARVIN BROOK BASIN

05378300 STRAIGHT VALLEY CREEK NEAR ROLLINGSTONE, MN

LOCATION.--Lat 44°05'09", long 91°50'34", in SE¼NE¼ sec.12, T.107 N., R.9 W., Winona County, Hydrologic Unit 07040003, at bridge on County Highway, 0.2 mi (0.3 km) above mouth, and 1.5 mi (2.4 km) southwest of Rollingstone.

DRAINAGE AREA.--5.16 mi<sup>2</sup> (13.36 km<sup>2</sup>).

PERIOD OF RECORD.--Water years 1959-66 (annual maximums), 1967-70 (peaks above base), October 1970 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 723.85 ft (220.629 m) National Geodetic Vertical Datum of 1929. Nov. 6, 1958, to Oct. 20, 1966, crest-stage gage at present site and datum.

REMARKS.--Records good except those for period of no gage-height record, Nov. 21 to Dec. 5 and Dec. 28 to Feb. 23, which are fair.

AVERAGE DISCHARGE.--13 years (water years 1971-83), 2.35 ft<sup>3</sup>/s (0.067 m<sup>3</sup>/s), 6.18 in/yr (157 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,500 ft<sup>3</sup>/s (42.5 m<sup>3</sup>/s) July 5, 1978, gage height, 18.10 ft (5.517 m) from high-water mark in well; minimum observed, 0.12 ft<sup>3</sup>/s (0.003 m<sup>3</sup>/s) Aug. 5, 1960.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 74 ft<sup>3</sup>/s (2.10 m<sup>3</sup>/s) Dec. 27, gage height, 11.51 ft (3.508 m), no peak above base of 100 ft<sup>3</sup>/s (2.83 m<sup>3</sup>/s); minimum recorded discharge, 1.3 ft<sup>3</sup>/s (0.037 m<sup>3</sup>/s) Oct. 16, gage height, 9.71 ft (2.960 m), but may have been less during period of no gage height record Nov. 21 to Dec. 6 or Dec. 28 to Feb. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.1	1.7	1.8	2.3	1.6	3.7	2.2	2.2	2.2	3.3	1.8	1.8
2	1.9	1.7	1.9	2.1	1.6	4.3	2.3	2.6	2.2	2.9	1.8	1.8
3	1.8	1.7	2.0	2.0	1.6	7.6	2.3	2.2	2.3	8.4	1.8	1.8
4	1.7	1.7	2.2	2.0	1.6	10	2.3	2.1	2.2	3.0	1.8	1.8
5	1.7	1.7	2.4	1.9	1.6	5.3	2.3	2.0	2.1	2.4	1.8	2.2
6	1.8	1.6	2.4	1.9	1.6	4.1	2.3	2.5	2.1	2.2	1.7	1.9
7	1.7	1.6	2.2	1.8	1.6	3.2	2.3	4.5	2.1	2.0	1.7	1.8
8	1.6	1.6	2.1	1.7	1.6	2.9	2.3	2.6	2.0	2.0	1.7	1.8
9	1.8	2.3	2.0	1.7	1.6	2.6	2.4	2.4	2.0	1.9	1.6	1.8
10	1.8	3.6	2.0	1.7	1.6	2.5	2.6	2.3	2.0	1.9	1.7	1.8
11	1.7	3.6	1.8	1.7	1.6	2.4	2.6	2.2	2.0	1.8	1.7	1.8
12	1.7	6.9	1.8	1.7	1.6	2.3	2.5	2.9	2.0	1.8	1.6	1.9
13	1.7	2.8	1.9	1.7	1.6	2.3	2.8	2.7	2.0	1.8	1.6	1.8
14	1.6	2.6	2.0	1.7	1.6	2.3	5.2	2.4	2.0	1.7	1.6	1.8
15	1.6	2.4	2.0	1.6	1.6	2.2	3.6	2.3	2.0	1.7	1.7	2.2
16	1.4	2.3	1.9	1.6	1.6	2.2	3.2	2.3	2.0	1.7	1.8	2.1
17	1.4	2.1	1.9	1.6	1.6	2.4	2.9	2.3	2.0	1.7	1.8	2.0
18	1.4	2.1	2.0	1.6	1.6	2.6	2.7	2.3	2.2	1.7	1.8	1.9
19	2.0	2.1	1.9	1.6	1.7	2.5	2.7	2.6	2.2	1.8	1.8	4.2
20	4.2	2.2	1.9	1.6	1.8	2.4	2.6	2.5	2.0	1.8	1.7	5.3
21	2.4	1.9	1.8	1.6	1.9	2.3	2.5	2.5	2.0	1.8	2.2	2.2
22	2.2	1.8	2.0	1.6	2.0	2.3	2.5	2.4	2.0	1.7	1.9	2.0
23	2.1	1.8	3.8	1.6	2.1	2.3	2.5	2.3	2.0	1.7	1.8	1.8
24	1.9	1.8	3.5	1.6	2.2	2.2	2.4	2.5	2.0	1.7	1.8	1.8
25	1.9	1.8	2.4	1.6	2.1	2.1	2.3	2.4	2.2	1.7	2.2	1.7
26	1.8	1.8	3.1	1.6	2.0	2.0	2.3	2.2	2.3	1.7	2.3	1.7
27	1.8	1.8	1.8	1.6	2.4	2.0	2.3	2.2	2.6	1.8	1.9	1.6
28	1.9	1.8	5.0	1.6	4.5	2.1	2.4	2.4	2.9	1.8	1.8	1.6
29	2.0	1.8	3.3	1.6	---	2.1	2.4	2.5	2.9	1.9	1.8	1.6
30	1.8	1.8	2.9	1.6	---	2.0	2.3	2.4	3.3	1.8	1.9	1.6
31	1.7	---	2.6	1.6	---	2.2	---	2.3	---	1.7	1.8	---
TOTAL	58.1	66.4	88.5	53.1	51.5	93.4	78.0	76.0	65.8	66.8	55.9	61.1
MEAN	1.87	2.21	2.85	1.71	1.84	3.01	2.60	2.45	2.19	2.15	1.80	2.04
MAX	4.2	6.9	18	2.3	4.5	10	5.2	4.5	3.3	8.4	2.3	5.3
MIN	1.4	1.6	1.8	1.6	1.6	2.0	2.2	2.0	2.0	1.7	1.6	1.6
CFSM	.36	.43	.55	.33	.36	.58	.50	.48	.42	.42	.35	.40
IN.	.42	.48	.64	.38	.37	.67	.56	.55	.47	.48	.40	.44
AC-FT	115	132	176	105	102	185	155	151	131	132	111	121
CAL YR 1982	TOTAL 729.9		MEAN 2.00	MAX 18	MIN 1.1	CFSM .39	IN 5.26	AC-FT 1450				
WTR YR 1983	TOTAL 814.6		MEAN 2.23	MAX 18	MIN 1.4	CFSM .43	IN 5.87	AC-FT 1620				

## MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN

LOCATION.--Lat 44°03'21", long 91°38'16", in sec.23, T.107 N., R.7 W., Winona County, Hydrologic Unit 07040003, on right bank at Winona pumping station in Winona, 9.5 mi (15.3 km) upstream from Trempealeau River, and at mile 725.7 (1,167.7 km) upstream from the Ohio River.

DRAINAGE AREA.--59,200 mi<sup>2</sup> (153,300 km<sup>2</sup>), approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1928 to current year. Gage-height records collected in this vicinity since 1878 are contained in reports of Mississippi River Commission.

GAGE.--Water-stage recorder. Datum of gage is 639.64 ft (194.962 m) National Geodetic Vertical Datum of 1929. June 10, 1928, to Apr. 15, 1931, nonrecording gage at site 800 ft (244 m) upstream. Prior to Oct. 1, 1929, at datum 0.20 ft (0.06 m) higher and Oct. 1, 1929, to Apr. 15, 1931, at datum 0.12 ft (0.04 m) lower. Apr. 16, 1931, to Nov. 12, 1934, nonrecording gage at present site and datum. Since Mar. 31, 1937, auxiliary water-stage recorder 2.7 mi (4.3 km) upstream at tailwater of navigation dam 5A.

REMARKS.--Records good. Some regulation by reservoirs, navigation dams, and powerplants at low and medium stages. Flood flow not materially affected by artificial storage.

AVERAGE DISCHARGE.--55 years, 26,900 ft<sup>3</sup>/s (761.8 m<sup>3</sup>/s), 6.17 in/yr (157 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 268,000 ft<sup>3</sup>/s (7,590 m<sup>3</sup>/s) Apr. 19, 1965, gage height, 20.77 ft (6.331 m) from floodmark; minimum, 1,940 ft<sup>3</sup>/s (54.9 m<sup>3</sup>/s) Dec. 12, 1980, gage height, 3.96 ft (1.207 m) result of ice jam; minimum gage height, -3.38 ft (-1.030 m) Aug. 31, 1934 (prior to dam construction in 1936); minimum gage height since 1938, after completion of dam, 1.95 ft (0.594 m) Jan. 27, 1944.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 18, 1880, reached an elevation of 657.14 ft (200.296 m), discharge, 172,000 ft<sup>3</sup>/s (4,870 m<sup>3</sup>/s), from information by Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 138,000 ft<sup>3</sup>/s (3,910 m<sup>3</sup>/s) Mar. 12, gage height 14.53 ft (4.429 m); minimum daily, 17,700 ft<sup>3</sup>/s (501 m<sup>3</sup>/s) Jan. 18, Aug. 25; minimum recorded gage height, 5.08 ft (1.548 m) Aug. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	26700	52500	47500	34300	23200	39500	53100	82900	39600	50800	27300	25600		
2	28500	48100	45900	35200	23200	46500	54400	78900	37400	52000	24400	26900		
3	27000	47500	46700	33900	22900	53200	57300	75900	37400	52200	23100	29500		
4	25500	46100	48600	29300	22900	61600	59400	74300	37900	56100	25800	31900		
5	22000	45000	49400	28800	22300	67900	61400	72000	37800	59400	26100	31300		
6	21500	44600	50800	34900	21200	72400	62200	68100	37500	62300	25800	28100		
7	23700	41000	52000	42900	21300	76400	62900	67300	37400	64100	26300	24300		
8	27900	39200	52300	45900	21200	85600	64000	66900	37500	64500	26600	20800		
9	30900	38500	47900	42300	21200	104000	66400	67300	36400	66700	26400	19400		
10	37200	38100	42400	40000	21300	123000	69000	68100	35300	68900	25600	20000		
11	40300	41800	36000	38200	21200	134000	71600	68000	33900	71000	24900	25600		
12	41000	42500	32000	35500	21600	137000	76100	67600	31900	72500	23700	24900		
13	43400	46800	22800	32300	21900	132000	79400	66000	29100	72400	22400	25300		
14	52600	49200	21000	27100	22100	126000	85300	64700	27600	71000	20900	25300		
15	54800	51200	18100	28600	23400	118000	91000	62500	28200	68500	21600	24000		
16	55200	54300	23900	26000	24500	113000	96700	61100	28800	66200	21000	22600		
17	54700	56300	34900	18400	25400	110000	101000	61900	28500	64700	22300	23800		
18	54000	55400	39300	17700	25700	106000	106000	62000	28500	62700	24000	25200		
19	54000	53000	42100	22200	26900	101000	107000	61700	30500	58600	26700	27900		
20	53700	48300	42900	28300	27100	96600	106000	60400	32900	54600	27100	33400		
21	55800	48400	40300	30100	27000	91300	104000	60500	34200	52800	26100	37900		
22	55000	50700	36000	30200	26900	86400	102000	60500	35700	51400	25200	39100		
23	55900	51600	34100	30200	31600	81000	103000	59600	38500	48700	23600	43300		
24	57600	53400	32300	30100	34400	76400	103000	56500	41100	42100	19700	46400		
25	55800	57300	30700	30200	35600	72000	102000	54300	42400	36800	17700	45200		
26	61000	60500	33900	29100	35900	68600	99800	53800	42600	35400	19600	40000		
27	60700	60500	39700	29100	36100	66100	98000	51200	43000	33200	22500	34200		
28	51000	57000	43400	26400	36200	64200	94900	47500	44400	31000	23100	31500		
29	55500	53800	36700	23300	---	59300	90600	47200	45700	30700	23400	29900		
30	57600	50000	36300	22100	---	56000	87000	45300	48000	30400	23400	28200		
31	55100	---	34800	22400	---	54100	---	42500	---	29300	23800	---		
TOTAL	1395600	1482600	1194700	945000	724200	2679100	2514500	1936500	1089700	1681000	740100	891500		
MEAN	45020	49420	38540	30480	25860	86420	83820	62470	36320	54230	23870	29720		
MAX	61000	60500	52300	45900	36200	137000	107000	82900	48000	72500	27300	46400		
MIN	21500	38100	18100	17700	21200	39500	53100	42500	27600	29300	17700	19400		
CFSM	.76	.84	.65	.52	.44	1.46	1.42	1.06	.61	.92	.40	.50		
IN.	.88	.93	.75	.59	.46	1.68	1.58	1.22	.68	1.06	.47	.56		
AC-FT	2768000	2941000	2370000	1874000	1436000	5314000	4988000	3841000	2161000	3334000	1468000	1768000		
CAL YR 1982	TOTAL	14354700	MEAN	39330	MAX	137000	MIN	12100	CFSM	.66	IN	9.02	AC-FT	28470000
WTR YR 1983	TOTAL	17274500	MEAN	47330	MAX	137000	MIN	17700	CFSM	.80	IN	10.85	AC-FT	34260000

## MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May 1980 to current year.

WATER TEMPERATURES: October 1975 to current year.

SUSPENDED-SEDIMENT DISCHARGE: September 1975 to current year.

REMARKS.--For the winter period, daily sediment loads were estimated on the basis of water records and weekly sediment samples. Water temperature and specific conductance were obtained once daily during most of the open water period and weekly during the winter period. Letter K indicates a non-ideal colony count.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 500 micromhos, Apr. 3, 1983; minimum daily, 180 micromhos Sept. 24, 1980, May 9, 1981.

WATER TEMPERATURES: Maximum daily, 29.0°C July 10, 1976; minimum daily, 0.0°C many days each year.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 393 mg/L July 2, 1978; minimum daily mean, 1 mg/L many days during several years.

SEDIMENT LOADS: Maximum daily 65,300 tons (59,200 tonnes) July 2, 1978; minimum daily, 19 tons (17 tonnes) Dec. 12, 1980.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 500 micromhos Apr. 3; minimum daily, 240 micromhos Sept. 24, 25.

WATER TEMPERATURES: Maximum daily, 27.0°C July 20, 22, 24, 30; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 83 mg/L Mar. 9; minimum daily mean, 1 mg/L Jan. 19, 20.

SEDIMENT LOADS: Maximum daily, 26,400 tons (24,000 tonnes) Mar. 11; minimum daily, 60 tons (54 tonnes) Jan. 19.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 13...	1430	43400	--	330	336	8.1	7.9	11.0	13.0	6.6	748	9.1
JAN 10...	1600	--	39600	340	438	8.1	7.5	2.0	.5	4.4	740	13.2
APR 06...	1330	--	62000	495	482	8.2	7.8	5.0	4.0	7.0	750	13.2
AUG 02...	1530	--	24300	390	436	8.8	8.5	29.5	27.5	6.7	745	9.4

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINEITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT 13...	88	120	140	36	14	8.9	2.0	123	26	12	.20
JAN 10...	94	24	440	53	22	12	2.3	158	51	14	.20
APR 06...	102	K6	480	60	21	8.7	3.1	154	62	16	.20
AUG 02...	122	K14	210	53	20	8.9	2.6	171	45	15	.30

## MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L AS N) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L (T/DAY) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
OCT 13...	12	221	1.20	.060	.60	.150	.110	.100	24	2860	86
JAN 10...	15	283	2.70	.340	.90	.140	.110	.100	7	748	--
APR 06...	12	294	3.30	.100	.90	.100	.050	.040	18	3010	70
AUG 02...	13	316	1.10	.020	1.5	.150	.120	.080	15	984	96

DATE	TIME	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
OCT 13...	1430	60	3	50	<1	<1	6	<3	--	110	--
JAN 10...	1600	90	2	56	<1	<1	<1	<3	11	120	2
APR 06...	1330	10	1	55	<1	<1	<1	<3	2	76	2
AUG 02...	1530	<10	2	62	<.5	<1	<1	<3	8	10	3

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
OCT 13...	5	8	<.1	<10	--	<1	<1	88	<6	5
JAN 10...	9	28	<.1	<10	1	1	1	140	<6	5
APR 06...	18	11	.2	<10	5	1	<1	150	<6	<3
AUG 02...	10	2	.1	20	5	1	<1	140	<6	6

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	NUMBER OF SAM- PLING POINTS (00063)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
AUG 02...	1530	24300	27.5	4	0	1	30	77	90	94	99

## MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	325	320	470	---	---	---	480	460	480	460	400	340
2	330	330	460	---	425	410	490	460	485	470	400	320
3	340	320	440	---	---	410	500	460	480	470	400	300
4	340	330	440	---	---	390	490	455	460	460	400	285
5	340	350	430	425	---	390	480	460	460	450	390	310
6	340	360	440	---	---	390	480	460	460	440	380	310
7	330	360	430	---	---	370	480	460	450	435	380	320
8	320	360	440	---	---	335	485	450	440	440	380	325
9	320	360	460	---	430	315	490	430	420	440	370	325
10	330	360	480	340	---	300	490	420	420	440	370	320
11	320	340	470	---	---	320	485	420	425	410	380	320
12	320	350	470	445	---	360	480	420	420	410	380	320
13	335	360	460	---	---	350	460	420	420	400	390	320
14	340	360	460	---	---	370	450	425	420	400	390	320
15	360	310	460	---	---	370	450	420	420	400	380	320
16	370	280	---	---	425	380	460	430	410	400	370	320
17	380	300	---	---	---	380	450	440	410	415	380	320
18	370	340	---	---	---	385	440	440	420	---	370	320
19	370	350	---	435	---	390	450	450	420	---	360	320
20	360	370	---	---	---	390	460	460	440	430	360	320
21	340	370	---	---	---	400	460	460	440	---	360	300
22	330	360	440	---	---	410	460	460	440	420	360	300
23	320	360	---	---	390	420	465	470	430	---	360	280
24	310	350	---	---	---	425	470	470	430	440	360	240
25	290	360	---	---	---	430	470	460	440	---	350	240
26	290	390	---	430	---	445	470	470	440	---	340	280
27	290	440	---	---	---	450	470	470	460	440	340	290
28	310	450	---	---	---	460	470	470	460	---	340	290
29	310	470	410	---	---	470	460	470	450	---	330	290
30	310	480	---	---	---	480	460	480	460	400	330	300
31	310	---	---	---	---	475	---	490	---	---	330	---
MEAN	331	361	---	---	---	---	470	452	440	---	369	306

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.0	8.5	2.5	---	---	---	4.0	11.0	15.0	22.0	26.0	24.0
2	15.0	8.0	5.0	---	.0	2.0	5.0	11.0	16.0	23.0	26.0	25.0
3	15.0	8.0	4.0	---	---	3.0	4.0	11.0	16.0	23.0	26.0	25.0
4	15.0	6.0	2.0	---	---	3.0	4.0	11.0	16.0	22.0	25.0	25.0
5	15.0	5.0	2.0	.0	---	3.0	4.0	11.0	16.0	21.0	26.0	23.0
6	17.0	5.0	1.0	---	---	3.0	4.0	12.0	16.0	20.0	26.0	22.0
7	15.0	5.0	1.0	---	---	3.0	4.0	12.0	16.0	21.0	26.0	22.0
8	14.0	5.0	1.0	---	---	2.0	4.0	12.0	18.0	23.0	26.0	22.0
9	13.0	6.0	1.0	---	.0	1.0	5.0	12.0	19.0	24.0	25.0	23.0
10	13.0	5.5	1.0	.5	---	1.0	4.0	12.0	19.0	25.0	25.0	24.0
11	12.0	5.5	.5	---	---	2.0	4.0	14.0	21.0	25.0	24.0	22.0
12	12.0	4.0	.5	1.0	---	2.0	5.0	14.0	21.0	24.0	24.0	20.0
13	13.0	3.0	1.0	---	---	2.0	5.0	15.0	21.0	25.0	24.0	19.0
14	12.0	2.0	1.0	---	---	2.0	5.0	14.0	21.0	26.0	24.0	18.0
15	12.0	2.0	.5	---	---	2.0	4.0	13.0	20.0	26.0	24.0	18.0
16	11.0	2.0	---	---	.0	3.0	5.0	12.0	19.0	26.0	25.0	17.0
17	10.0	2.0	---	---	---	3.0	4.0	12.0	19.5	26.0	25.0	17.0
18	10.0	3.5	---	---	---	3.0	5.0	13.0	19.0	---	25.0	17.0
19	12.0	5.0	---	.0	---	2.0	5.0	13.0	19.0	---	26.0	16.0
20	10.0	7.0	---	---	---	2.0	6.0	13.5	21.0	27.0	26.0	15.0
21	8.0	5.0	---	---	---	1.0	7.0	15.0	22.0	---	25.0	13.0
22	7.5	5.0	.5	---	---	1.0	9.0	15.0	24.0	27.0	24.0	12.0
23	8.0	2.0	---	---	1.0	2.0	9.0	15.0	24.0	---	23.0	12.0
24	9.0	1.0	---	---	---	2.0	9.0	16.0	24.0	27.0	23.5	12.0
25	9.0	1.0	---	---	---	2.0	10.0	15.0	24.0	---	24.0	13.0
26	9.0	2.0	---	.0	---	2.0	11.0	15.0	24.0	---	24.0	15.0
27	9.0	1.0	---	---	---	2.0	11.0	16.0	23.0	26.0	25.0	16.0
28	9.0	1.0	---	---	---	3.0	11.0	16.0	20.0	---	25.0	17.0
29	8.5	2.0	.0	---	---	3.0	11.0	16.0	20.0	---	25.0	17.5
30	9.0	2.0	---	---	---	3.0	11.0	15.0	21.0	27.0	25.0	18.0
31	8.0	---	---	---	---	4.0	---	13.0	---	---	24.0	---
MEAN	11.5	4.0	---	---	---	---	6.5	13.5	---	---	25.0	18.5



SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	
	OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	12	865	14	1980	8	1030	11	1020	2	125	5	533	
2	17	1310	14	1820	9	1120	9	855	2	125	7	879	
3	16	1170	18	2310	10	1260	7	641	2	124	18	2590	
4	12	826	20	2490	9	1180	6	475	2	124	40	6650	
5	13	772	19	2310	9	1200	4	311	2	120	58	10600	
6	14	813	14	1690	7	960	5	471	2	114	57	11100	
7	17	1090	13	1440	6	842	5	579	2	115	49	10100	
8	20	1510	11	1160	8	1130	6	744	2	114	55	12700	
9	19	1590	12	1250	10	1290	7	799	2	114	83	23300	
10	23	2310	13	1340	9	1030	7	756	3	173	78	25900	
11	17	1850	16	1810	17	1650	5	516	5	286	73	26400	
12	16	1770	46	5280	7	605	3	288	6	350	62	22900	
13	22	2580	46	5810	4	246	3	262	8	473	54	19200	
14	25	3550	43	5710	3	170	2	146	10	597	33	11200	
15	27	3990	25	3460	4	195	2	154	11	695	31	9880	
16	34	5070	26	3810	4	258	2	140	13	860	32	9760	
17	27	3990	20	3040	4	377	2	99	11	754	27	8020	
18	20	2920	16	2390	4	424	2	96	10	694	29	8300	
19	22	3210	15	2150	4	455	1	60	8	581	30	8180	
20	58	8410	13	1700	4	463	1	76	7	512	24	6260	
21	31	4670	14	1830	4	435	2	163	5	364	21	5180	
22	29	4310	18	2460	4	389	2	163	3	218	18	4200	
23	42	6340	24	3340	6	552	2	163	2	171	18	3940	
24	25	3890	17	2450	8	698	2	163	2	186	13	2680	
25	27	4070	18	2780	9	746	2	163	3	288	12	2330	
26	27	4450	20	3270	11	1010	2	157	4	388	16	2960	
27	27	4430	16	2610	12	1290	2	157	4	390	18	3210	
28	22	3030	13	2000	14	1640	2	143	5	489	14	2430	
29	22	3300	9	1310	15	1490	2	126	---	---	13	2080	
30	21	3270	8	1080	14	1370	2	119	---	---	13	1970	
31	17	2530	---	---	12	1130	2	121	---	---	13	1900	
TOTAL	---	93886	---	76080	---	26635	---	10126	---	9544	---	267332	
	APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	11	1580	19	4250	17	1820	25	3430	14	1030	13	899	
2	12	1760	20	4260	17	1720	24	3370	15	988	15	1090	
3	15	2320	18	3690	18	1820	27	3810	15	936	16	1270	
4	19	3050	25	5020	14	1430	51	7720	16	1110	17	1460	
5	18	2980	22	4280	14	1430	55	8820	16	1130	19	1610	
6	15	2520	20	3680	15	1520	53	8920	15	1040	17	1290	
7	16	2720	22	4000	17	1720	46	7960	15	1070	15	984	
8	14	2420	28	5060	15	1520	41	7140	16	1150	14	786	
9	16	2870	37	6720	15	1470	36	6480	16	1140	12	629	
10	16	2980	36	6620	15	1430	37	6880	15	1040	12	648	
11	16	3090	25	4590	15	1370	35	6710	16	1080	16	1110	
12	18	3700	23	4200	14	1210	34	6660	14	896	15	1010	
13	21	4500	23	4100	16	1260	25	4890	14	847	14	956	
14	24	5530	25	4370	17	1270	22	4220	13	734	14	956	
15	40	9830	25	4220	19	1450	22	4070	13	758	15	972	
16	30	7830	23	3790	16	1240	26	4650	14	794	13	793	
17	28	7640	23	3840	16	1230	35	6110	15	903	13	835	
18	32	9160	24	4020	14	1080	37	6260	16	1040	15	1020	
19	25	7220	26	4330	18	1480	32	5060	16	1150	17	1280	
20	19	5440	25	4080	20	1780	27	3980	13	951	23	2070	
21	21	5900	22	3590	16	1480	23	3280	12	846	31	3170	
22	25	6880	22	3590	17	1640	21	2910	11	748	31	3270	
23	22	6120	23	3700	19	1980	22	2890	11	701	29	3390	
24	20	5560	24	3660	15	1660	23	2610	12	638	31	3880	
25	28	7710	24	3520	19	2180	21	2090	12	573	31	3780	
26	22	5930	24	3490	24	2760	19	1820	11	582	16	1730	
27	22	5820	23	3180	18	2090	16	1430	12	729	13	1200	
28	20	5120	24	3080	20	2400	15	1260	16	998	13	1110	
29	19	4650	22	2800	26	3210	15	1240	15	948	13	1050	
30	20	4700	21	2570	25	3240	14	1150	14	885	14	1070	
31	---	---	20	2300	---	---	14	1110	13	835	---	---	
TOTAL	---	147530	---	124600	---	51890	---	138930	---	28270	---	45318	
TOTAL LOAD FOR YEAR:			1020141 TONS.										

## ROOT RIVER BASIN

05384000 ROOT RIVER NEAR LANESBORO, MN

LOCATION.--Lat 43°44'58", long 91°58'43", in sec.1, T.103 N., R.10 W., Fillmore County, Hydrologic Unit 07040008, on left bank 0.5 mi (0.8 km) upstream from highway bridge, 1.2 mi (1.9 km) upstream from South Branch, and 2.5 mi (4.0 km) northeast of Lanesboro.

DRAINAGE AREA.--615 mi<sup>2</sup> (1,593 km<sup>2</sup>).

PERIOD OF RECORD.--February to November 1910, February 1911 to September 1914, July 1915 to September 1917, August 1940 to current year. Published as North Branch Root River near Lanesboro, 1910-17.

REVISED RECORDS.--WSP 355: 1912. WSP 1308: 1911(M).

GAGE.--Water-stage recorder. Datum of gage is 791.32 ft (241.194 m) National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1917, nonrecording gage at site 0.5 mi (0.8 km) downstream at datum about 1.5 ft (0.5 m) higher.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--48 years (water years 1912-14, 1916-17, 1941-83), 351 ft<sup>3</sup>/s (9.940 m<sup>3</sup>/s), 7.75 in/yr (197 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,100 ft<sup>3</sup>/s (626 m<sup>3</sup>/s) Mar. 29, 1962, gage height, 16.11 ft (4.910 m); maximum gage height, 17.83 ft (5.435 m) Mar. 1, 1965, from floodmark (backwater from ice); minimum discharge, 29 ft<sup>3</sup>/s (0.82 m<sup>3</sup>/s) Aug. 27, 1949, gage height, 1.08 ft (0.329 m); minimum gage height, 0.42 ft (0.128 m) Dec. 3, 1980.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 3,500 ft<sup>3</sup>/s (99.1 m<sup>3</sup>) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Mar. 4	2345	5,760 163	8.72 2.658	July 2	1445	*8,860 251	*11.40 3.475
Mar. 7	1230	5,840 165	8.79 2.679	July 4	0430	4,010 114	6.96 2.121
Apr. 15	0300	4,980 141	7.96 2.426	Sept. 21	0200	3,850 109	6.78 2.067

Minimum discharge, 145 ft<sup>3</sup>/s (4.11 m<sup>3</sup>/s) Feb 3, gage height, 0.93 ft (0.283 m), result of freezeup.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	524	469	483	703	190	1430	1620	693	692	2430	379	428
2	583	449	486	589	185	2920	1980	872	659	7170	367	413
3	618	430	512	538	178	4050	1720	967	646	2740	364	378
4	552	411	539	538	180	5600	1670	851	655	3750	358	361
5	482	396	571	501	180	4840	1420	770	628	2310	349	368
6	431	381	864	496	180	4060	1190	798	601	1540	343	378
7	400	374	1020	467	180	5280	1330	1400	580	1250	337	354
8	377	363	754	426	185	3060	1430	1800	563	1080	331	338
9	380	363	579	415	190	1790	1150	1390	550	949	323	338
10	375	593	548	433	195	1330	1120	1180	533	850	321	344
11	356	1570	522	405	200	1120	1240	1060	520	772	318	331
12	339	2230	485	325	205	1030	1840	1040	517	704	313	315
13	326	2370	511	320	215	950	1900	1150	503	649	309	308
14	315	1350	568	300	225	908	3270	1240	483	607	307	302
15	306	999	517	280	235	910	3770	1080	473	571	306	315
16	292	870	482	270	250	912	2970	983	454	548	312	358
17	283	772	442	255	270	864	2530	911	435	552	300	358
18	278	706	451	245	290	1170	2100	864	443	544	295	344
19	279	669	444	240	321	1570	1880	982	441	516	291	460
20	535	680	430	235	457	1340	1670	1150	432	513	283	2530
21	1380	701	395	230	606	1090	1470	1170	428	488	291	3130
22	1050	652	407	225	715	914	1300	1060	417	462	308	1570
23	748	596	405	220	1090	814	1180	956	401	448	297	1040
24	633	524	455	215	1150	768	1060	866	386	429	286	841
25	563	493	710	210	992	742	981	807	379	417	1090	720
26	513	512	680	205	840	723	911	746	378	407	1130	642
27	477	447	600	200	741	728	845	740	431	400	900	598
28	461	476	2570	200	714	682	784	766	549	397	636	557
29	497	525	1440	200	---	666	765	753	615	463	520	532
30	546	498	932	195	---	684	727	730	723	470	467	511
31	509	---	857	190	---	729	---	724	---	402	447	---
TOTAL	15408	21869	20659	10271	11359	53674	47823	30499	15515	34828	12878	19462
MEAN	497	729	666	331	406	1731	1594	984	517	1123	415	649
MAX	1380	2370	2570	703	1150	5600	3770	1800	723	7170	1130	3130
MIN	278	363	395	190	178	666	727	693	378	397	283	302
CFSM	.81	1.19	1.08	.54	.66	2.82	2.59	1.60	.84	1.83	.68	1.06
IN.	.93	1.32	1.25	.62	.69	3.25	2.89	1.84	.94	2.11	.78	1.18
AC-FT	30560	43380	40980	20370	22530	106500	94860	60490	30770	69080	25540	38600
CAL YR 1982	TOTAL	200119	MEAN 548	MAX 2920	MIN 140	CFSM .89	IN 12.10	AC-FT 396900				
WTR YR 1983	TOTAL	294245	MEAN 806	MAX 7170	MIN 178	CFSM 1.31	IN 17.80	AC-FT 583600				

## ROOT RIVER BASIN

05385000 ROOT RIVER NEAR HOUSTON, MN

LOCATION.--43°46'07", long 91°34'11", in SW¼NW¼ sec.33, T.104 N., R.6 W., Houston County, Hydrologic Unit 07040008, on right bank 0.2 mi (0.3 km) north of Houston and 1.6 mi (2.6 km) upstream from South Fork and 18.2 mi (29.3 km) upstream from mouth.

DRAINAGE AREA.--1,270 mi<sup>2</sup> (3,290 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--May 1909 to September 1917, May to November 1929, March 1930 to current year. Monthly discharge only for some periods, published in WSP 1308 (discontinued).

REVISED RECORDS.--WSP 895: Drainage area. WSP 1508: 1911-12. WSP 1628: 1948(P).

GAGE.--Water-stage recorder. Datum of gage is 667.00 ft (203.302 m) National Geodetic Vertical Datum of 1929. May 28, 1909, to Sept. 30, 1917, nonrecording gage at site 1.3 mi (2.1 km) downstream at different datum. May 4, 1929, to Sept. 27, 1933, nonrecording gage and Sept. 28, 1933 to June 26, 1980, recording gage at site 0.9 mi (1.4 km) upstream at datum 671.86 ft (204.783 m).

REMARKS.--Records good except those for winter periods, which are fair. Slight diurnal fluctuation at low flows caused by powerplants above station.

AVERAGE DISCHARGE.--61 years (water years 1910-17, 1931-83), 696 ft<sup>3</sup>/s (19.71 m<sup>3</sup>/s), 7.44 in/yr (189 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,000 ft<sup>3</sup>/s (1,050 m<sup>3</sup>/s) Apr. 1, 1952, gage height, 13.90 ft (4.237 m); maximum gage height, 18.32 ft (5.584 m) Mar. 2, 1965 (backwater from ice); minimum discharge, 65 ft<sup>3</sup>/s (1.84 m<sup>3</sup>/s) Dec. 26, 1933, Feb. 25, 1935.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 5,000 ft<sup>3</sup>/s (142 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Dec. 28	1800	5,360 152	10.40 3.170	July 3	0600	*9,500 269	*13.33 4.063
Mar. 5	0430	6,860 194	11.60 3.536	July 5	0045	5,540 157	10.56 3.219
Mar. 7	2315	7,090 201	11.77 3.587	Sept. 21	1000	6,440 182	11.28 3.438
Apr. 15	1245	6,240 177	11.13 3.392				

Minimum discharge, 658 ft<sup>3</sup>/s (18.6 m<sup>3</sup>/s) Jan. 27, gage height, 4.07 ft (1.241 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1290	1070	1070	1610	690	1800	1700	1460	1480	3100	951	960
2	1130	1040	1060	1420	690	3080	2850	1510	1420	7160	891	938
3	1220	1000	1070	1270	690	4560	2620	1700	1370	7230	907	912
4	1150	962	1100	1220	690	6250	2520	1620	1340	4830	907	876
5	1040	927	1200	1190	690	6420	2390	1520	1310	4530	886	860
6	969	895	1500	1150	690	5260	2120	1540	1270	3010	865	876
7	920	876	1750	1120	690	6110	2050	1850	1230	2480	855	850
8	850	859	1570	1050	695	5500	2350	2850	1200	2170	845	829
9	831	859	1270	1000	700	3300	2120	2500	1170	1950	829	819
10	826	1090	1210	1030	700	2560	2030	2190	1140	1780	814	819
11	797	2100	1130	1020	710	2210	2010	2010	1130	1660	809	799
12	762	3730	1100	933	720	2020	2430	1970	1110	1550	799	779
13	737	4480	1120	905	730	1890	2820	2090	1110	1470	794	754
14	720	2890	1170	974	740	1800	3440	2270	1090	1400	789	754
15	709	2180	1130	946	760	1760	5540	2130	1060	1350	784	759
16	693	1880	1070	855	780	1780	4090	1950	1050	1320	784	819
17	676	1710	1020	855	800	1760	3960	1860	1040	1300	809	840
18	671	1560	1000	779	840	1890	3350	1780	1030	1340	774	829
19	677	1470	1000	750	871	2470	3060	1840	1040	1270	764	954
20	1320	1440	984	740	976	2430	2790	2060	1040	1260	754	3430
21	1910	1430	948	730	1240	2090	2560	2150	1030	1210	750	5750
22	2190	1400	918	720	1430	1860	2360	2030	1020	1160	759	3500
23	1640	1300	933	710	1720	1710	2190	1960	1000	1120	759	2420
24	1410	1210	957	705	1910	1630	2030	1840	978	1090	745	2000
25	1270	1090	1190	700	1750	1580	1900	1840	964	1050	1040	1760
26	1170	1090	1350	695	1500	1540	1800	1670	956	1030	2260	1610
27	1100	1060	1250	689	1350	1530	1700	1620	1030	1000	1860	1500
28	1050	1020	3400	690	1340	1500	1610	1620	1610	990	1430	1400
29	1060	1110	3330	690	---	1430	1560	1610	1680	994	1200	1320
30	1130	1100	2110	690	---	1420	1510	1570	1820	1070	1080	1260
31	1150	---	1840	690	---	1440	---	1530	---	992	1010	---
TOTAL	33068	44828	41750	28526	27092	82580	75460	58140	35718	63866	29503	41976
MEAN	1067	1494	1347	920	968	2664	2515	1875	1191	2060	952	1399
MAX	2190	4480	3400	1610	1910	6420	5540	2850	1820	7230	2260	5750
MIN	671	859	918	689	690	1420	1510	1460	956	990	745	754
CFSM	.84	1.18	1.06	.72	.76	2.10	1.98	1.48	.94	1.62	.75	1.10
IN.	.97	1.31	1.22	.84	.79	2.42	2.21	1.70	1.05	1.87	.86	1.23
AC-FT	65590	88920	82810	56580	53740	163800	149700	115300	70850	126700	58520	83260

CAL YR 1982	TOTAL	397366	MEAN	1089	MAX	4480	MIN	365	CFSM	.86	IN	11.64	AC-FT	788200
WTR YR 1983	TOTAL	562507	MEAN	1541	MAX	7230	MIN	671	CFSM	1.21	IN	16.48	AC-FT	1116000

## ROOT RIVER BASIN

05385500 SOUTH FORK ROOT RIVER NEAR HOUSTON, MN

LOCATION.--Lat 43°44'19", long 91°33'50", in NE¼SW¼ sec.9, T.103 N., R.6 W., Houston County, Hydrologic Unit 07040008, on left bank 50 ft (15 m) downstream from bridge on State Highway 76, 0.5 mi (0.8 km) upstream from Badger Creek and 1.5 mi (2.4 km) south of Houston.

DRAINAGE AREA.--275 mi<sup>2</sup> (712 km<sup>2</sup>).

PERIOD OF RECORD.--January 1953 to September 1983 (discontinued).

REVISED RECORDS.--WSP 1388: 1953. WSP 1914: 1956(M), 1959(P), 1960.

GAGE.--Water-stage recorder. Datum of gage is 680.41 ft (207.389 m) National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter period and period of no gage-height record, Aug. 3 to Sept. 27, which are fair.

AVERAGE DISCHARGE.--30 years, 142 ft<sup>3</sup>/s (4.021 m<sup>3</sup>/s), 7.01 in/yr (178 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,000 ft<sup>3</sup>/s (312 m<sup>3</sup>/s) June 21, 1974, July 1, 1978; maximum gage height, 13.81 ft (4.209 m) June 21, 1974; minimum, 11 ft<sup>3</sup>/s (0.31 m<sup>3</sup>/s) Nov. 28, 1961, gage height, 1.47 ft (0.448 m); minimum gage height, 0.85 ft (0.259 m) Aug. 17, 1967.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 26, 1950, reached a stage of 12.81 ft (3.904 m), from floodmark, discharge, 7,040 ft<sup>3</sup>/s (199 m<sup>3</sup>/s).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 900 ft<sup>3</sup>/s (25.5 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Discharge (m <sup>3</sup> /s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft <sup>3</sup> /s)	Discharge (m <sup>3</sup> /s)	Gage height (ft)	Gage height (m)
Dec. 28	1215	932	26.4	7.36	2.243	Sept. 20	unknown	1,330	37.7	9.47	2.886
*July 1	1830	*1,400	39.6	*9.68	2.950						

Minimum daily discharge, 145 ft<sup>3</sup>/s (4.11 m<sup>3</sup>/s) Feb. 5; minimum gage height, 2.19 ft (0.668 m) Jan. 27 (temporary ice storage).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	160	185	209	259	150	341	279	266	287	986	236	355
2	160	185	211	245	150	370	281	282	279	707	230	320
3	159	182	207	234	147	413	296	275	277	550	227	290
4	158	179	199	231	146	505	303	260	269	508	230	280
5	157	178	216	226	145	470	295	256	262	429	230	270
6	162	177	266	218	147	443	296	268	260	388	228	250
7	166	176	235	219	150	458	301	319	258	364	226	240
8	162	175	226	210	152	395	296	342	249	346	224	225
9	165	178	216	209	154	358	296	302	245	333	221	215
10	168	243	215	211	155	331	313	296	241	322	218	210
11	164	264	210	208	156	315	320	290	238	313	217	205
12	161	573	210	192	157	307	318	303	242	304	216	202
13	159	416	210	190	160	299	324	334	251	296	215	200
14	159	338	205	185	165	295	360	340	237	292	213	200
15	158	306	205	180	165	289	377	326	232	285	211	200
16	156	284	203	175	170	299	367	318	227	281	220	220
17	156	267	199	170	176	317	358	309	222	283	213	225
18	156	255	200	170	181	329	345	304	226	319	210	220
19	161	248	199	165	190	326	333	329	228	286	204	220
20	293	247	193	165	221	318	322	322	225	284	205	900
21	280	236	189	165	274	315	313	305	230	274	210	780
22	227	225	188	160	322	308	305	335	224	264	215	620
23	215	218	189	160	343	299	298	341	218	261	225	510
24	207	209	194	160	302	294	290	318	215	254	220	430
25	200	206	220	160	245	290	286	319	215	248	215	350
26	195	204	216	155	220	286	281	308	216	246	450	310
27	191	200	211	155	212	288	274	306	268	242	750	290
28	192	208	730	152	248	285	269	307	452	244	630	280
29	202	237	360	150	---	279	268	305	336	251	520	275
30	195	215	300	150	---	275	266	303	470	250	460	270
31	187	---	280	150	---	274	---	296	---	241	400	---
TOTAL	5631	7214	7311	5779	5403	10371	9230	9484	7799	10651	8689	9562
MEAN	182	240	236	186	193	335	308	306	260	344	280	319
MAX	293	573	730	259	343	505	377	342	470	986	750	930
MIN	156	175	188	150	145	274	266	256	215	241	204	200
CFSM	.66	.87	.86	.68	.70	1.22	1.12	1.11	.95	1.25	1.02	1.16
IN.	.76	.98	.99	.78	.73	1.40	1.25	1.28	1.05	1.44	1.18	1.29
AC-FT	11170	14310	14500	11460	10720	20570	18310	18810	15470	21130	17230	18970
CAL YR 1982	TOTAL	71638	MEAN 196	MAX 730	MIN 110	CFSM .71	IN 9.69	AC-FT	142107			
WTR YR 1983	TOTAL	97124	MEAN 266	MAX 986	MIN 145	CFSM .97	IN 13.14	AC-FT	192600			

## IOWA RIVER BASIN

05457000 CEDAR RIVER NEAR AUSTIN, MN

LOCATION.--Lat 43°38'11", long 92°58'26", in NE¼Sec.15, T.102 N., R.18 W., Mower County, Hydrologic Unit 07080201, on left bank 200 ft (61 m) upstream from abandoned powerhouse, 500 ft (152 m) downstream from highway bridge, 1.1 mi (1.8 km) downstream from Turtle Creek, and 1.1 mi (1.8 km) south of Austin.

DRAINAGE AREA.--425 mi<sup>2</sup> (1,100 km<sup>2</sup>).

PERIOD OF RECORD.--May 1909 to September 1914, October 1944 to current year.

REVISED RECORDS.--WSP 1145: 1945, 1948.

GAGE.--Water-stage recorder. Datum of gage is 1,162.10 ft (354.208 m) National Geodetic Vertical Datum of 1929. May 1909 to April 1912, nonrecording gage in tailwater of powerplant 200 ft (61 m) downstream at datum 3.1 ft (0.94 m) lower. May 1912 to September 1914, nonrecording gage on highway bridge 500 ft (152 m) downstream at datum 1.1 ft (0.34 m) lower.

REMARKS.--Records good except those for winter periods, which are fair.

AVERAGE DISCHARGE.--44 years (water years 1910-14, 1945-83), 202 ft<sup>3</sup>/s (5.721 m<sup>3</sup>/s), 6.45 in/yr (164 mm/yr); median of yearly mean discharges, 190 ft<sup>3</sup>/s (5.38 m<sup>3</sup>/s), 6.07 in/yr (154 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft<sup>3</sup>/s (351 m<sup>3</sup>/s) July 17, 1978, gage height, 20.35 ft (6.203 m) from floodmark in well; no flow for several days in 1911.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 1,400 ft<sup>3</sup>/s (39.6 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Oct. 21	0945	2,050 58.1	7.16 2.182	Apr. 7	1200	1,580 44.7	6.25 1.905
Nov. 12	1930	2,180 61.7	7.41 2.259	Apr. 14	1300	3,310 93.7	9.40 2.865
Feb. 23	2145	1,540 43.6	6.15 1.875	July 2	0430	*8,690 246	*17.01 5.185
Mar. 7	0400	3,880 110	10.33 3.149	July 5	0400	2,380 67.4	7.75 2.362
Apr. 1	2230	2,800 79.3	8.53 2.600	Sept. 21	0400	3,120 88.4	9.04 2.755

Minimum discharge, 69 ft<sup>3</sup>/s (1.95 m<sup>3</sup>/s) Aug. 20, gage height, 2.33 ft (0.710 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	672	308	324	378	115	2040	2600	411	347	2820	117	202		
2	1110	297	376	317	110	3070	2580	508	319	6870	111	163		
3	1160	284	457	278	97	3080	2100	547	307	2340	111	141		
4	847	268	432	261	100	3060	1670	489	294	1780	108	127		
5	602	256	540	246	105	2670	1280	433	276	2010	104	161		
6	492	247	979	237	105	2970	1170	452	264	1050	100	177		
7	591	243	811	214	110	3650	1520	523	250	686	96	155		
8	622	238	578	211	111	2170	1240	624	240	544	94	136		
9	511	268	390	204	113	1160	999	533	232	453	90	141		
10	434	683	370	212	113	793	1030	459	219	394	91	132		
11	385	1360	340	176	113	669	1560	412	210	348	89	120		
12	347	1950	320	163	113	589	1590	421	216	314	86	115		
13	324	1830	305	160	116	555	2240	610	210	288	84	110		
14	301	1020	295	160	121	563	3110	669	237	262	82	106		
15	289	656	284	155	124	578	2390	549	225	243	81	131		
16	264	540	264	155	128	573	2390	459	210	227	81	155		
17	248	472	245	150	139	575	2140	406	197	218	82	179		
18	242	432	252	145	155	771	1800	381	204	212	77	168		
19	315	470	243	140	218	894	1530	626	202	205	77	430		
20	1300	642	229	140	568	743	1450	887	211	193	76	1870		
21	1980	651	220	140	1010	582	1450	690	213	183	106	2600		
22	1360	541	221	140	1310	491	1340	568	203	172	93	1200		
23	837	466	224	138	1500	445	1110	478	188	162	85	654		
24	632	370	264	138	1400	431	881	416	178	152	83	461		
25	526	368	535	131	979	433	725	373	176	146	156	377		
26	456	343	633	126	720	428	625	337	182	141	303	327		
27	408	299	506	125	586	392	545	394	218	136	416	293		
28	388	330	749	125	961	386	488	582	243	137	246	266		
29	373	334	628	125	---	414	464	482	240	137	187	247		
30	351	319	602	125	---	434	431	427	292	129	222	232		
31	322	---	500	120	---	1030	---	386	---	124	281	---		
TOTAL	18689	16485	13116	5535	11340	36639	44448	15532	7003	23076	4015	11576		
MEAN	603	550	423	179	405	1182	1482	501	233	744	130	386		
MAX	1980	1950	979	378	1500	3650	3110	887	347	6870	416	2600		
MIN	242	238	220	120	97	386	431	337	176	124	76	106		
CFSM	1.42	1.29	1.00	.42	.95	2.78	3.49	1.18	.55	1.75	.31	.91		
IN.	1.64	1.44	1.15	.48	.99	3.21	3.89	1.36	.61	2.02	.35	1.01		
AC-FT	37070	32700	26020	10980	22490	72670	88160	30810	13890	45770	7960	22960		
CAL YR 1982	TOTAL	151026	MEAN	414	MAX	2650	MIN	59	CFSM	.97	IN	13.22	AC-FT	299600
WTR YR 1983	TOTAL	207454	MEAN	568	MAX	6870	MIN	76	CFSM	1.34	IN	18.16	AC-FT	411500

## DES MOINES RIVER BASIN

## 05476000 DES MOINES RIVER AT JACKSON, MN

LOCATION.--Lat 43°37'10", long 94°59'10", in SE¼SW¼ sec.24, T.102 N., R.35 W., Jackson County, Hydrologic Unit 07100001, on right bank in storage room of city powerplant in Jackson.

DRAINAGE AREA.--1,220 mi<sup>2</sup> (3,160 km<sup>2</sup>), approximately.

PERIOD OF RECORD.--May 1909 to December 1913, August 1930 to current year (winter record incomplete prior to 1936). Published as Des Moines River near Jackson, 1930-35, as West Fork Des Moines River near Jackson, 1936-44, and as West Fork Des Moines River at Jackson, 1945-69.

REVISED RECORDS.--WSP 1115: 1942. WSP 1175: Drainage area. WSP 1238: 1950. WSP 1308: 1938(M).

GAGE.--Water-stage recorder. Datum of gage is 1,287.75 ft (392.506 m) National Geodetic Vertical Datum of 1929. May 31, 1909, to Dec. 20, 1913, nonrecording gage at site 0.6 mi (1.0 km) downstream at datum 0.99 ft (0.302 m) lower. Aug. 22, 1930, to Sept. 30, 1944, nonrecording gage at site 7 mi (11 km) upstream at datum 17.10 ft (5.212 m) higher. Oct. 1, 1944, to Oct. 26, 1949, nonrecording gage at site 600 ft (183 m) upstream at datum 10.64 ft (3.243 m) higher. Oct. 27, 1949, to Dec. 15, 1965, water-stage recorder 200 ft (61 m) downstream at present datum.

REMARKS.--Records good except those for winter period, which are fair. Regulation at times by Yankton, Long, Shetek, and Heron Lakes.

AVERAGE DISCHARGE.--48 years (water years 1936-83), 296 ft<sup>3</sup>/s (8.383 m<sup>3</sup>/s), 3.29 in/yr (84 mm/yr); median of yearly mean discharges, 227 ft<sup>3</sup>/s (6.43 m<sup>3</sup>/s), 2.53 in/yr (64 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,700 ft<sup>3</sup>/s (445 m<sup>3</sup>/s) Apr. 11, 1969, gage height, 19.45 ft (5.928 m); no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 500 ft<sup>3</sup>/s (14.2 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Gage height (ft) (m)
Oct. 10	2300	513 14.5	5.14 1.567	Mar. 8	1430	3,380 95.7	12.24 3.731
Oct. 24	1045	630 17.8	5.53 1.686	Mar. 14	0745	3,710 105	12.64 3.853
Nov. 12	0245	954 27.0	6.62 2.018	Apr. 14	2200	4,870 138	14.35 4.374
Nov. 20	0715	1,210 34.3	7.42 2.262	May 11	0100	2,980 84.4	12.14 3.700
Dec. 2	1330	1,160 32.9	7.29 2.222	July 5	1045	*5,210 148	*15.03 4.581
Dec. 15	0200	714 20.2	6.24 1.902				

a Backwater from ice.

Minimum discharge, 50 ft<sup>3</sup>/s (1.416 m<sup>3</sup>/s) Sept. 28, gage height, 3.26 ft (0.994 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	115	487	1100	300	213	1780	1600	2350	961	3440	732	159		
2	115	468	1140	305	213	1950	1880	2440	924	3420	666	154		
3	115	462	1060	310	213	2130	2110	2420	888	3750	584	148		
4	143	456	1020	320	175	2440	2250	2350	843	4470	561	142		
5	173	413	976	305	135	2560	2360	2240	792	5090	501	137		
6	210	381	927	280	140	2770	2500	2230	752	4770	453	132		
7	424	410	783	260	165	3070	2680	2350	717	4360	421	124		
8	363	398	636	240	170	3320	2840	2540	681	4190	387	117		
9	436	398	450	230	175	2760	2900	2820	639	3810	352	106		
10	501	580	450	220	175	2170	3020	2910	603	3430	320	109		
11	498	776	455	220	180	2140	3160	2940	576	3080	297	103		
12	489	944	445	185	190	2430	3480	2880	558	2800	267	97		
13	456	715	500	145	205	3260	4270	2860	567	2700	242	91		
14	442	663	595	220	210	3570	4630	2750	741	2480	227	82		
15	407	742	685	245	230	3130	4670	2670	951	2300	220	93		
16	390	954	670	225	260	2850	4400	2450	1040	2080	215	103		
17	366	1000	600	215	330	2640	4480	2250	1110	1910	217	86		
18	352	1070	550	213	410	2520	4420	2090	1220	1830	206	88		
19	355	1110	535	213	535	2350	4250	1990	1330	1740	197	86		
20	445	1190	500	213	755	2200	4020	1900	1740	1650	184	86		
21	516	1180	470	213	835	2060	3810	1820	2270	1550	163	80		
22	558	1190	445	213	865	1940	3580	1730	2660	1470	153	77		
23	597	1090	435	213	981	1830	3380	1640	2600	1410	141	70		
24	627	762	430	213	1080	1720	3200	1530	2400	1320	133	63		
25	630	720	435	213	1170	1630	3040	1460	2310	1230	137	59		
26	624	1030	405	213	1160	1560	2920	1360	2220	1140	135	56		
27	624	1100	365	213	1320	1490	2760	1280	2160	1060	145	53		
28	621	1090	385	213	1630	1400	2720	1220	2360	985	154	51		
29	609	1130	320	213	---	1380	2600	1140	2480	921	169	73		
30	585	1110	225	213	---	1330	2460	1070	2760	858	174	91		
31	543	---	225	213	---	1380	---	1010	---	798	168	---		
TOTAL	13329	24019	18217	7207	14120	69760	96390	64690	41853	76042	8921	2916		
MEAN	430	801	588	232	504	2250	3213	2087	1395	2453	288	97.2		
MAX	630	1190	1140	320	1630	3570	4670	2940	2760	5090	732	159		
MIN	115	381	225	145	135	1330	1600	1010	558	798	133	51		
CFSM	.35	.66	.48	.19	.41	1.84	2.63	1.71	1.14	2.01	.24	.08		
IN.	.41	.73	.56	.22	.43	2.13	2.94	1.97	1.28	2.32	.27	.09		
AC-FT	26440	47640	36130	14300	28010	138400	191200	128300	83020	150800	17690	5780		
CAL YR 1982	TOTAL	144266.2	MEAN	395	MAX	1190	MIN	5.0	CFSM	.32	IN	4.40	AC-FT	286200
WTR YR 1983	TOTAL	437464.0	MEAN	1199	MAX	5090	MIN	51	CFSM	.98	IN	13.34	AC-FT	867700

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements made at miscellaneous sites for both low flow and high flow are given in a third table.

#### Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow partial-record stations are given in the following table. These measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream when continuous records are available, will give a picture of the low-flow potentiality of a stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same site.

#### Discharge measurements made at low-flow partial-record stations during water year 1983

					Measurements	
Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Discharge (ft <sup>3</sup> /s)
Rum River basin						
05284970	Lower Stanchfield Creek near Grandy, MN	Lat 45°37'50", long 93°13'46", in SW¼SE¼ sec.5, T.36 N., R.23 W., Isanti County, Hydrologic Unit 07010207, at bridge on County Highway 6, at Little Stanchfield Lake, and 1.9 miles southwest of Grandy.	40.9	1969-70, 1974, 1976, 1979, 1983	9-29-83	9.78
Minnesota River basin						
05302980	Lake Emily outlet near Hancock, MN	Lat 45°30'56", long 95°41'45", in SE¼SW¼ sec.28, T.124 N., R.40 W., Pope County, Hydrologic Unit 07020005, at culvert on county road, 4.9 miles east of Hancock.	260	1969-70, 1973-74, 1980, 1983	9-19-83	19.7
05303350	East Branch Chippewa River near Swift Falls, MN	Lat 45°22'35", long 95°24'51", in SW¼NW¼ sec.14, T.122 N., R.38 W., Swift County, Hydrologic Unit 07020005, at bridge on County Highway 28, 1.7 miles southeast of Swift Falls.	200	1969-70, 1973-74, 1980-81, 1983	9-19-83	50.9
05303400	Mud Creek near Swift Falls, MN	Lat 45°21'54", long 95°22'34", in SW¼NW¼ sec.19, T.122 N., R.37 W., Swift County, Hydrologic Unit 07020005, at bridge on County Highway 87, 3.4 miles southeast of Swift Falls.	114	1969-70, 1973-74, 1976, 1980, 1983	9-19-83	38.1
05303430	Mud Creek near Benson, MN	Lat 45°18'46", long 95°32'29", on line between secs.2 and 3, T.121 N., R.39 W., Swift County, Hydrologic Unit 07020005, at bridge on county road, 2.9 miles east of Benson.	85.0	1969-70, 1973-74, 1976, 1980, 1983	9-19-83	17.9
05304000	Shakopee Creek near Benson, MN	Lat 45°12'50", long 95°38'10", in SE¼ sec. 11, T.120 N., R.40 W., Swift County, Hydrologic Unit 07020005, at bridge on county road, 1.5 miles upstream from mouth, and 7 miles southwest of Benson.	352	1949,54#, 1955, 1957, 1969-70, 1973-74, 1983	9-20-83	85.3
05304800	Dry Weather Creek near Montevideo, MN	Lat 45°03'00", long 95°46'00", in NE¼NW¼ sec.11, T.118 N., R.41 W., Chippewa County, Hydrologic Unit 07020005, at bridge on county road, 7.4 miles northwest of Montevideo.	105	1969-70, 1973-75, 1980-81, 1983	9-20-83	1.76
05311100	Palmer Creek near Granite Falls, MN	Lat 44°50'54", long 95°33'47", in SW¼SW¼ sec.16, T.116 N., R.39 W., Chippewa County, Hydrologic Unit 07020004, at bridge on county road, 2.5 miles north of Granite Falls.	34.2	1969-70, 1974, 1976, 1978-81, 1983	9-20-83	0.77

"See footnotes at end of table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1983-Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
Minnesota River basin--Continued						
05313670	Hawk Creek near Clara City, MN	Lat 44°58'41", long 95°21'40", on line between sec.31, T.118 N., R.37 W., and sec.6, T.117 N., R.37 W., Chippewa County, Hydrologic Unit 07020004, at bridge on county road, 1.5 miles north of Clara City.	197	1969, 1974-78, 1980-81, 1983	9-20-83	31.1
05314520	Spring Creek near Maynard, MN	Lat 44°51'16", long 95°26'30", in SW¼NW¼ sec.16, T.116 N., R.38 W., Renville County, Hydrologic Unit 07020004, at culvert on farm road 75 ft upstream from mouth, and 3.5 miles southeast of Maynard.	162	1969-70, 1974-76, 1979-81, 1983	9-20-83	6.04
05314700	Sacred Heart Creek near Delhi, MN	Lat 44°40'41", long 95°14'43", in NW¼NE¼ sec.24, T.114 N., R.37 W., Renville County, Hydrologic Unit 07020004, at bridge on County Highway 15, 4.8 miles northwest of Delhi.	42.7	1969, 1974-81, 1983	5- 9-80 9-12-83	3.11 0.39
05314750	Middle Creek near Delhi, MN	Lat 44°37'25", long 95°09'37", in SE¼NE¼ sec.3, T.113 N., R.36 W., Renville County, Hydrologic Unit 07020004, at bridge on County Highway 15, 0.3 mile upstream from mouth, and 2.8 miles northeast of Delhi.	13.1	1969, 1974-81, 1983	9-12-83	0.32
05314800	Smith Creek near North Redwood, MN	Lat 44°36'21", long 95°07'10", in NE¼SE¼ sec.12, T.113 N., R.36 W., Renville County, Hydrologic Unit 07020004, at bridge on County Highway 15, 0.7 mile upstream from mouth, and 3 miles northwest of North Redwood.	14.6	1969, 1974-81, 1983	9-12-83	0.90
05316840	Cottonwood River near Tracy, MN	Lat 44°20'41", long 95°36'50", on line between secs.11 and 12, T.110 N., R.40 W., Lyon County, Hydrologic Unit 07020008, at bridge on County Highway 11, 7.2 miles north of Tracy.	76.7	1968-69, 1973-76, 1980-81, 1983	9-12-83	3.50
05316870	Plum Creek near Walnut Grove, MN	Lat 44°16'09", long 95°25'39", on line between secs.4 and 9, T.109 N., R.38 W., Redwood County, Hydrologic Unit 07020008, at bridge on county road, 3.8 miles northeast of Walnut Grove.	82.6	1969, 1973-74, 1978, 1980-81, 1983	9-12-83	1.59
05316879	Pell Creek near Lamberton, MN	Lat 44°14'47", long 95°19'56", in SE¼NE¼ sec.18, T.109 N., R.37 W., Redwood County, Hydrologic Unit 07020008, at bridge on county road, 3 miles west of Lamberton.	51.5	1969, 1973-74, 1978, 1980-81, 1983	9-12-83	0.20
05316890	Dutch Charley Creek near Lamberton, MN	Lat 44°12'58", long 95°16'12", on line between secs.26 and 27, T.109 N., R.37 W., Redwood County, Hydrologic Unit 07020008, at bridge on County Highway 6, 1.2 miles south of Lamberton.	88.2	1969, 1973-74, 1978, 1980-81, 1983	9-12-83	0.26
05316895	Highwater Creek near Lamberton, MN	Lat 44°12'36", long 95°14'45", on line between secs.25 and 36, T.109 N., R.37 W., Redwood County, Hydrologic Unit 07020008, at bridge on County Highway 15, 1.9 miles southeast of Lamberton.	108	1969, 1973-75, 1979-81, 1983	9-12-83	2.36
05316910	Dry Creek at Sanborn, MN	Lat 44°11'43", long 95°08'15", on line between sec.35, T.109 N., R.36 W., Redwood County and sec.2, T.108 N., R.36 W., Cottonwood County, Hydrologic Unit 07020008, at bridge on County Highway 41, at the southwest limits of Sanborn, and 1.5 miles upstream from mouth.	39.6	1969, 1973-75, 1979, 1983	9-12-83	0.78

"See footnotes at end of table."



Discharge measurements made at low-flow partial-record stations during water year 1983-Continued

					Measurements	
Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Discharge (ft <sup>3</sup> /s)
St. Croix River basin						
05340100	North Branch Sunrise River tributary near Weber, MN	Lat 45°30'00", long 93°04'44", in SW¼SW¼ sec.22, T.35 N., R.22 W., Isanti County, Hydrologic Unit 07030005, at culvert on County Highway 5, 0.6 mile upstream from mouth, and 2.8 miles north-east of Weber.	12.4	1969-70, 1974, 1976, 1980, 1983	9-29-83	1.03
05340110	North Branch Sunrise River near Weber, MN	Lat 45°29'59", long 93°03'22", in SE¼SW¼ sec.23, T.35 N., R.22 W., Isanti County, Hydrologic Unit 07030005, at bridge on County Highway 5, 3.8 miles northeast of Weber.	30.7	1969-70, 1974, 1976, 1980, 1983	9-29-83	7.73
Cannon River basin						
05352810	Turtle Creek near Owatonna, MN	Lat 44°02'00", long 93°14'46", on line between secs.32 and 33, T.107 N., R.20 W., Steele County, Hydrologic Unit 07040002, at bridge on county road, 0.7 mile upstream from mouth, and 3.7 miles south of Owatonna.	41.1	1969-71, 1974, 1977, 1979-80, 1983	9-29-83	23.1
05354600	Wolf Creek near Dundas, MN	Lat 44°24'38", long 93°13'15", on line between secs.21 and 22, T.111 N., R.20 W., Rice County, Hydrologic Unit 07040002, at bridge on County Highway 8, 0.7 mile upstream from mouth, and 1.5 miles southwest of Dundas.	42.1	1969-72, 1974-76, 1979-80, 1983	9-29-83	9.77
05355020	Heath Creek near Northfield, MN	Lat 44°26'48", long 93°11'15", in NW¼SE¼ sec.2, T.111 N., R.20 W., Rice County, Hydrologic Unit 07040002, at bridge on County Highway 78, 0.2 mile upstream from mouth, and 1.5 miles south-west of Northfield.	40.7	1965, 1969-72, 1974-76, 1979-80, 1983	9-29-83	16.7
Crooked Creek basin						
05387040	Crooked Creek at Reno, MN	Lat 43°35'22", long 91°16'47", in SW¼SE¼ sec.35, T.102 N., R.4 W., Houston County, Hydrologic Unit 07060001, at bridge on State Highway 26, 0.8 mile southwest of Reno.	69.7	1971, 1976-77, 1980, 1983	9-18-83	45.9
Winnebago Creek basin						
05387200	Winnebago Creek near New Albin, Iowa	Lat 43°31'04", long 91°18'28", in SW¼SW¼ sec.27, T.101 N., R.4 W., Houston County, Hydrologic Unit 07060001, at bridge on County Highway 5, 1.3 miles northwest of New Albin, Iowa.	59.0	1969-71, 1976-77, 1980, 1983	9-28-83	44.0
Des Moines River basin						
05474770	Beaver Creek near Currie, MN	Lat 44°03'30", long 95°43'08", in NW¼SW¼ sec.24, T.107 N., R.41 W., Murray County, Hydrologic Unit 07100001, at bridge on county road, 2.8 miles southwest of Currie.	177	1969-70, 1972-76, 1983	9-19-83	3.82
05474920	Okabena Creek at Okabena, MN	Lat 43°44'38", long 95°18'54", on line between secs.7 and 8, T.103 N., R.37 W., Jackson County, Hydrologic Unit 07100001, at bridge on County Highway 9, 0.3 mile north of Okabena.	141	1969-70, 1973-76, 1983	9-19-83	3.47
05474980	Jack Creek near Heron Lake, MN	Lat 43°46'10", long 95°18'54", on line between secs.31 and 32, T.104 N., R.37 W., Jackson County, Hydrologic Unit 07100001, at bridge on County Highway 9, 1.8 miles south of Heron Lake.	218	1969-70, 1973-74, 1979, 1983	9-19-83	1.83

"See footnotes at end of table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1983-Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
Des Moines River basin--Continued						
05474800	Lime Creek near Avoca, MN	Lat 43°56'58", long 95°31'17", at Common Corner of secs.27, 28, and 33, T.106 N., R.39 W., Murray County, Hydrologic Unit 07100001, at bridge on County Highway 6, 0.6 mile upstream from mouth, and 6.2 miles east of Avoca.	95.0	1969-70, 1972-74, 1983	9-19-83	0.45
05475600	Des Moines River at Windom, MN	Lat 43°51' 30", long 95°06'55", in NE¼NW¼ sec.36, T.105 N., R.36 W., Cottonwood County, Hydrologic Unit 07100001, at State Highway 60 at Windom.	-	1946, 1961, 1969, 1973, 1979, 1983	9-19-83	76.6
05476990	East Fork Des Moines River near Ceylon, MN	Lat 43°34'08", long 94°38'04", on line between secs.11 and 12, T.101 N., R.32 W., Martin County, Hydrologic Unit 07100003, at bridge on County Highway 125, 2.4 miles north of Ceylon.	155	1971-76, 1983	9-19-83	5.40
Big Sioux River basin						
06480600	Flandreau Creek near Cazenovia, MN	Lat 44°04'54", long 96°26'27", in NE¼NW¼ sec.13, T.107 N., R.47 W., Pipestone County, Hydrologic Unit 10170203, at bridge on County Highway 13, 3.5 miles northwest of Cazenovia.	92.2	1971-76, 1979, 1983	9-20-83	5.03
06482520	Pipestone Creek near Pipestone, MN	Lat 43°58'49", long 96°26'08", on line between secs.13 and 24, T.106 N., R.47 W., Pipestone County, Hydrologic Unit 10170203, at bridge on County Highway 55, 6.1 miles southwest of Pipestone.	113	1971, 1973-76, 1979, 1983	9-20-83	6.09
06482540	Split Rock Creek near Jasper, MN	Lat 43°46'36", long 96°26'13", on line between secs.26 and 35, T.104 N., R.47 W., Rock County, Hydrologic Unit 10170203, at bridge on county road, 5.4 miles southwest of Jasper.	310	1969-70, 1973-76, 1983	9-20-83	15.4
06482740	Beaver Creek near Beaver Creek, MN	Lat 43°35'31", long 96°25'55", on line between secs.35 and 36, T.102 N., R.47 W., Rock County, Hydrologic Unit 10170203, at bridge on State Highway 23, 3.8 miles southwest of Beaver Creek.	84.6	1969-70, 1973-74, 1983	9-20-83	4.77
06482930	Rock River at Edgerton, MN	Lat 43°52'14", long 96°08'27", in SW¼NW¼ sec.28, T.105 N., R.44 W., Pipestone County, Hydrologic Unit 10170204, at bridge on County Highway 1, at west edge of Edgerton, and 1.7 miles upstream from Chanarambie Creek.	121	1969-70, 1973-76, 1979, 1983	9-20-83	8.95
06482935	Chanarambie Creek at Edgerton, MN	Lat 43°52'14", long 96°07'23", in NW¼SW¼ sec.27, T.105 N., R.44 W., Pipestone County, Hydrologic Unit 10170204, at bridge on County Highway 1, in Edgerton, 1 mile upstream from mouth.	72.0	1969-70, 1972-76, 1983	9-20-83	2.79
06482980	Champepadan Creek near Hardwick, MN	Lat 43°42'31", long 96°07'59", in NE¼SE¼ sec.20, T.103 N., R.44 W., Rock County, Hydrologic Unit 10170204, at bridge on County Highway 9, 1.2 miles upstream from mouth, and 5.8 miles south-east of Hardwick.	75.5	1969-70, 1973-74, 1983	9-20-83	3.78
06483030	Elk Creek near Luverne, MN	Lat 43°36'11", long 96°10'22", on line between sec.25, T.102 N., R.45 W., and sec.30, T.102 N., R.44 W., Rock County, Hydrologic Unit 10170204, at bridge on County Highway 9, 4 miles southeast of Luverne.	62.0	1969-70, 1973-74, 1983	9-20-83	1.85

"See footnotes at end of table."

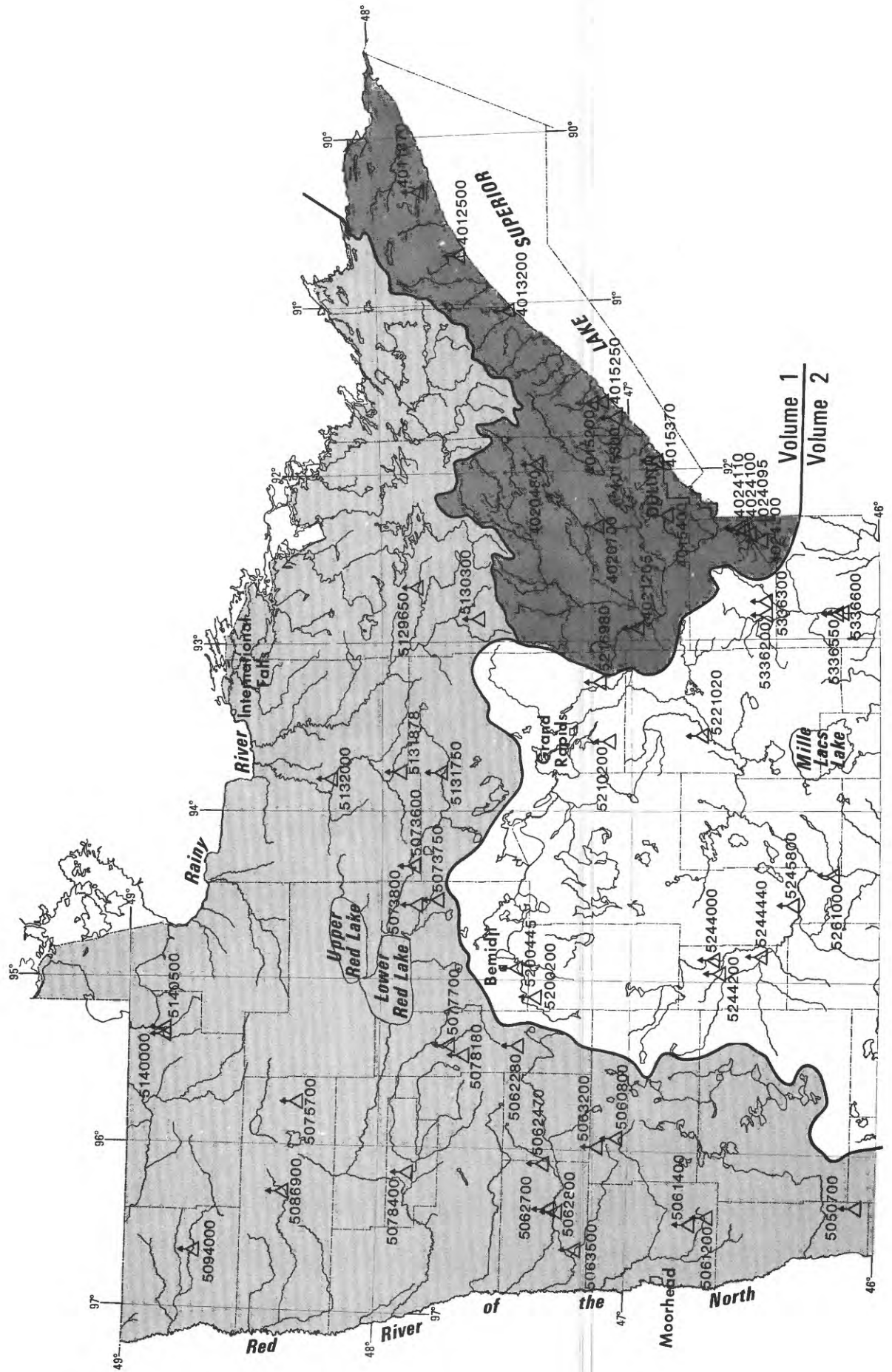
## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1983-Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
Big Sioux River basin--Continued						
06483240	Kanaranzi Creek near Kanaranzi, MN	Lat 43°30'01", long 96°07'12", on line between sec.11, T.100 N., R.45 W., and sec.33, T.101 N., R.44 W., Rock County, Hydrologic Unit 10170204, at bridge on county road on Minn.-Iowa border, 5.3 miles southwest of Kanaranzi.	192	1969-70, 1973-76, 1983	9-19-83	4.47
06483355	Little Rock River near Bigelow, MN	Lat 43°30'00", long 95°50'57", in SE¼SW¼ sec.35, T.101 N., R.42 W., Nobles County, Hydrologic Unit 10170204, at bridge on county road on Minn.-Iowa border, 8 miles west of Bigelow.	91.5	1971, 1973-74, 1983	9-19-83	2.43
06603690	West Fork Little Sioux River near Sioux Valley, MN	Lat 43°30'02", long 95°16'46", in SE¼SE¼ sec.33, T.101 N., R.37 W., Jackson County, Hydrologic Unit 10170204, at bridge on County Highway 62, 3.3 miles southeast of Sioux Valley.	106	1971, 1973-75, 1983	9-19-83	0.55

# Operated as continuous-record gaging station.

a Approximately.



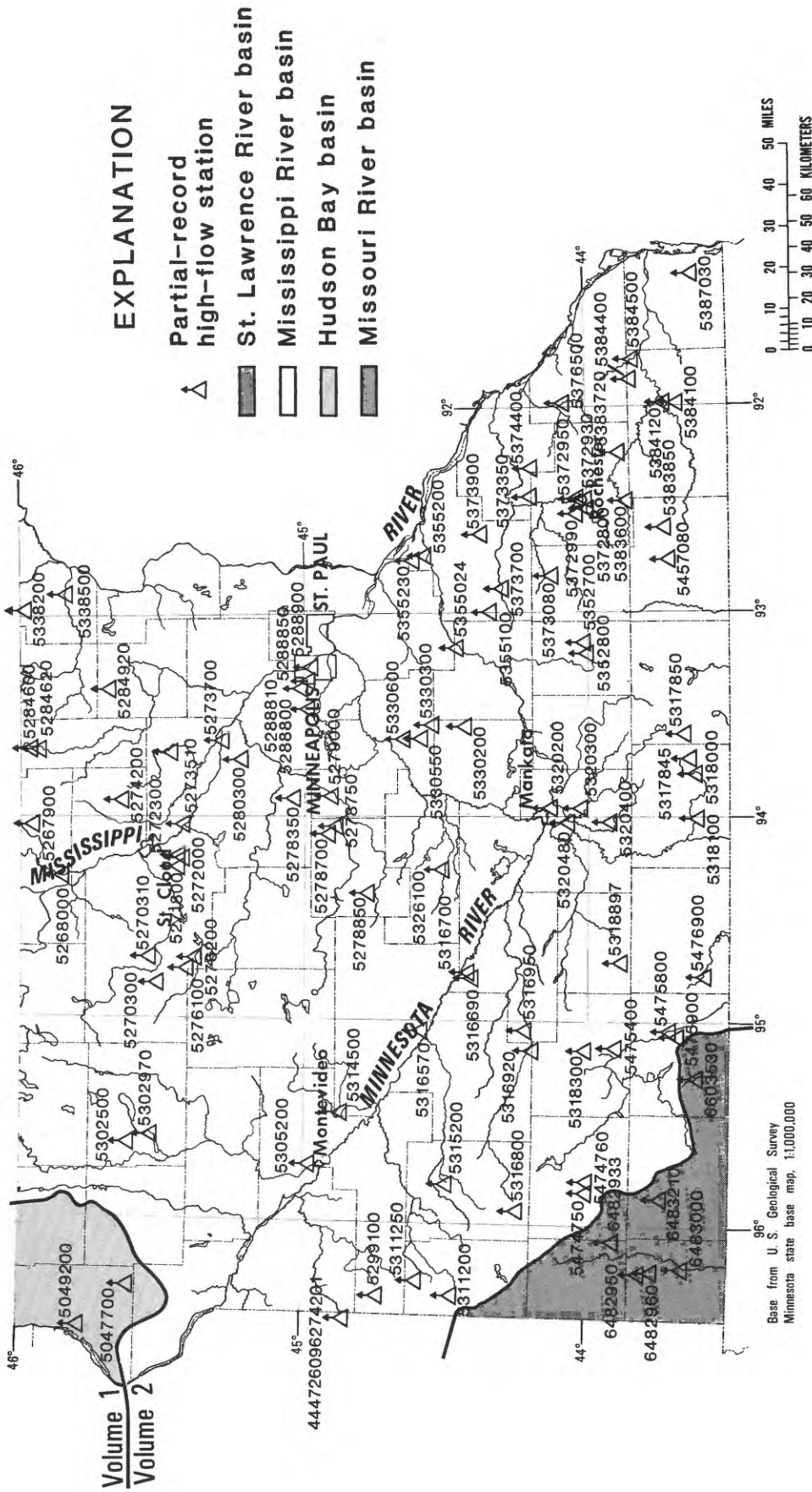


Figure 10.--Location of high-flow partial-record stations

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## High-flow partial-record stations

The following table contains annual maximum discharge for high-flow stations. A high-flow partial-record station is equipped with a crest-stage gage, a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, and discharge measurements may have been made for purposes of establishing the stage-discharge relation, but these are not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

## Annual maximum discharge at high-flow partial-record stations during water year 1983

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Mississippi River main stem							
05200200	Hennepin Creek near Becida, MN	Lat 47°23'52", long 95°05'12", in NW¼NE¼ sec.11, T.145 N., R.35 W., Hubbard County, Hydrologic Unit 07010101, gages upstream and downstream from culvert on Stumphges Rapids Trail approximately 0.5 mile west of Hubbard County Road 3, 3 miles north of Becida, and 1.5 miles upstream from mouth.	41.4	1979-83	7- 3-83	a13.59	98
05200445	Mississippi River at Bemidji, MN	Lat 47°27'04", long 94°54'23", in NW¼NW¼ sec.20, T.146 N., R.33 W., Beltrami County, Hydrologic Unit 07010101, at bridge on County Highway 11, 1.5 miles southwest of intersection of U.S. Highway 2 and County Highway 7 in Bemidji.	b400	1973-83	10-12-82	11.07	313
Smith Creek basin							
05210200	Smith Creek near Hill City, MN	Lat 47°04'58", long 93°34'59", in SE¼NW¼ sec.13, T.53 N., R.26 W., Itasca County, Hydrologic Unit 07010101, at culvert on U.S. Highway 169, 6.2 miles north of Hill City.	8.00	1961-83	8- 3-83	d5.66	100
Swan River basin							
05216980	Swan River tributary at Warba, MN	Lat 47°07'11", long 93°15'00", in SE¼NW¼ sec.34, T.54 N., R.23 W., Itasca County, Hydrologic Unit 07010103, at culvert on U.S. Highway 2, 0.9 mile upstream from mouth, and 1.1 miles southeast of Warba.	3.95	1961-83	8- 3-83	6.74	74
Willow River basin							
05221020	Willow River below Palisade, MN	Lat 46°42'36", long 93°33'21", in NW¼NE¼ sec.30, T.49 N., R.25 W., Aitkin County, Hydrologic Unit 07010103, at bridge on County Highway 3, 3.2 miles west of Palisade.	b445	1972-83	7- 5-83	d10.64	866
Crow Wing River basin							
05244000	Crow Wing River at Nimrod, MN	Lat 46°38'25", long 94°52'44", in SE¼NW¼ sec.32, T.137 N., R.33 W., Wadena County, Hydrologic Unit 07010106, 200 ft upstream from bridge on County Highway 121, 0.2 mile north of Nimrod, and 0.7 mile upstream of Cat River.	b1,010	1910-14#, 1931-81#, 1982-83	7- 4-83	d4.47	1,250
05244200	Cat River near Nimrod, MN	Lat 46°37'49", long 94°55'51", in SW¼SW¼ sec.36, T.137 N., R.34 W., Wadena County, Hydrologic Unit 07010106, at bridge on State Highway 227, 2.5 miles west of Nimrod, and 3.0 miles upstream from mouth.	49.2	1961-83	7- 5-83	a5.95	116

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Crow Wing River basin--Continued							
05244440	Leaf River near Aldrich, MN	Lat 46°27'25", long 94°50'29", in SW¼SW¼ sec.34, T.135 N., R.33 W., Wadena County, Hydrologic Unit 07010107, at bridge on County Highway 29, 3.3 miles upstream from mouth, and 7.0 miles north-east of Aldrich.	860	1972-83	7- 4-83	d13.02	1,330
05245800	Sevenmile Creek near Pillager, MN	Lat 46°20'32", long 94°32'56", in SW¼SE¼ sec.11, T.133 N., R.31 W., Cass County, Hydrologic Unit 07010106, at downstream wingwall of bridge on township road, 3.5 miles northwest of Pillager, 3.2 miles upstream from mouth.	18.3	1979-83	6-14-83	13.08	285
Mississippi River main stem							
05261000	Mississippi River near Fort Ripley, MN	Lat 46°10'50", long 94°21'56", in SE¼NW¼ sec.27, T.43 N., R.32 W., Crow Wing County, Hydrologic Unit 07010104, on left bank 600 ft upstream from Nokasippi River, and 1.0 mile north of Fort Ripley.	11,010	1929#, 1972-83	7- 8-83	1142.39	11,900
Platte River basin							
05267900	Hillman Creek near Pierz, MN	Lat 45°58'27", long 94°04'21", in NE¼SE¼ sec.9, T.40 N., R.30 W., Morrison County, Hydrologic Unit 07010201, at bridge on county highway, 1.1 miles upstream from mouth, and 1.5 miles east of Pierz.	46.7	1964-83	3- 5-83	c14.38	620
05268000	Platte River above Royalton, MN	Lat 45°50'43", long 94°17'40", in SE¼NW¼ sec.26, T.39 N., R.32 W., Morrison County, Hydrologic Unit 07010201, at bridge on County Highway 27, 0.6 mile north of Royalton, and 6.6 miles upstream from mouth.	335	1929-36#, 1972-83	3- 9-83	4.17	2,600
Sauk River basin							
05270300	Sauk River tributary at Spring Hill, MN	Lat 45°31'22", long 94°48'31", in SW¼NE¼ sec.27, T.124 N., R.33 W., Stearns County, Hydrologic Unit 07010202, at culvert on State Highway 4, 1.0 mile east of Spring Hill, and 2.7 miles upstream from mouth.	7.06	1960-83	6-13-83	12.77	330
05270310	Sauk River tributary No. 2 near St. Martin, MN	Lat 45°31'44", long 94°44'50", in SE¼SE¼ sec.19, T.124 N., R.32 W., Stearns County, Hydrologic Unit 07010202, at culvert on county highway, 4.2 miles northwest of St. Martin.	.26	1960, 1962-83	6-13-83	10.32	76
Johnson Creek basin							
05271800	Johnson Creek tributary at Luxemburg, MN	Lat 45°26'30", long 94°14'46", in NW¼NE¼ sec.30, T.123 N., R.28 W., Stearns County, Hydrologic Unit 07010203, at culverts on State Highway 15, 0.8 mile south of Luxemburg.	3.82	1964-83	6-26-83	d9.07	90
05272000	Johnson Creek tributary No. 2 near St. Augusta, MN	Lat 45°26'52", long 94°12'00", in NE¼SE¼ sec.21, T.123 N., R.28 W., Stearns County, Hydrologic Unit 07010203, at culverts on county highway, 0.7 mile upstream from mouth, and 3.1 miles southwest of St. Augusta.	13.4	1964-83	9-12-80 6-14-81 9- 9-82 6-27-83	e8.65 e8.70 e8.49 e10.63	<100 <100 <98 <135
05272300	Johnson Creek near St. Augusta, MN	Lat 45°27'49", long 94°09'19", in NW¼SW¼ sec.13, T.123 N., R.28 W., Stearns County, Hydrologic Unit 07010203, at bridge on County Highway 7, 1.0 mile south of St. Augusta, and 3.3 miles upstream from mouth.	46.7	1964-83	6-14-81 f4- 2-82 6-26-83	13.26 13.35 15.30	270 285 770

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Mississippi River main stem							
05273510	Mississippi River at Clearwater, MN	Lat 45°25'15", long 94°02'37", in NW¼SW¼ sec.23, T.34 N., R.30 W., Sherburne County, Hydrologic Unit 07010203, on left bank 700 ft upstream from bridge, on State Highway 24 at Clearwater.	-	1972-83	10-15-82	13.14	17,200
Otsego Creek basin							
05273700	Otsego Creek near Otsego, MN	Lat 45°17'19", long 93°38'59", in SW¼NE¼ sec.13, T.131 N., R.24 W., Wright County, Hydrologic Unit 07010203, at culvert on County Highway 39, 1.3 miles upstream from mouth, and 1.9 miles west of Otsego.	3.11	1964-83	7- 3-83	6.31	193
Elk River basin							
05274200	Stony Brook tributary near Foley, MN	Lat 45°38'42", long 93°54'54", in NE¼NW¼ sec.2, T.36 N., R.29 W., Benton County, Hydrologic Unit 07010203, at culvert on State Highway 25, 0.3 mile upstream from mouth, and 1.5 miles south of Foley.	2.26	1960-83	6-26-83	12.00	150
Crow River basin							
05276100	North Fork Crow River tributary near Paynesville, MN	Lat 45°23'29", long 94°46'56", in SW¼NW¼ sec.12, T.122 N., R.33 W., Kandiyohi County, Hydrologic Unit 07010204, at culvert on county highway, 1.2 miles upstream from mouth, and 3.0 miles west of Paynesville.	.55	1960-83	6-27-83	19.29	64
05276200	North Fork Crow River at Paynesville, MN	Lat 45°23'09", long 94°42'41", in SW¼SE¼ sec.9, T.122 N., R.32 W., Stearns County, Hydrologic Unit 07010204, at bridge on county road at northeast edge of Paynesville city limits.	236	1973-83	6-21-83	9.29	2,300
05278350	Fountain Creek near Montrose, MN	Lat 45°01'20", long 93°56'29", in NE¼NW¼ sec.22, T.118 N., R.26 W., Wright County, Hydrologic Unit 07010204, at culvert on County Highway 30, 3.3 miles southwest of Montrose.	6.73	1962-83	7- 4-83	6.40	64
05278700	Otter Creek near Lester Prairie, MN	Lat 44°54'23", long 94°04'24", in SE¼SE¼ sec.28, T.117 N., R.27 W., McLeod County, Hydrologic Unit 07010205, at culvert on State Highway 7, 2.1 miles northwest of Lester Prairie, and 4.4 miles upstream from mouth.	30.2	1961-83	3-29-82 3- 6-83	8.11 d7.40	230 105
05278750	Otter Creek tributary near Lester Prairie, MN	Lat 44°53'34", long 94°04'24", in SE¼SE¼ sec.33, T.117 N., R.27 W., McLeod County, Hydrologic Unit 07010205, at culvert on County Highway 63, 1.7 miles northwest of Lester Prairie, and 3.3 miles upstream from mouth.	1.54	1962-83	7- 3-83	d8.92	29
05278850	Buffalo Creek tributary near Brownton, MN	Lat 44°45'55", long 94°22'33", in NE¼SE¼ sec.13, T.115 N., R.30 W., McLeod County, Hydrologic Unit 07010205, at culvert on State Highway 15, 0.6 mile upstream from mouth, and 2.6 miles northwest of Brownton.	9.45	1961-83	4-12-83	d14.12	41

"See footnotes at end of the table."



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Crow River basin--Continued							
05279000	South Fork Crow River near Mayer, MN	Lat 44°54'20", long 93°53'05", in SW¼SW¼ sec.30, T.117 N., R. 25 W., Carver County, Hydrologic Unit 07010205, near center of span on downstream side of bridge on State Highway 7, 1.3 miles north of Mayer, 4.3 miles southwest of Watertown, and 16 miles upstream from confluence with North Fork.	1170	1934-79†, 1980-83	4-19-83	d12.29	3,800
05280300	School Lake Creek tributary near St. Michael, MN	Lat 45°12'09", long 93°41'31", in NW¼SE¼ sec.15, T.120 N., R.24 W., Wright County, Hydrologic Unit 07010204, at culvert on county highway, 0.2 mile upstream from mouth, and 1.5 miles southwest of St. Michael.	2.04	1964-83	3- 6-83	7.57	22
Rum River basin							
05284600	Robinson Brook near Onamia, MN	Lat 45°58'22", long 93°39'42", in NE¼SE¼ sec.11, T.40 N., R.27 W., Mille Lacs County, Hydrologic Unit 07010207, at culvert on U.S. Highway 169, 0.2 mile upstream from mouth, and 6.8 miles south of Onamia.	4.79	1960-83	3- 7-83	15.05	113
05284620	Rum River tributary near Onamia, MN	Lat 45°57'29", long 93°39'43", in NE¼SE¼ sec.14, T.40 N., R.27 W., Mille Lacs County, Hydrologic Unit 07010207, at culvert on U.S. Highway 169, 0.3 mile upstream from mouth, and 7.8 miles south of Onamia.	2.37	1960-83	4-15-82 3- 6-83	8.36 c8.54	f52 44
05284920	Stanchfield Creek tributary near Day, MN	Lat 45°41'29", long 93°23'45", in NW¼SE¼ sec.13, T.37 N., R.25 W., Isanti County, Hydrologic Unit 07010207, at culvert on County Highway 60, 0.5 mile upstream from mouth, and 1.5 miles southwest of Day.	1.26	1961-83	3- 6-83	6.06	34
Bassett Creek basin							
05288800	Bassett Creek in Golden Valley, MN	Lat 44°59'58", long 93°21'17", in W¼ sec.28, T.118 N., R.21 W., Hennepin County, Hydrologic Unit 07010206, at bridge on County Highway 66, 0.2 mile west of underpass on State Highway 100 in Golden Valley.	-	1963-83	9-10-82 6- 3-83	7.21 6.19	182 g105
05288810	North Fork Bassett Creek at Crystal, MN	Lat 45°01'06", long 93°21'32", in NE¼ sec.21, T.118 N., R.21 W., Hennepin County, Hydrologic Unit 07010206, at culvert on 34th Avenue North at Crystal, and 0.8 mile upstream from mouth.	-	1963-83	3- 6-83	-	g25
05288850	Bassett Creek (at State Highway 55) in Golden Valley, MN	Lat 44°59'04", ong 93°20'40", near center of W¼ sec.19, T.29 N., R.24 W., Hennepin County, Hydrologic Unit 07010206, at culvert on Olson Memorial Highway (State Highway 55), 0.2 mile east of State Highway 100 in Golden Valley.	-	1963-69, 1971-83	7- 3-83	6.22	27
05288900	Bassett Creek at Fruen Mill in Golden Valley, MN	Lat 44°58'45", long 93°18'48", in SE¼ sec.20, T.29 N., R.24 W., Hennepin County, Hydrologic Unit 07010206, at Fruen Mill, 700 ft downstream from Glenwood Avenue, at Minneapolis.	41.6	1952-56, 1963-83	3- 6-83	6.62	123

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Minnesota River basin							
h	West Branch Lac qui Parle River near Gary, SD	Lat 44°47'26", long 96°27'42", seq. 01, in NE¼NE¼ sec.9, T.115 N., R.47 W., Deuel County, So. Dak., Hydrologic Unit 07020003, at bridge on Deuel County Road, 0.25 mile west of Gary, SD.	28	1982-83	4- 2-82, 4-20-83	5.38 4.92	f96 43
05299100	Lazarus Creek tributary near Canby, MN	Lat 44°43'04", long 96°19'42", in NE¼NW¼ sec.6, T.114 N., R.45 W., Yellow Medicine County, Hydrologic Unit 07020003, at culvert on State Highway 68, 2.7 miles west of Canby, and 4.2 miles upstream from mouth.	2.97	1960-83	5- 7-83	d10.26	64
05302500	Little Chippewa River near Starbuck, MN	Lat 45°36'52", long 95°37'12", in NW¼NE¼ sec.30, T.125 N., R.39 W., Pope County,Hydrologic Unit 07020005, at downstream wingwall on triple box culvert on State Highway 28, 4.4 miles west of Starbuck.	69.6	1979-83	4-11-83	10.70	42
05302970	Outlet Creek tributary near Starbuck, MN	Lat 45°31'35", long 95°33'43", in NW¼NW¼ sec.27, T.124 N., R.39 W., Pope County, Hydrologic Unit 07020005, at culvert on State Highway 29, 0.2 mile upstream from mouth, and 6.6 miles south of Starbuck.	.47	1962-83	8-17-83	7.85	15
05305200	Spring Creek near Montevideo, MN	Lat 44°58'41", long 95°42'57", in NW¼NW¼ sec.5, T.117 N., R.40 W., Chippewa County, Hydrologic Unit 07020005, at culvert on State Highway 29, 1.2 miles upstream from mouth, and 2.0 miles north of Montevideo.	16.0	1959-83	5- 7-83	d12.52	8.4
05311200	North Branch Yellow Medicine River near Ivanhoe, MN	Lat 44°27'32", long 96°21'27", in NE¼NW¼ sec.2, T.111 N., R.46 W., Lincoln County, Hydrologic Unit 07020004, at culvert on State Highway 19, 5.3 miles west of Ivanhoe.	14.8	1960-83	5- 7-83	d13.03	95
05311250	North Branch Yellow Medicine River tributary near Wilno, MN	Lat 44°33'12", long 96°16'33", in SE¼NE¼ sec.33, T.113 N., R.45 W., Lincoln County, Hydrologic Unit 07020004, at culvert on U.S. Highway 75, 2.1 miles upstream from mouth, and 4.3 miles north-west of Wilno.	.33	1960-83	5- 7-83	7.73	5.1
05314500	Hawk Creek near Maynard, MN	Lat 44°52'10", long 95°28'58", in SW¼NW¼ sec.7, T.116 N., R.38 W., at Renville and Chippewa County line, Hydrologic Unit 07020004, at right downstream side of bridge on State Highway 23, 3.0 miles southwest of Maynard.	474	1949-54#, 1981-83	7-12-81 4- 4-82 6-15-83	15.34 14.95 13.25	f1,370 f1,290 830
05315200	Prairie Ravine near Marshall, MN	Lat 44°29'44", long 95°47'48", in SE¼NE¼ sec.20, T.112 N., R.41 W., Lyon County, Hydrologic Unit 07020006, at culvert on U.S. Highway 59, 2.7 miles north of Marshall.	5.63	1959-64#, 1965-83	5- 7-83	d7.85	83
05316570	Beaver Creek at Beaver Falls, MN	Lat 44°35'03", long 95°02'49", in NE¼NW¼ sec.22, T.113 N., R.35 W., Renville County, Hydrologic Unit 07020004, at bridge on County Highway 2 in Beaver Falls, 2.2 miles upstream from mouth, and 3.8 miles northwest of Morton.	194	1972-83	4-13-83	10.49	940

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Minnesota River basin--Continued							
05316690	Spring Creek tributary near Sleepy Eye, MN	Lat 44°23'54", long 94°45'35", in NW¼ sec.25, T.111 N., R.33 W., Brown County, Hydrologic Unit 07020007, at culvert on county highway, 0.1 mile upstream from mouth, and 7.5 miles north of Sleepy Eye.	3.69	1966-83	5- 7-83	6.72	100
05316700	Spring Creek near Sleepy Eye, MN	Lat 44°24'12", long 94°44'41", in NE¼SE¼ sec.24, T.111 N., R.33 W., Brown County, Hydrologic Unit 07020007, at culvert on county highway, 4.3 miles upstream from mouth, and 7.5 miles north of Sleepy Eye.	31.3	1959-83	5- 7-83	13.60	410
05316800	Cottonwood River tributary near Balaton, MN	Lat 44°14'24", long 95°57'22", in NW¼NW¼ sec.19, T.109 N., R.42 W., Lyon County, Hydrologic Unit 07020008, at culvert on U.S. Highway 14, 4.0 miles west of Balaton.	.91	1959-83	5- 7-83	10.30	380
05316920	Cottonwood River tributary No. 2 near Sanborn, MN	Lat 44°10'34", long 95°07'15", in SW¼NW¼ sec.12, T.108 N., R.36 W., Cottonwood County, Hydrologic Unit 07020008, at culvert on U.S. Highway 71, 2.4 miles south of Sanborn.	.42	1966-83	5- 7-83	6.01	79
05316950	Cottonwood River near Springfield, MN	Lat 44°12'12", long 95°02'53", on line between secs.33 and 34, T.109 N., R.35 W., Brown County, Hydrologic Unit 07020008, at bridge on County Highway 2, 1.3 miles downstream from Mound Creek, 1.0 mile upstream from Coal Mine Creek, and 3.5 miles southwest of Springfield.	773	1973-83	5- 8-83	28.79	2,900
05317845	East Branch Blue Earth River near Walters, MN	Lat 43°37'58", long 93°42'28", in SE¼SE¼ sec.16, T.102 N., R.24 W., Faribault County, Hydrologic Unit 07020009, at left downstream wing-wall of box culvert on State Highway 22, 2.5 miles northwest of Walters.	29.6	1979-83	7- 1-83	16.17	†
05317850	Foster Creek near Alden, MN	Lat 43°39'31", long 93°35'30", in NE¼NE¼ sec.9, T.102 N., R.23 W., Freeborn County, Hydrologic Unit 07020009, at culvert on County Road 46 (old U.S. Highway 16), 1.2 miles southwest of Alden.	2.26	1959-83	7- 1-83	7.63	†
05318000	East Branch Blue Earth River near Bricelyn, MN	Lat 43°37'50", long 93°47'25", in NE¼NE¼ sec.23, T.102 N., R.25 W., Faribault County, Hydrologic Unit 07020009, at bridge on county highway, 2.0 miles upstream from Brush Creek, 3.0 miles downstream from South Walnut Lake, and 5.0 miles northeast of Bricelyn.	132	1973-83	4-17-83	9.85	720
05318100	East Branch Blue Earth River tributary near Blue Earth, MN	Lat 43°37'09", long 94°01'03", in SW¼SE¼ sec.24, T.102 N., R.27 W., Faribault County, Hydrologic Unit 07020009, at culvert on County Highway 13, 0.5 mile upstream from mouth, and 4.3 miles east of Blue Earth.	9.20	1960-83	5-12-82 7- 1-83	d8.27 d4.71	f345 90
05318300	Watowwan River near Delft, MN	Lat 43°59'55", long 95°07'11", in NE¼SE¼ sec.11, T.106 N., R.36 W., Cottonwood County, Hydrologic Unit 07020010, at culvert on U.S. Highway 71, 1.7 miles northwest of Delft.	13.0	1960-83	6-20-83	16.87	370

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Minnesota River basin--Continued							
05318897	South Fork Watonwan River near Ormsby, MN	Lat 43°53'08", long 94°41'27", in SE¼NW¼ sec.21, T.105 N., R.32 W., Watonwan County, Hydrologic Unit 07020010, at right downstream wing-wall of bridge on township road, 2.6 miles north of Ormsby, 5.0 miles upstream from mouth at Willow Creek.	109	1979-83	6-31-83	d14.68	690
05320200	Le Sueur River tributary near Mankato, MN	Lat 44°07'29", long 93°57'33", in SE¼SW¼ sec.28, T.108 N., R.26 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 22, 0.2 mile upstream from mouth, and 1.5 miles southeast of Mankato Airport.	.073	1959-83	6-30-83	23.23	1120
05320300	Cobb River tributary near Mapleton, MN	Lat 44°01'05", long 93°57'30", in SW¼NE¼ sec.4, T.106 N., R.26 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 22, 1.0 mile upstream from mouth, and 6.3 miles north of Mapleton.	7.25	1959-83	5-12-83	17.61	234
05320400	Maple River tributary near Mapleton, MN	Lat 43°55'18", long 94°01'17", in SE¼SW¼ sec.1, T.105 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 30, 0.9 mile upstream from mouth, and 3.3 miles west of Mapleton.	6.22	1959-83	5-12-83	19.23	204
05320480	Maple River near Rapidan, MN	Lat 44°03'54", long 94°01'32", in SW¼ sec.13, T.107 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, at bridge on County Highway 35, 3.0 miles southeast of Rapidan, and 3.3 miles upstream from mouth.	343	1972-83	3- 1-83	12.73	-
05326100	Middle Branch Rush River near Gaylord, MN	Lat 44°30'27", long 94°15'00", in SW¼NW¼ sec.18, T.112 N., on line between R.28 W. and R.29 W., Sibley County, Hydrologic Unit 07020012, at downstream side of bridge on township road, 3.0 miles southwest of Gaylord, 10.5 miles upstream from the main branch of Rush River.	68.5	1979-83	6-30-83	19.78	920
05330200	Rice Lake tributary near Montgomery, MN	Lat 44°25'42", long 93°32'10", in NE¼NW¼ sec.13, T.111 N., R.23 W., Le Sueur County, Hydrologic Unit 07020012, at culvert on State Highway 21, 1.8 miles upstream from Rice Lake, and 2.5 miles east of Montgomery.	3.16	1960-83	3- 7-83	7.30	54
05330300	Sand Creek near New Prague, MN	Lat 44°32'37", long 93°32'16", in NE¼NW¼ sec.1, T.112 N., R.23 W., Le Sueur County, Hydrologic Unit 07020012, at culvert on State Highway 13 and 19, 1.9 miles east of New Prague.	62.4	1960-83	3- 7-83	11.46	395
05330550	East Branch Raven Stream near New Prague, MN	Lat 44°34'21", long 93°35'58", in NW¼ sec.28, T.113 N., R.23 W., Scott County, Hydrologic Unit 07020012, at culvert on county road, 1.6 miles upstream from mouth, and 2.3 miles northwest of New Prague.	22.1	1960-83	3- 7-83	12.96	318
05330600	Sand Creek tributary No. 2 near Jordan, MN	Lat 44°37'45", long 93°36'33", in NW¼NE¼ sec.5, T.113 N., R.23 W., Scott County, Hydrologic Unit 07020012, at culvert on State Highway 21, 0.8 mile upstream from mouth, and 2.8 miles south of Jordan.	2.62	1960-83	8-27-78 3-30-79 3-16-80 8-27-81 3-29-82 6-21-83	13.29 13.46 c12.92 12.75 c13.61 15.28	f42 f51 f23 f20 f16 206

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
St. Croix River basin							
05336200	Glaisby Brook near Kettle River, MN	Lat 46°27'19", long 92°51'34", in SE¼NW¼ sec.22, T.46 N., R.20 W., Carlton County, Hydrologic Unit 07030003, at bridge on State Highways 27 and 73, 1.0 mile upstream from mouth, and 2.4 miles south of Kettle River.	24.2	1960-70#, 1971-83	10- 7-82	5.02	300
05336550	Wolf Creek tributary near Sandstone, MN	Lat 46°09'45", long 92°51'58", in NE¼SE¼ sec.33, T.43 N., R.20 W., Pine County, Hydrologic Unit 07030003, at culvert on U.S. Highway 61, 0.2 mile upstream from mouth, and 2.2 miles north of Sandstone.	5.46	1960-83	9-24-77 7- 7-78 5-10-79 4- 1-80 6-14-81 4-15-82 7- 3-83	15.94 16.66 20.03 15.77 16.72 16.94 17.74	f18 f60 240 f5.8 f63 58 118
05338200	Mission Creek near Hinckley, MN	Lat 45°59'52", long 92°56'44", in SW¼SW¼ sec.25, T.41 N., R.21 W., Pine County, Hydrologic Unit 07030004, at culvert on U.S. Highway 23, 1.2 miles south of Hinckley.	3.84	1960-83	11-20-82	14.43	104
05338500	Snake River near Pine City, MN	Lat 45°50'30", long 92°56'00", in SE¼NW¼ sec.26, T.39 N., R.21 W., Pine County, Hydrologic Unit 07030004, on left bank at site of former powerplant and dam, 0.5 mile downstream from Cross Lake and 1.5 miles northeast of Pine City.	958	1913-17, 1951-81#, 1982-83	3-11-83	6.84	4,760
Cannon River basin							
05352700	Turtle Creek tributary No. 2 near Pratt, MN	Lat 44°00'02", long 93°08'30", in NW¼SW¼ sec.8, T.106 N., R.19 W., Steele County, Hydrologic Unit 07040002, at culvert on U.S. Highway 218, 1.0 mile upstream from mouth, and 1.7 miles south-east of Pratt.	1.26	1960-83	7- 1-83	20.19	†
05352800	Turtle Creek tributary near Steele Center, MN	Lat 44°00'26", long 93°12'20", in NW¼NW¼ sec.11, T.106 N., R.20 W., Steele County, Hydrologic Unit 07040002, at culvert on township road, 1.3 miles upstream from mouth, and 1.6 miles northeast of Steele Center.	5.01	1960-83	7- 1-83	10.07	260
05355024	Cannon River at Northfield, MN	Lat 44°27'19", long 93°09'46", in NE¼NE¼ sec.1, T.111 N., R.20 W., Rice County, Hydrologic Unit 07040002, on left bank at downstream side of Fifth Street bridge in Northfield.	934	1980-83	7- 1-83	904.71	6,700
05355100	Little Cannon River tributary near Kenyon, MN	Lat 44°20'45", long 92°58'47", in NE¼SE¼ sec.9, T.110 N., R.18 W., Goodhue County, Hydrologic Unit 07040002, at culvert on State Highway 56, 0.3 mile upstream from mouth, and 5.3 miles north of Kenyon.	2.20	1960-83	5- 7-83	d12.85	98
05355200	Cannon River at Welch, MN	Lat 44°33'50", long 92°43'55", in NW¼SW¼ sec.27, T.113 N., R.16 W., Goodhue County, Hydrologic Unit 07040002, on right bank 0.3 mile downstream from highway bridge at Welch, and 1.8 miles upstream from Belle Creek.	1,320	1909-14#, 1930-71#, 1973-83	7- 4-83	9.70	7,800

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Zumbro River basin							
05372800	South Fork Zumbro River on Belt Line at Rochester, MN	Lat 44°00'26", long 92°28'19", in SE¼SW¼ sec.2, T.106 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, at bridge on west-bound lane of U.S. Highway 14 at Rochester, and 1.5 miles upstream from Bear Creek.	155	1969-83	7- 1-83	1001.21	5,480
05372930	Bear Creek on Belt Line at Rochester, MN	Lat 44°00'29", long 92°26'44", in sec.1, T.106 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, at bridge on west-bound lane of U.S. Highway 14 at Rochester, and 1.2 miles upstream from mouth.	80.0	1969-83	3- 4-83	997.48	830
05372950	Silver Creek at Rochester, MN	Lat 44°01'44", long 92°25'44", near center of sec.31, T.107 N., R.13 W., Olmsted County, Hydrologic Unit 07040004, at bridge on county highway at east edge of Rochester, and 1.7 miles upstream from mouth.	17.3	1969-83	3- 3-83	11.12	564
05372990	Cascade Creek at Rochester, MN	Lat 44°01'41", long 92°29'03", in NW¼SE¼ sec.25, T.107 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, at bridge on 16th Street NW at Rochester, and 1.5 miles upstream from mouth.	37.0	1969-83	7- 4-83	992.59	414
05373080	Milliken Creek near Concord, MN	Lat 44°07'13", long 92°49'08", in NW¼NW¼ sec.36, T.108 N., R.17 W., Dodge County, Hydrologic Unit 07040004, at bridge on County Road 9, 8.0 miles upstream from mouth, 2.1 miles southeast of Concord.	20.2	1979-83	8-29-79 3-19-80 7-11-81 5-31-82 9-18-83	13.93 c13.90 13.85 14.50 13.56	480 260 470 580 425
05373350	Zumbro River tributary near South Troy, MN	Lat 44°11'16", long 92°25'22", in SE¼NE¼ sec.6, T.108 N., R.13 W., Olmsted County, Hydrologic Unit 07040004, at culvert on county road, 0.8 mile upstream from mouth, and 1.3 miles south of South Troy.	.16	1962-83	3- 3-83	7.86	20
05373700	Spring Creek near Wanamingo, MN	Lat 44°17'13", long 92°52'17", in SE¼SE¼ sec.32, T.110 N., R.17 W., Goodhue County, Hydrologic Unit 07040004, at culvert on County Highway 1, 3.5 miles upstream from mouth, and 4.2 miles southwest of Wanamingo.	9.93	1960-83	5- 7-83	d12.35	760
05373900	Trout Brook tributary near Goodhue, MN	Lat 44°21'30", long 92°36'58", in NE¼SE¼ sec.4, T.110 N., R.15 W., Goodhue County, Hydrologic Unit 07040004, at culvert on State Highway 58, 0.8 mile upstream from mouth, and 3.0 miles south of Goodhue.	.40	1960-83	7- 1-83	7.25	90
05374400	Long Creek near Potsdam, MN	Lat 44°10'48", long 92°17'23", at quarter corner on north line of sec.8, T.108 N., R.12 W., Wabasha County, Hydrologic Unit 07040004, at culvert on county highway, 2.6 miles northeast of Potsdam.	4.46	1966-83	3- 2-83	c15.40	95
Whitewater River basin							
05376500	South Fork White-water River near Altura, MN	Lat 44°04'10", long 91°58'49", in SE¼ sec.14, T.107 N., R.10 W., Winona County, Hydrologic Unit 07040003, on left bank 500 ft upstream from highway bridge, 2.0 miles west of Altura, and 2.4 miles upstream from Keefer Creek.	76.8	1939-71#, 1973-83	3- 4-83	d3.57	515

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Root River basin							
05383600	North Branch Root River tributary near Stewartville, MN	Lat 43°51'20", long 92°26'50", near center sec.36, T.105 N., R.14 W., Olmsted County, Hydrologic Unit 07040008, at culvert on State Highway 30, 2.0 miles east of Stewartville, and 2.3 miles upstream from mouth.	.73	1958, 1959-64, 1965-83	7- 1-83	7.45	70
05383720	Mill Creek near Chatfield, MN	Lat 43°53'01", long 92°13'46", in SE¼NW¼ sec.23, T.105 N., R.12 W., Olmsted County, Hydrologic Unit 07040008, at bridge on county highway, 3.4 miles northwest of Chatfield, and 4.8 miles upstream from mouth.	22.4	1962-83	7- 1-83	11.40	660
05383850	South Fork Bear Creek near Grand Meadow, MN	Lat 43°43'24", long 92°35'24", in NE¼SE¼ sec.14, T.103 N., R.15 W., Mower County, Hydrologic Unit 07040008, at bridge on county highway, 1.5 miles northwest of Grand Meadow, and 4.0 miles upstream from North Fork Bear Creek.	14.0	1962-83	7- 1-83	18.75	1,070
05384100	Duschee Creek near Lanesboro, MN	Lat 43°39'40", long 91°58'10", in SW¼SW¼ sec.6, T.102 N., R.9 W., Fillmore County, Hydrologic Unit 07040008, at culvert on county highway, 4 miles south of Lanesboro, and 7.4 miles upstream from mouth.	3.85	1959-83	7- 1-83	14.38	130
05384120	South Branch Root River at Lanesboro, MN	Lat 43°43'19", long 91°58'43", in NW¼SE¼ sec.13, T.103 N., R.10 W., Fillmore County, Hydrologic Unit 07040008, at bridge to ball park in Lanesboro, and 2.5 miles upstream from mouth.	b297	1973-83	9-20-83	8.46	3,150
05384200	Gribben Creek near Whalan, MN	Lat 43°42'26", long 91°54'50", in NE¼SE¼ sec.21, T.103 N., R.9 W., Fillmore County, Hydrologic Unit 07040008, at bridge on county highway, 1.9 miles southeast of Whalan, and 2.4 miles upstream from mouth.	7.80	1959-83	5- 6-82 7- 1-83	d14.06 16.15	f50 450
05384400	Pine Creek near Arendahl, MN	Lat 43°50'27", long 91°53'39", in SE¼NE¼ sec.3, T.104 N., R.9 W., Fillmore County, Hydrologic Unit 07040008, at bridge on County Highway 25, 1.3 miles northeast of Arendahl, and 4.9 miles upstream from Hemingway Creek.	28.1	1959-83	2-23-83	c11.84	270
05384500	Rush Creek near Rushford, MN	Lat 43°50'00", long 91°46'40", on line between secs.3 and 10, T.104 N., R.8 W., Fillmore County, Hydrologic Unit 07040008, on downstream side near center of span of highway bridge, 1.5 miles northwest of Rushford, 3.0 miles upstream from mouth.	129	1942-79, 1980-83	7- 1-83	-	g700
Crooked Creek basin							
05387030	Crooked Creek at Freeburg, MN	Lat 43°36'37", long 91°21'39", in SW¼NE¼ sec.30, T.102 N., R.4 W., Houston County, Hydrologic Unit 07060001, on right downstream wingwall of bridge on State Highway 249 at Freeburg, 6.5 miles upstream from mouth.	44.2	1979-83	7- 4-79 8-21-80 7-11-81 5- 7-82 2-21-83	10.50 12.63 14.87 k 9.20	330 790 1,270 fg55 160

"See footnotes at end of the table."

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Iowa River basin							
05457080	Rose Creek tributary near Dexter, MN	Lat 43°42'11", long 92°44'35", in SE¼SW¼ sec.22, T.103 N., R.16 W., Mower County, Hydrologic Unit 07080201, at culvert on county highway, 0.2 mile upstream from mouth, and 2.2 miles southwest of Dexter.	1.17	1962-83	9-19-83	d9.29	125
Des Moines River basin							
05474750	Beaver Creek tributary No. 2 near Slayton, MN	Lat 43°59'35", long 95°48'01", in NW¼NW¼ sec.17, T.106 N., R.41 W., Murray County, Hydrologic Unit 07100001, at culvert on State Highway 30, 2.4 miles west of Slayton, and 3.2 miles upstream from mouth.	3.53	1961-83	6-12-83	17.11	64
05474760	Beaver Creek tributary above Slayton, MN	Lat 43°59'35", long 95°47'12", in NE¼NE¼ sec.17, T.106 N., R.41 W., Murray County, Hydrologic Unit 07100001, at culvert on State Highway 30, 0.9 mile upstream from mouth, and 1.7 miles west of Slayton.	2.20	1961-83	6-12-83	18.35	59
05475400	Warren Lake tributary near Windom, MN	Lat 43°54'02", long 95°07'13", in SE¼NE¼ sec.14, T.105 N., R.36 W., Cottonwood County, Hydrologic Unit 07100001, at culvert on U.S. Highway 71, 0.2 mile up stream from Warren Lake, and 2.4 miles north of Windom.	1.39	1960-83	5-29-80 7-24-81 5-17-82 6-20-83	12.84 6.04 d4.26 7.13	1666 175 12 1106
05475800	Des Moines River tributary near Jackson, MN	Lat 43°41'36", long 95°01'26", in NW¼SE¼ sec.27, T.103 N., R.35 W., Jackson County, Hydrologic Unit 07100001, at culvert on county highway, 0.8 mile upstream from mouth, and 5.3 miles north of Jackson.	1.52	1960-83	2-22-83	d14.29	25
05475900	Des Moines River tributary No. 2 near Lakefield, MN	Lat 43°40'28", long 95°03'15", in SE¼SE¼ sec.32, T.103 N., R.35 W., Jackson County, Hydrologic Unit 07100001, at culvert on County Highway 19, 1.9 miles upstream from mouth, and 5.8 miles east of Lakefield.	5.18	1960-83	7- 1-83	d7.08	98
05476900	Fourmile Creek near Dunnell, MN	Lat 43°34'57", long 94°46'26", in SW¼NW¼ sec.2, T.101 N., R.33 W., Martin County, Hydrologic Unit 07100003, at bridge on State Highway 4, 0.6 mile upstream from mouth, and 1.6 miles north of Dunnell.	14.0	1960-83	5-27-82 6-30-83	11.98 14.82	f160 850
Big Sioux River basin							
06482933	Chanarambi Creek near Edgerton, MN	Lat 43°53'59", long 96°03'39", in NW¼SW¼ sec.18, T.105 N., R.43 W., near Murray and Pipestone County line, Hydrologic Unit 10170204, at right downstream wingwall of bridge on township road, 3.8 miles northeast of Edgerton, 7.4 miles upstream from mouth.	56.1	1979-83	4-17-79 6- 5-80 8-14-81 7-15-82 4-12-83	16.72 16.92 a11.61 a13.01 ca15.62	470 485 19 140 275
06482950	Mound Creek near Hardwick, MN	Lat 43°48'18", long 96°12'47", in SE¼ SE¼ sec.15, T.104 N., R.45 W., Rock County, Hydrologic Unit 10170204, at culvert on county highway, 2.2 miles northwest of Hardwick.	2.47	1959-83	6-14-83	d7.76	26

"See footnotes at end of the table."



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at high-flow partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Big Sioux River basin--Continued							
06482960	Mound Creek tributary at Hardwick, MN	Lat 43°46'05", long 96°12'44", in NE¼SE¼ sec.34, T.104 N., R.45 W., Rock County, Hydrologic Unit 10170204, at culvert on U.S. Highway 75, 0.7 mile upstream from mouth, and 0.9 mile south-west of Hardwick.	.19	1959-83	6-14-83	7.08	56
06483000	Rock River at Luverne, MN	Lat 43°39'15", long 96°12'03", in SW¼NE¼ sec.11, T.102 N., R.45 W., Rock County, Hydrologic Unit 10170204, at bridge on Main Street (County Highway 4) in Luverne.	425	1911-14*, 1972-83	4-14-83	c8.80	4,200
06483210	Kanaranzi Creek tributary No. 2 near Wilmont, MN	Lat 43°43'32", long 95°52'20", in SW¼NW¼ sec.15, T.103 N., R.42 W., Nobles County, Hydrologic Unit 10170204, at culvert on County Highway 15, 3.5 miles southwest of Wilmont, and 3.7 miles upstream from mouth.	2.14	1966-83	6-13-83	7.28	270
Little Sioux River basin							
06603530	Little Sioux River near Spafford, MN	Lat 43°36'08", long 95°15'27", in NE¼NE¼ sec.34, T.102 N., R.37 W., Jackson County, Hydrologic Unit 10230003, at bridge on county highway, 1.6 miles downstream from Jackson County ditch No. 11, and 5.8 miles east of Spafford.	41.1	1962-83	6-13-83	8.42	360

\* Operated as a continuous-record gaging station.

† Discharge not determined.

&lt; Less than.

a Affected by beaver dam.

b approximately.

c Backwater from ice.

d Affected by shifting control.

e Backwater from temporary rock dam.

f Revised.

g Estimated.

h Operated as a miscellaneous water-quality site.

i Adjusted for inflow to storage.

j Backwater from aquatic growth or debris.

k Peak stage did not reach bottom of gage.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## Discharge measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations are given in the following table. The measurements of base flow are designated by an asterisk (\*); measurements of peak flow by a dagger (†).

Discharge measurements made at miscellaneous sites during water year 1983

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured previously (water years)	Date	Discharge (ft <sup>3</sup> /s)
Mississippi River main stem						
Mississippi River	Gulf of Mexico	Lat 47°15'00", long 93°35'12", in N½ sec.13, T.155 N., R.26 W., Itasca County, Hydrologic Unit 07010103, at dam at outlet of Pokegama Lake, 3.5 miles northwest of Grand Rapids, MN (05210700).	a3,360	1929-30, 1944-45, 1948-55, 1957-75	11-03-82 7- 6-83 9-22-83	2,010 2,140 807
Clearwater River basin						
Clearwater River	Mississippi River	Lat 45°17'54", long 94°15'38", in SW¼SW¼ sec.7, T.121 N., R.28 W., Stearns County, Hydrologic Unit 07010203, at bridge on State Highways 55 and 24, 0.1 mile upstream from Lake Louisa, and 2.1 miles southeast of Kimball, MN (05273000).	82.3	1969, 1970	6-23-83 6-28-83 7- 5-83	2,150 789 338
Crow River basin						
North Fork Crow River	Crow River	Lat 45°12'13", long 94°23'16", in SW¼NE¼ sec.13, T.120 N., R.30 W., Meeker County, Hydrologic Unit 07010204, at bridge on State Highway 24, 2.7 miles west of Kingston, 29 miles east of Forest City, MN (05278120).	-	-	6-24-83 6-28-83 7- 5-83	4,300 2,270 1,920
Mississippi River main stem						
Mississippi River	Gulf of Mexico	Lat 44°54'57", long 93°11'59", in NE¼NW¼ sec.17, T.28 N., R.23 W., Ramsey County, Hydrologic Unit 07010206, at Ford Motor Company hydroelectric plant, 800 ft downstream from Ford Parkway bridge in St. Paul, MN, 3.5 miles upstream from Minnesota River, and at River mile 847.6 upstream from Ohio River (05288950).	a19,700	1924, 1935, 1938-39, 1941, 1943, 1945-50, 1954, 1957, 1959, 1961-62, 1964-70, 1972-82	3-15-83 4-25-83 7-13-83	23,800 17,300 18,500
Minnesota River basin						
Chippewa River diversion	Minnesota River	Lat 45°01'30", long 95°48'00", in SE¼ sec.16, T.118 N., R.41 W., Chippewa County, Hydrologic Unit 07020001, 1 mile north of Watson, MN.	-	1945-82	10- 5-82 11- 4-82 12- 6-83 1-26-83 3-15-83 5-11-83 7-14-83	206 151 327 a71 627 413 302
Chippewa River below diversion	Minnesota River	Lat 45°01'10", long 95°47'30", in NW¼ sec.22, T.118 N., R.41 W., Chippewa County, Hydrologic Unit 07020005, 1.4 miles northeast of Watson, MN.	-	1945-82	10- 5-83 11-24-83 12- 6-83 1-26-83 5-11-83 7-14-83 9-20-83	8.0 121 129 66 129 110 36
St. Croix River basin						
St. Croix River	Mississippi River	Lat 44°44'57", long 92°48'16", in SE¼SE¼ sec.9, T.26 N., R.20 W., Pierce County, Hydrologic Unit 07030005, at bridge in Prescott, WI, 0.1 mile upstream from mouth (05344490).	a7,650	1928-30, 1932-39, 1947-48, 1950, 1953-57, 1959-82	3-17-83 5- 4-83	15,700 12,800

a Approximately.

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

Water-quality partial-record stations are particular sites where chemical-quality, biological and (or) sediment data are collected systematically over a period of years for use in hydrologic analyses. Letter E indicates estimated value. Letter K indicates non-ideal colony count.

444640093094700 JENSEN LAKE AT EAGAN, MN

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
15...	1215	1.50	6.2	242	255	7.2	1.0	--
15...	1218	3.00	--	243	--	7.0	2.0	--
15...	1220	5.00	--	258	--	6.8	3.5	--
APR								
20...	1126	1.00	6.0	166	173	8.1	9.0	>1.80
20...	1128	2.00	--	--	--	--	9.0	--
20...	1130	4.00	--	--	--	--	8.5	--
20...	1132	5.00	--	--	--	8.1	8.5	--
AUG								
09...	1330	1.00	6.0	160	--	8.9	28.5	.60
09...	1332	3.00	--	160	--	8.4	27.0	--
09...	1334	5.00	--	170	--	8.2	26.5	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
15...	E740	4.0	--	8.2	.040	32.0	7.80
15...	E740	3.0	--	--	--	--	--
15...	E740	1.8	--	--	--	--	--
APR							
20...	744	12.0	106	6.9	.020	5.00	<.100
20...	744	--	--	--	--	--	--
20...	744	--	--	--	--	--	--
20...	744	--	--	--	--	--	--
AUG							
09...	741	9.4	125	6.8	.030	29.0	4.30
09...	741	4.6	60	--	--	--	--
09...	741	.3	4	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444652093131000 SLATER'S ACRES POND AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
15...	0845	1.50	4.8	226	239	7.1	2.0	--
15...	0847	2.50	--	229	--	7.0	1.5	--
15...	0849	4.00	--	289	--	6.5	4.0	--
APR								
18...	1141	1.00	6.7	195	200	8.1	7.0	>2.00
18...	1143	2.00	--	195	--	7.9	7.0	--
18...	1145	4.00	--	194	--	7.8	6.5	--
18...	1147	6.00	--	195	--	7.8	6.5	--
AUG								
08...	1215	1.00	6.5	172	--	9.3	28.0	1.50
08...	1217	2.00	--	170	--	--	28.0	--
08...	1218	3.00	--	168	--	--	28.0	--
08...	1220	4.00	--	181	--	--	27.5	--
08...	1225	5.00	--	310	--	6.9	23.5	--
08...	1230	6.00	--	570	--	--	21.0	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
15...	E740	2.1	--	18	.220	35.0	3.30
15...	E740	1.8	--	--	--	--	--
15...	E740	1.6	--	--	--	--	--
APR							
18...	745	13.7	115	16	.030	1.50	<.100
18...	745	13.7	115	--	--	--	--
18...	745	14.0	117	--	--	--	--
18...	745	14.0	117	--	--	--	--
AUG							
08...	734	11.0	146	20	.020	3.10	<.100
08...	734	8.0	106	--	--	--	--
08...	734	7.1	94	--	--	--	--
08...	734	1.5	20	--	--	--	--
08...	734	.1	1	--	--	--	--
08...	734	<.1	--	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444717093083100 HOLLAND LAKE AT EAGAN, MN

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
FEB										
14...	1100	1.00	>50.0	228	241	7.6	2.5	--	E740	3.2
14...	1102	7.60	--	--	--	--	4.0	--	E740	3.1
14...	1104	10.8	--	--	--	--	4.0	--	E740	2.7
14...	1107	14.1	--	--	--	--	4.0	--	E740	2.5
14...	1110	17.4	--	--	--	--	4.0	--	E740	1.9
14...	1113	24.0	--	--	--	--	4.0	--	E740	1.6
14...	1116	33.8	--	--	--	--	4.0	--	E740	1.0
14...	1120	50.0	--	231	250	7.4	4.0	--	E740	.2
APR										
20...	0955	1.00	51.0	205	222	8.1	7.5	3.2	747	11.7
20...	0957	4.00	--	205	--	--	7.0	--	747	11.7
20...	0959	10.0	--	205	--	--	6.5	--	747	11.3
20...	1001	15.0	--	204	--	--	6.0	--	747	11.0
20...	1003	20.0	--	204	--	--	5.5	--	747	10.3
20...	1005	25.0	--	203	--	7.8	5.0	--	747	10.1
20...	1007	30.0	--	203	--	--	5.0	--	747	9.8
20...	1009	35.0	--	203	--	--	5.0	--	747	9.7
20...	1011	40.0	--	203	--	--	5.0	--	747	9.6
20...	1013	45.0	--	203	--	--	5.0	--	747	9.4
20...	1015	50.0	--	203	224	7.8	5.0	--	747	9.4
AUG										
10...	0930	1.00	>50.0	167	162	8.9	27.0	1.20	730	5.5
10...	0932	5.00	--	167	--	--	26.5	--	730	5.3
10...	0934	10.0	--	183	--	--	24.5	--	730	.2
10...	0936	15.0	--	215	--	--	15.5	--	730	.9
10...	0938	20.0	--	226	--	--	9.5	--	730	2.8
10...	0940	25.0	--	226	--	6.7	6.5	--	730	3.5
10...	0942	30.0	--	226	--	--	5.5	--	730	3.1
10...	0944	35.0	--	230	--	--	5.0	--	730	.3
10...	0946	40.0	--	235	--	--	5.0	--	730	.1
10...	0948	45.0	--	245	--	--	5.0	--	730	.1
10...	0950	50.0	--	255	243	6.6	5.0	--	730	.1
DATE		OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB										
14...	--	10	--	1	.400	.60	.030	.020	1.30	<.100
14...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
14...	--	10	--	1	.300	1.0	.030	.030	--	--
APR										
20...	100	9.5	--	2	<.100	.40	.030	.020	1.80	<.100
20...	98	--	--	--	--	--	--	--	--	--
20...	94	--	--	--	--	--	--	--	--	--
20...	90	--	--	--	--	--	--	--	--	--
20...	83	--	--	--	--	--	--	--	--	--
20...	81	--	--	--	--	--	--	--	--	--
20...	78	--	--	--	--	--	--	--	--	--
20...	78	--	--	--	--	--	--	--	--	--
20...	77	--	--	--	--	--	--	--	--	--
20...	75	--	--	--	--	--	--	--	--	--
20...	75	10	--	20	<.100	.50	.030	.010	--	--
AUG										
10...	72	9.4	--	8	<.100	1.2	.030	<.010	22.0	<.100
10...	69	--	--	--	--	--	--	--	--	--
10...	3	--	--	--	--	--	--	--	--	--
10...	9	--	--	--	--	--	--	--	--	--
10...	26	--	--	--	--	--	--	--	--	--
10...	30	--	--	--	--	--	--	--	--	--
10...	26	--	--	--	--	--	--	--	--	--
10...	2	--	--	--	--	--	--	--	--	--
10...	0	--	--	--	--	--	--	--	--	--
10...	0	--	--	--	--	--	--	--	--	--
10...	0	9.6	--	16	.170	1.9	.250	.100	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444733093120900 BOESEL POND AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
15...	0935	1.40	7.0	124	--	7.2	1.5	--
15...	0937	3.00	--	124	--	7.1	1.5	--
15...	0938	5.00	--	124	--	6.9	3.5	--
15...	0940	6.00	--	140	--	6.5	4.0	--
APR								
18...	1314	1.00	8.0	91	80	7.7	7.0	.30
18...	1316	2.00	--	91	--	8.1	7.0	--
18...	1318	4.00	--	90	--	8.2	7.0	--
18...	1320	6.00	--	90	--	8.2	6.5	--
18...	1323	7.00	--	90	--	8.0	6.0	--
AUG								
08...	1340	1.00	8.0	165	--	8.9	29.5	.70
08...	1342	2.00	--	165	--	--	29.0	--
08...	1344	4.00	--	165	--	7.2	28.5	--
08...	1346	6.00	--	173	--	--	28.0	--
08...	1348	7.00	--	195	--	--	26.0	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
15...	E740	7.4	--	9.1	.050	33.0	15.0
15...	E740	7.5	--	--	--	--	--
15...	E740	3.1	--	--	--	--	--
15...	E740	1.8	--	--	--	--	--
APR							
18...	745	14.1	119	6.0	.200	91.0	20.0
18...	745	14.1	119	--	--	--	--
18...	745	14.1	119	--	--	--	--
18...	745	13.9	116	--	--	--	--
18...	745	13.2	108	--	--	--	--
AUG							
08...	734	9.7	132	5.6	.040	9.80	<.100
08...	734	9.6	130	--	--	--	--
08...	734	9.2	123	--	--	--	--
08...	734	.7	9	--	--	--	--
08...	734	--	--	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444735093100900 THOMAS LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
FEB										
14...	1230	1.50	5.0	267	294	7.4	1.5	--	E740	3.8
14...	1232	3.50	--	--	--	--	3.0	--	E740	1.0
14...	1234	4.50	--	267	--	7.4	5.0	--	E740	.3
APR										
21...	0945	1.00	6.5	215	218	8.4	9.5	1.20	744	13.4
21...	0947	2.00	--	215	--	--	9.0	--	744	14.0
21...	0949	4.00	--	215	--	--	9.0	--	744	14.0
21...	0951	5.50	--	218	--	8.5	8.0	--	744	13.8
AUG										
10...	1150	1.00	6.0	210	210	8.8	25.0	.20	730	4.0
10...	1152	2.00	--	208	--	8.8	25.0	--	730	3.5
10...	1154	4.00	--	208	--	--	25.0	--	730	3.2
10...	1156	5.00	--	206	--	8.8	25.0	--	730	2.1

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB									
14...	--	32	10	.170	1.5	.060	.040	27.0	5.20
14...	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--
APR									
21...	120	23	9	<.100	.80	.050	.010	21.0	<.100
21...	124	--	--	--	--	--	--	--	--
21...	124	--	--	--	--	--	--	--	--
21...	119	--	--	--	--	--	--	--	--
AUG									
10...	51	24	36	<.100	4.0	.190	<.010	210	<.100
10...	44	--	--	--	--	--	--	--	--
10...	41	--	--	--	--	--	--	--	--
10...	27	--	--	--	--	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444738093065200 LAKESIDE ESTATE LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
15...	1305	1.30	9.4	316	332	7.4	1.0	--
15...	1307	3.00	--	316	--	6.9	1.5	--
15...	1309	6.00	--	322	--	6.8	4.0	--
15...	1311	8.50	--	335	--	6.9	4.5	--
APR								
20...	0850	1.00	9.5	228	242	8.0	8.5	1.10
20...	0852	2.00	--	229	--	--	8.5	--
20...	0854	4.00	--	229	--	--	8.0	--
20...	0856	6.00	--	229	--	--	8.0	--
20...	0858	8.00	--	226	--	8.0	6.0	--
AUG								
10...	1110	1.00	9.0	225	233	8.4	26.0	.40
10...	1112	3.00	--	228	--	--	25.5	--
10...	1114	5.00	--	228	--	8.2	25.5	--
10...	1116	6.00	--	242	--	--	23.5	--
10...	1118	8.00	--	400	--	7.6	20.5	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
15...	739	6.6	48	24	.090	140	<.100
15...	739	5.2	38	--	--	--	--
15...	739	1.6	13	--	--	--	--
15...	739	1.5	12	--	--	--	--
APR							
20...	745	11.9	104	17	.020	7.50	<.100
20...	745	11.8	103	--	--	--	--
20...	745	11.6	100	--	--	--	--
20...	745	11.5	99	--	--	--	--
20...	745	11.8	97	--	--	--	--
AUG							
10...	730	5.6	72	19	.080	51.0	<.100
10...	730	4.7	60	--	--	--	--
10...	730	4.7	60	--	--	--	--
10...	730	1.1	14	--	--	--	--
10...	730	.1	1	--	--	--	--



## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444745093095700 WILDERNESS LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
14...	1300	1.00	4.5	261	279	7.4	2.5	--
14...	1302	2.00	--	261	--	--	3.0	--
14...	1304	4.00	--	261	--	7.3	4.0	--
APR								
21...	1010	1.00	7.0	222	221	8.3	10.0	1.60
21...	1015	2.00	--	220	--	--	9.5	--
21...	1019	4.00	--	220	--	--	9.0	--
21...	1022	6.00	--	220	--	8.3	8.5	--
AUG								
10...	1210	1.00	6.0	187	200	8.4	26.0	.40
10...	1212	2.00	--	200	--	8.7	26.0	--
10...	1214	4.00	--	200	--	--	26.0	--
10...	1216	5.00	--	200	--	8.6	25.5	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L) AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
14...	E740	3.3	--	33	.070	39.0	<.100
14...	E740	2.7	--	--	--	--	--
14...	E740	.4	--	--	--	--	--
APR							
21...	744	13.1	119	26	.040	14.0	.400
21...	744	13.0	117	--	--	--	--
21...	744	13.0	115	--	--	--	--
21...	744	11.9	104	--	--	--	--
AUG							
10...	730	8.1	105	20	.090	66.0	<.100
10...	730	7.8	101	--	--	--	--
10...	730	6.2	80	--	--	--	--
10...	730	5.0	64	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444821093124500 CEDAR GROVE POND AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
15...	1035	1.50	6.6	188	198	7.1	5.5	--
15...	1037	3.50	--	195	--	7.0	2.0	--
15...	1039	5.00	--	248	--	7.0	3.0	--
15...	1042	6.00	--	>700	--	6.8	3.5	--
APR								
18...	1357	1.00	8.2	187	186	8.3	8.5	.60
18...	1400	2.00	--	186	--	8.4	8.5	--
18...	1403	4.00	--	184	--	8.6	7.0	--
18...	1406	7.00	--	185	--	8.4	5.5	--
AUG								
09...	1240	1.00	7.5	168	--	10.2	28.0	.20
09...	1242	2.00	--	--	--	--	26.5	--
09...	1244	3.00	--	148	--	10.1	26.0	--
09...	1246	4.00	--	--	--	--	26.0	--
09...	1248	6.50	--	285	--	9.3	24.0	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
15...	E740	E3.4	--	17	.150	19.0	9.00
15...	E740	2.4	--	--	--	--	--
15...	E740	1.9	--	--	--	--	--
15...	E740	--	--	--	--	--	--
APR							
18...	745	13.9	122	33	.100	43.0	11.0
18...	745	14.0	122	--	--	--	--
18...	745	13.9	117	--	--	--	--
18...	745	13.6	110	--	--	--	--
AUG							
09...	742	12.0	158	12	.160	250	<.100
09...	742	9.1	116	--	--	--	--
09...	742	4.5	57	--	--	--	--
09...	742	3.6	46	--	--	--	--
09...	742	.4	5	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444843093090500 MCCARTHY LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
18...	1130	1.00	3.0	510	524	7.3	1.0	--
18...	1132	3.00	--	570	--	--	2.0	--
APR								
21...	0830	1.00	5.5	290	291	7.9	9.5	>1.70
21...	0832	2.00	--	298	--	--	9.5	--
21...	0834	3.00	--	298	--	--	9.0	--
21...	0836	4.50	--	300	--	7.9	9.0	--
AUG								
11...	1230	1.00	5.0	275	--	6.3	22.0	.70
11...	1232	2.50	--	275	--	--	22.0	--
11...	1234	4.00	--	440	--	--	23.0	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
18...	E740	.8	--	10	.260	55.0	6.50
18...	E740	.5	--	--	--	--	--
APR							
21...	746	13.0	116	6.3	.040	4.40	<.100
21...	746	12.9	115	--	--	--	--
21...	746	12.9	114	--	--	--	--
21...	746	13.3	118	--	--	--	--
AUG							
11...	742	3.1	36	3.7	<.010	11.0	<.100
11...	742	1.5	18	--	--	--	--
11...	742	.4	5	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444859093122700 LANGHOVEN LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
APR 21...	1130	1.00	1.3	272	263	8.2	11.5	>.40
AUG 09...	1000	.50	.6	360	--	7.0	28.0	>.20

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
APR 21...	746	11.8	111	14	.100	3.10	<.100
AUG 09...	741	86.5	--	26	.250	110	<.100

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

[illegible]

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444923093095800 FISH LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
FEB										
17...	1025	1.00	28.5	267	283	7.5	1.0	--	E740	7.1
17...	1027	3.00	--	269	--	--	3.5	--	E740	5.6
17...	1028	8.00	--	275	--	--	4.0	--	E740	4.6
17...	1030	13.0	--	276	--	--	4.0	--	E740	3.4
17...	1032	18.0	--	281	--	--	4.0	--	E740	2.6
17...	1034	23.0	--	285	--	--	4.0	--	E740	2.1
17...	1036	28.0	--	288	297	7.3	4.0	--	E740	1.5
APR										
21...	1511	1.00	30.0	300	261	8.5	12.0	3.2	743	13.0
21...	1513	5.00	--	325	--	--	9.0	--	743	13.4
21...	1515	10.0	--	350	--	--	6.5	--	743	13.1
21...	1518	15.0	--	390	--	8.4	5.5	--	743	13.0
21...	1520	20.0	--	390	--	--	5.0	--	743	12.2
21...	1521	25.0	--	390	--	--	5.0	--	743	11.9
21...	1522	29.5	30.0	400	262	8.2	5.0	--	743	11.6
AUG										
11...	1025	1.00	28.0	186	--	6.6	25.0	1.80	741	3.4
11...	1027	5.00	--	186	--	--	25.0	--	741	3.4
11...	1028	9.00	--	188	--	--	25.0	--	741	3.2
11...	1029	11.0	--	188	--	--	24.5	--	741	.3
11...	1030	12.0	--	188	--	--	21.5	--	741	.4
11...	1031	14.0	--	250	--	6.4	18.5	--	741	.4
11...	1033	16.0	--	250	--	--	15.0	--	741	.4
11...	1035	20.0	--	275	--	--	10.5	--	741	.4
11...	1037	24.0	--	275	--	--	8.5	--	741	.4
11...	1039	27.0	--	330	--	6.1	8.0	--	741	.4

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB									
17...	--	18	14	.360	1.1	.020	<.010	2.80	<.100
17...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
17...	--	18	12	.240	1.4	.040	.010	--	--
APR									
21...	124	17	<1	<.100	.50	.020	.020	1.10	<.100
21...	119	--	--	--	--	--	--	--	--
21...	109	--	--	--	--	--	--	--	--
21...	106	--	--	--	--	--	--	--	--
21...	98	--	--	--	--	--	--	--	--
21...	96	--	--	--	--	--	--	--	--
21...	93	17	4	<.100	.60	.030	<.010	--	--
AUG									
11...	42	14	--	<.100	--	.020	--	5.50	<.100-
11...	42	--	--	--	--	--	--	--	--
11...	40	--	--	--	--	--	--	--	--
11...	4	--	--	--	--	--	--	--	--
11...	5	--	--	--	--	--	--	--	--
11...	4	--	--	--	--	--	--	--	--
11...	4	--	--	--	--	--	--	--	--
11...	4	--	--	--	--	--	--	--	--
11...	4	--	--	--	--	--	--	--	--
11...	3	18	12	.190	.70	.030	.010	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

445026093065100 BURVIEW PARK POND AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
18...	1000	1.00	6.5	695	651	7.2	2.0	--
18...	1002	3.00	--	712	--	--	3.5	--
18...	1004	6.00	--	775	--	7.1	4.0	--
APR								
19...	1342	1.00	8.7	499	502	6.8	9.5	1.10
19...	1344	2.00	--	499	--	7.2	9.5	--
19...	1346	4.00	--	499	--	7.4	9.0	--
19...	1348	6.00	--	503	--	7.5	7.0	--
19...	1350	7.70	--	507	--	7.3	6.5	--
AUG								
12...	1120	1.00	8.5	425	444	6.8	23.0	.80
12...	1122	2.00	--	430	--	--	23.0	--
12...	1123	3.00	--	--	--	--	22.5	--
12...	1124	4.20	--	440	--	7.0	22.5	--
12...	1126	6.00	--	650	--	--	16.5	--
12...	1128	7.50	--	750	--	6.6	14.5	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
18...	738	1.5	11	35	.550	2.00	<.100
18...	738	1.5	12	--	--	--	--
18...	738	1.3	10	--	--	--	--
APR							
19...	746	13.4	120	36	.040	8.90	<.100
19...	746	13.3	119	--	--	--	--
19...	746	13.5	119	--	--	--	--
19...	746	13.5	114	--	--	--	--
19...	746	11.7	97	--	--	--	--
AUG							
12...	740	7.6	91	31	.050	26.0	<.100
12...	740	7.5	90	--	--	--	--
12...	740	5.9	70	--	--	--	--
12...	740	3.3	39	--	--	--	--
12...	740	.1	1	--	--	--	--
12...	740	<.1	--	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

445035093074600 DONALDSON'S POND AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
17...	0815	1.00	17.0	243	252	7.6	3.0	--
17...	0817	8.50	--	241	--	7.4	3.5	--
17...	0819	16.5	--	1190	--	7.2	5.0	--
APR								
19...	1036	1.00	21.2	253	264	8.5	7.5	1.30
19...	1038	4.00	--	252	--	--	6.5	--
19...	1040	8.00	--	252	--	--	5.5	--
19...	1042	12.0	--	252	--	8.0	5.5	--
19...	1044	16.0	--	252	--	--	5.0	--
19...	1046	19.0	--	266	--	7.5	5.0	--
AUG								
11...	1440	1.00	22.0	207	--	8.1	25.0	1.00
11...	1442	4.00	--	205	--	--	25.0	--
11...	1444	8.00	--	209	--	--	25.0	--
11...	1445	9.00	--	223	--	--	19.0	--
11...	1446	10.0	--	227	--	--	18.0	--
11...	1447	12.0	--	235	--	7.8	15.5	--
11...	1448	16.0	--	303	--	--	11.5	--
11...	1450	21.0	--	495	--	7.5	9.0	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
17...	E740	6.3	--	30	.080	24.0	5.40
17...	E740	5.2	--	--	--	--	--
17...	E740	2.0	--	--	--	--	--
APR							
19...	746	12.6	107	39	.050	14.0	3.00
19...	746	12.7	106	--	--	--	--
19...	746	12.4	101	--	--	--	--
19...	746	11.6	94	--	--	--	--
19...	746	10.2	82	--	--	--	--
19...	746	7.8	62	--	--	--	--
AUG							
11...	742	8.2	102	28	.030	27.0	<.100
11...	742	8.0	100	--	--	--	--
11...	742	7.9	98	--	--	--	--
11...	742	.1	1	--	--	--	--
11...	742	.2	2	--	--	--	--
11...	742	.4	4	--	--	--	--
11...	742	.1	0	--	--	--	--
11...	742	.1	0	--	--	--	--



## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

445042093094300 LEMAY LAKE AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
17...	0915	1.00	6.5	445	468	7.5	1.0	--
17...	0917	3.00	--	438	--	--	3.5	--
17...	0919	6.00	--	463	--	7.4	4.5	--
APR								
19...	0957	1.00	8.5	366	373	8.4	7.5	1.10
19...	1001	2.00	--	367	--	--	7.0	--
19...	1004	4.00	--	366	--	--	7.0	--
19...	1007	6.00	--	366	--	--	6.5	--
19...	1010	7.50	--	366	--	8.2	6.5	--
AUG								
11...	1320	1.00	8.5	295	--	6.5	24.0	.50
11...	1324	2.00	--	290	--	--	24.0	--
11...	1326	4.00	--	290	--	6.6	24.0	--
11...	1328	6.00	--	290	--	--	24.0	--
11...	1330	7.50	--	300	--	6.8	23.5	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
17...	E740	3.1	--	33	.030	3.80	2.20
17...	E740	2.0	--	--	--	--	--
17...	E740	1.4	--	--	--	--	--
APR							
19...	746	11.9	101	32	.050	11.0	<.100
19...	746	11.9	100	--	--	--	--
19...	746	11.7	99	--	--	--	--
19...	746	11.8	98	--	--	--	--
19...	746	11.4	95	--	--	--	--
AUG							
11...	741	3.7	45	31	.080	41.0	<.100
11...	741	3.6	44	--	--	--	--
11...	741	3.6	44	--	--	--	--
11...	741	3.5	43	--	--	--	--
11...	741	1.0	12	--	--	--	--

## ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

445115093062100 SHANAHAN POND AT EAGAN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	RESER- VOIR DEPTH (FEET) (72025)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
FEB								
18...	0900	1.00	4.5	94	115	7.0	2.0	--
18...	0902	2.00	--	94	--	6.9	2.5	--
18...	0904	4.00	--	96	--	6.8	3.0	--
APR								
19...	1242	1.00	8.1	68	82	8.1	9.0	2.10
19...	1244	2.00	--	68	--	--	9.0	--
19...	1246	4.00	--	68	--	--	8.5	--
19...	1248	6.00	--	69	--	--	8.0	--
19...	1250	7.00	--	70	--	8.0	8.0	--
AUG								
12...	1010	1.00	7.2	105	108	6.5	25.0	.50
12...	1012	2.00	--	105	--	--	24.0	--
12...	1014	3.60	--	105	--	6.3	24.0	--
12...	1016	5.00	--	108	--	--	24.0	--
12...	1018	6.20	--	104	--	6.1	23.0	--

DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
FEB							
18...	737	5.4	40	4.4	.070	25.0	<.100
18...	737	5.0	38	--	--	--	--
18...	737	4.1	31	--	--	--	--
APR							
19...	745	11.4	101	3.4	.030	4.00	<.100
19...	745	11.5	102	--	--	--	--
19...	745	11.6	101	--	--	--	--
19...	745	11.9	103	--	--	--	--
19...	745	11.9	103	--	--	--	--
AUG							
12...	740	8.2	102	2.7	.050	41.0	<.100
12...	740	8.3	102	--	--	--	--
12...	740	4.9	60	--	--	--	--
12...	740	2.5	31	--	--	--	--
12...	740	2.4	29	--	--	--	--

## ANALYSIS OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

441246095294802 LAKE LAURA NORTH INLET NEAR WALNUT GROVE, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	
MAY										
09...	1700	E5.0	--	--	--	E730	15.5	14.0	--	
11...	1630	1.5	1110	1140	8.1	730	26.0	18.5	13.7	
17...	1125	.61	1090	--	8.4	--	--	11.5	14.8	
JUN										
03...	1140	.53	1160	--	7.8	725	--	15.0	9.4	
27...	1200	.75	1190	1240	7.5	728	--	15.5	5.6	
JUL										
13...	1020	.43	1180	--	7.8	730	--	19.0	6.5	
28...	1050	.28	1200	1240	7.7	730	30.0	22.0	6.4	
DATE		COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE IT-FLD (MG/L AS HCO3) (99440)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)
MAY										
09...	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	120	46	11	3.3	--	--	242
17...	--	--	--	--	--	--	--	298	244	--
JUN										
03...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	170	62	15	1.4	--	--	269
JUL										
13...	K120	5300	--	--	--	--	--	--	--	--
28...	--	--	--	160	60	15	1.8	400	328	331
DATE		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)
MAY										
09...	--	--	--	--	--	--	--	--	<.01	25
11...	260	11	.70	13	556	12.0	.60	<.01	--	18
17...	--	--	--	--	--	--	--	--	--	23
JUN										
03...	--	--	--	--	--	--	--	--	--	55
27...	360	19	1.3	25	923	13.0	.90	.03	--	--
JUL										
13...	--	--	--	--	--	--	--	--	--	--
28...	160	18	1.2	29	799	10.0	1.0	.35	--	--
DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. FALL DIAM. % FINER THAN .062 MM (80158)	BED MAT. FALL DIAM. % FINER THAN .125 MM (80159)	BED MAT. FALL DIAM. % FINER THAN .250 MM (80160)	BED MAT. FALL DIAM. % FINER THAN .500 MM (80161)	BED MAT. FALL DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. FALL DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. FALL DIAM. % FINER THAN 4.00 MM (80170)	
MAY										
12...	1400	38	67	71	77	83	89	94	100	

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT									
14...	1150	1.4	--	--	--	--	--	--	--
27...	1325	1.2	809	813	7.8	714	--	10.0	10.0
FEB									
10...	1515	1.3	796	816	--	721	-1.0	1.0	11.7
MAR									
02...	1620	1.2	810	--	--	--	--	6.0	--
APR									
05...	1530	26	584	--	8.2	E725	--	4.5	14.9
06...	1350	23	596	630	8.1	724	2.5	3.0	12.7
07...	1140	22	596	--	8.4	725	7.5	5.0	12.2
11...	1330	16	662	--	8.1	E725	--	9.0	14.1
21...	1800	27	687	--	7.7	720	--	14.5	9.1
MAY									
26...	1415	2.8	853	--	7.7	722	--	14.0	--
JUN									
09...	1155	E2.0	797	--	8.2	E725	--	14.0	12.4
22...	1300	1.8	801	813	8.2	725	--	20.5	9.7
JUL									
11...	1140	1.1	794	--	8.0	725	21.0	16.5	10.0
27...	1235	1.6	909	798	9.1	720	--	19.0	--
AUG									
23...	1155	1.1	799	812	7.9	727	24.0	16.0	9.2
SEP									
14...	1250	1.6	796	--	8.0	728	17.0	13.0	10.7
26...	1138	1.3	--	--	8.0	E730	21.0	12.0	11.9

[illegible]

## ANALYSIS OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444726096274201 WEST BRANCH LAC QUI PARLE RIVER NEAR GARY, SD--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)
OCT									
14...	--	--	--	--	--	--	--	--	--
27...	170	5.7	.30	26	502	<.10	.20	.05	4
FEB									
10...	160	2.4	.20	25	525	<.10	<.10	<.01	--
MAR									
02...	--	--	--	--	--	--	--	--	16
APR									
05...	--	--	--	--	--	--	--	--	25
06...	120	3.8	.20	18	418	<.10	.90	.06	14
07...	--	--	--	--	--	--	--	--	11
11...	--	--	--	--	--	--	--	.05	--
21...	--	--	--	--	--	--	--	.06	25
MAY									
26...	--	--	--	--	--	--	--	--	--
JUN									
09...	--	--	--	--	--	--	--	--	--
22...	170	2.6	.30	24	578	<.10	.30	.02	--
JUL									
11...	--	--	--	--	--	--	--	--	--
27...	170	2.3	.30	26	446	<.10	.10	.03	--
AUG									
23...	170	2.3	.20	27	476	<.10	.10	.04	--
SEP									
14...	--	--	--	--	--	--	--	--	4
26...	--	--	--	--	--	--	--	--	2

DATE	TIME	BED MAT. SIEVE DIAM. % FINER THAN (80164)	BED MAT. SIEVE DIAM. % FINER THAN (80165)	BED MAT. SIEVE DIAM. % FINER THAN (80166)	BED MAT. SIEVE DIAM. % FINER THAN (80167)	BED MAT. SIEVE DIAM. % FINER THAN (80168)	BED MAT. SIEVE DIAM. % FINER THAN (80169)	BED MAT. SIEVE DIAM. % FINER THAN (80170)	BED MAT. SIEVE DIAM. % FINER THAN (80171)	BED MAT. SIEVE DIAM. % FINER THAN (80172)	BED MAT. SIEVE DIAM. % FINER THAN (80173)	BED MAT. SIEVE DIAM. % FINER THAN (80174)
APR												
06...	1530	1	1	4	16	30	40	48	58	73	85	100
MAY												
26...	1415	1	2	5	15	27	53	68	78	90	100	--

## ANALYSIS OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444900096240000 WEBBER IMPOUNDMENT NEAR GARY, SD

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT						
14...	1225	.50	473	7.4	9.0	9.8
14...	1228	3.0	473	7.6	9.0	9.8
14...	1230	6.0	472	7.7	9.0	9.8
14...	1233	7.0	472	7.7	9.0	9.7
28...	1234	.50	495	7.9	9.0	10.1
28...	1236	3.0	492	7.9	9.0	10.0
28...	1238	6.0	495	8.0	9.0	10.0
28...	1240	8.3	495	8.0	9.0	10.0
APR						
07...	1038	.50	726	8.5	4.0	12.8
07...	1041	3.0	725	8.3	4.0	12.9
MAY						
26...	1508	.50	917	8.4	16.0	11.0
26...	1510	3.0	915	8.4	16.0	11.0
26...	1513	6.0	916	8.4	16.0	10.8
26...	1514	9.0	915	8.4	15.5	10.8
26...	1515	12.0	918	8.3	15.0	9.4
JUN						
22...	1015	.50	875	8.2	23.0	7.6
22...	1018	3.0	878	8.2	23.0	7.4
22...	1021	6.0	878	8.1	23.0	7.5
22...	1023	9.0	880	8.0	23.0	7.4
22...	1025	12.0	884	8.0	19.0	7.4
JUL						
11...	1256	.50	840	8.7	25.0	11.2
11...	1258	3.0	842	8.7	25.0	11.2
11...	1303	6.0	841	8.7	25.0	11.1
11...	1306	9.0	842	8.7	24.5	10.7
11...	1308	11.0	887	7.6	22.5	2.1
AUG						
23...	0938	.50	889	7.6	23.5	5.2
23...	0941	3.0	892	7.8	23.5	4.5
23...	0943	6.0	893	7.6	23.5	4.0
23...	0945	9.0	895	7.4	23.5	1.7
23...	0948	9.9	903	7.4	23.0	1.3
SEP						
14...	1315	.50	875	8.6	17.0	9.6
14...	1318	3.0	876	8.5	17.0	9.8
14...	1322	6.0	877	8.4	16.5	8.6
14...	1325	9.0	882	8.1	16.5	6.1

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	DEPTH TO BOT- TOM OF SAMPLE INTER- VAL (FT) (72016)	RESER- VOIR DEPTH (FEET) (72025)	LAKE STAGE (FT ABOVE DATUM) (00065)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
OCT												
14...	1233	--	7.0	7.6	17.03	472	--	7.7	725	--	9.0	1.40
28...	1240	8.3	7.8	8.8	16.97	495	508	8.0	718	--	9.0	1.60
APR												
07...	1041	--	3.0	--	22.34	725	--	8.3	E730	--	4.0	--
MAY												
26...	1515	12.0	--	--	--	918	--	8.3	E730	--	15.0	--
26...	1518	--	12	13.3	11.90	--	--	--	--	--	--	2.30
JUN												
22...	1020	--	7.5	12.3	20.91	--	897	--	--	--	--	1.50
JUL												
11...	1300	--	3.6	11.9	20.50	--	--	--	--	--	--	.70
11...	1308	11.0	--	--	--	887	--	7.6	731	--	22.0	--
AUG												
23...	0940	--	4.5	10.4	19.01	--	908	--	732	21.0	--	.90
SEP												
14...	1320	--	4.0	10.4	18.94	--	--	--	733	19.0	--	.80

## ANALYSIS OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444900096240000 WEBBER IMPOUNDMENT NEAR GARY, SD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCHI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	BICARBONATE IT-FLD AS HCO3) (99440)	ALKALINITY, CARBONATE IT-PLD (MG/L - CAC03) (99430)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 14...	--	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	45	27	5.0	.4	--	--	323	<.10	<.10	.02
APR 07...	--	--	--	--	--	--	--	--	--	--	.82	--
MAY 26...	--	--	--	--	--	--	182	149	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--	--
JUN 22...	--	--	100	48	6.9	3.9	159	130	651	--	<.10	--
JUL 11...	--	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 23...	--	--	92	54	8.3	11	169	138	718	--	<.10	--
SEP 14...	2	2300	--	--	--	--	--	--	--	--	--	--

DATE	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, ORGANIC DIS-SOLVED (MG/L AS N) (00607)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITROGEN, AMMONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CHLOR-A PHYTO-PLANKTON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO-PLANKTON CHROMO FLUOROM (UG/L) (70954)	PHYTO-PLANKTON, TOTAL (CELLS PER ML) (60050)
OCT 14...	--	--	--	--	.05	--	--	--	--	--
28...	--	--	1.0	--	.05	--	--	1.50	<.100	1500
APR 07...	.06	1.2	--	1.3	.09	.05	.02	3.00	<.100	--
MAY 26...	--	--	--	--	.07	--	--	.600	<.100	1600
26...	--	--	--	--	--	--	--	--	--	--
JUN 22...	.04	.96	--	1.0	.09	.05	<.05	.400	<.100	4300
JUL 11...	--	--	--	--	.09	--	--	91.0	<.100	--
11...	--	--	--	--	.16	--	--	--	--	--
AUG 23...	.20	1.5	--	1.7	.15	.06	.06	--	--	--
SEP 14...	--	--	--	--	--	--	--	41.0	11.0	70000

## ANALYSIS OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

444900096240002 WEBBER IMPOUNDMENT INLET NEAR GARY, SD

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
APR										
01...	1415	.18	--	--	7.9	--	9.0	12.0	--	--
06...	1100	.95	1260	1320	8.3	730	4.5	4.5	15.8	170

DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LILITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)
APR										
01...	--	--	--	--	--	--	--	--	--	--
06...	68	20	7.0	225	530	4.0	.20	21	1010	2



## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS

Field determinations of water temperature and specific conductance are made at many streamflow stations in addition to those that are also regular water-quality stations. These data are usually collected at regular intervals during routine visits to the station. Additional data for each station are published elsewhere in this report.

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05211000 MISSISSIPPI RIVER AT GRAND RAPIDS, MN							
OCT. 15, 1982...	1820	11.0	260	MAR. 16.....	205	3.0	270
OCT. 26.....	2150	8.5	135	APR. 04.....	592	2.5	330
NOV. 04.....	2080	4.0	275	MAY 02.....	179	11.0	---
NOV. 18.....	2120	4.0	290	MAY 09.....	190	14.5	285
DEC. 21.....	2080	4.0	360	JUNE 22.....	1400	20.5	250
JAN. 10, 1983...	2130	1.0	280	JUNE 30.....	1270	21.5	263
JAN. 28.....	2030	.5	308	JULY 05.....	2380	20.5	260
FEB. 15.....	1960	.5	322	AUG. 22.....	1770	24.5	298
MAR. 07.....	1420	3.0	290	SEPT. 09.....	1100	23.0	266
05212700 PRAIRIE RIVER NEAR TACONITE, MN							
NOV. 15, 1982...	249	2.0	120	APR. 06.....	238	1.0	---
JAN. 14, 1983...	106	.5	150	MAY 02.....	324	6.0	125
FEB. 10.....	76	.0	168	JUNE 28.....	254	22.5	115
MAR. 08.....	212	.5	155	AUG. 25.....	86	23.0	148
05216820 INITIAL TAILINGS BASIN OUTFLOW NEAR KEEWATIN, MN							
OCT. 07, 1982...	11	8.0	260	APR. 19.....	.79	3.5	384
APR. 06, 1983...	1.7	.5	240	MAY 02.....	.06	9.5	570
APR. 12.....	.82	2.0	340				
05216860 SWAN RIVER NEAR CALUMET, MN							
NOV. 15, 1982...	83	3.0	280	APR. 06.....	94	2.0	310
DEC. 21.....	59	.5	320	MAY 02.....	85	6.0	280
JAN. 11, 1983...	56	.5	340	JUNE 28.....	74	19.5	308
FEB. 15.....	46	1.0	320	AUG. 25.....	38	25.0	298
MAR. 08.....	72	.5	280				
05227500 MISSISSIPPI RIVER AT AITKIN, MN							
NOV. 16, 1982...	2210	3.0	---	MAY 04.....	2470	8.5	215
JAN. 13, 1983...	2030	.0	290	JUNE 29.....	2670	21.0	---
MAR. 11.....	2710	.5	216	AUG. 23.....	2360	24.0	296
APR. 13.....	3440	1.0	200				

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05245100 LONG PRAIRIE RIVER AT LONG PRAIRIE, MN							
OCT. 01, 1982...	72	10.0	500	MAR. 25.....	179	4.0	480
NOV. 08.....	108	3.0	475	MAY 24.....	129	17.0	480
DEC. 21.....	88	.5	490	JUNE 27.....	125	---	---
FEB. 01, 1983...	70	.5	480	AUG. 26.....	81	25.0	480
MAR. 14.....	432	2.0	460				
05247500 CROW WING RIVER NEAR PILLAGER, MN							
DEC. 01, 1982...	1420	.0	435	JUNE 28.....	3660	24.0	350
JAN. 20, 1983...	911	.5	270	AUG. 24.....	788	26.0	340
MAR. 09.....	3130	.0	225	SEPT. 27.....	695	13.5	380
05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN							
OCT. 20, 1982...	12100	8.5	370	APR. 04.....	6160	4.0	290
DEC. 14.....	5770	.0	310	JUNE 15.....	8710	20.0	285
FEB. 09, 1983...	4090	.0	290	AUG. 22.....	3610	28.0	240
05275000 ELK RIVER NEAR BIG LAKE, MN							
NOV. 05, 1982...	247	2.5	345	APR. 19.....	726	7.0	285
DEC. 21.....	196	.0	400	JUNE 22.....	605	21.0	215
FEB. 16, 1983...	170	.5	375	AUG. 04.....	242	27.0	250
MAR. 02.....	508	.0	310	AUG. 17.....	168	22.0	335
MAR. 09.....	1320	---	---				
05278000 MIDDLE FORK CROW RIVER NEAR SPICER, MN							
OCT. 05, 1982...	58	14.0	400	APR. 22.....	177	11.0	430
DEC. 01.....	105	---	---	JUNE 13.....	43	22.0	420
FEB. 01, 1983...	66	.5	460	JUNE 27.....	317	---	---
MAR. 14.....	195	---	---	JULY 08.....	297	26.0	400
MAR. 25.....	206	3.0	440	AUG. 16.....	84	26.5	370
05280000 CROW RIVER AT ROCKFORD, MN							
OCT. 25, 1982...	1170	8.5	725	MAR. 28.....	2980	3.0	590
NOV. 29.....	2310	.0	870	APR. 05.....	3480	5.5	385
DEC. 01.....	2310	1.0	740	APR. 26.....	3750	14.5	620
DEC. 27.....	1040	.5	610	MAY 25.....	1410	16.5	670
JAN. 24, 1983...	638	.0	---	JUNE 27.....	3260	23.5	500
FEB. 23.....	968	.0	---	JULY 27.....	1950	24.5	585
MAR. 03.....	2870	.0	480	AUG. 30.....	704	24.5	540
MAR. 07.....	4960	2.5	495	SEPT. 26.....	534	11.0	565

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCTANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCTANCE (MICRO- MHOS)
05286000 RUM RIVER NEAR ST. FRANCIS, MN							
OCT. 06, 1982...	502	14.5	290	APR. 22.....	2520	9.0	195
NOV. 29.....	1390	.0	230	JUNE 29.....	1300	21.0	250
JAN. 31, 1983...	414	.0	330	AUG. 04.....	432	22.0	280
MAR. 02.....	799	.0	300	AUG. 26.....	485	24.0	280
MAR. 09.....	2730	---	---				
05287890 ELM CREEK NEAR CHAMPLIN, MN							
OCT. 06, 1982...	4.0	14.0	650	APR. 26.....	123	14.5	490
NOV. 22.....	26	2.0	515	MAY 31.....	19	14.5	520
DEC. 30.....	11	1.0	430	JULY 05.....	36	---	370
JAN. 27, 1983...	5.4	.0	515	AUG. 24.....	11	19.5	530
MAR. 04.....	164	.5	350	AUG. 26.....	15	---	---
MAR. 10.....	397	1.0	335	SEPT. 09.....	33	21.0	430
MAR. 24.....	86	2.5	410	SEPT. 26.....	14	11.5	460
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN							
NOV. 08, 1982...	9910	3.5	300	MAY 19.....	9130	13.5	430
MAR. 23, 1983...	15000	2.0	505	JULY 29.....	9220	17.0	385
05288840 BASSETT CREEK IN GOLDEN VALLEY, MN							
OCT. 04, 1982...	5.4	14.5	630	MAY 20.....	36	13.0	600
NOV. 17.....	6.9	1.5	900	MAY 31.....	19	13.5	630
MAR. 04, 1983...	45	2.5	600	JULY 11.....	18	24.5	580
APR. 01.....	56	3.5	750				
05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SOUTH DAKOTA							
OCT. 04, 1982...	2.4	13.0	1300	MAR. 21.....	113	.5	750
NOV. 29.....	4.0	1.0	2100	APR. 05.....	137	4.5	600
JAN. 05, 1983...	3.8	.5	1500	JUNE 15.....	7.5	19.0	1300
FEB. 25.....	9.0	.5	1190	AUG. 16.....	8.6	---	850
05292000 MINNESOTA RIVER AT ORTONVILLE, MN							
OCT. 04, 1982...	4.1	14.5	1500	MAR. 21.....	269	---	---
NOV. 29.....	3.7	2.0	2900	APR. 19.....	33	8.5	1475
JAN. 05, 1983...	4.3	1.0	1850	JUNE 15.....	4.4	19.0	1550
FEB. 25.....	5.9	1.0	1275	AUG. 15.....	4.6	27.0	1450

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCTANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCTANCE (MICRO- MHOS)
05293000 YELLOW BANK RIVER NEAR ODESSA, MN							
OCT. 04, 1982...	0.99	15.0	1150	MAR. 21.....	48	.0	800
NOV. 10.....	1.5	4.0	790	APR. 05.....	166	4.0	520
JAN. 05, 1983...	2.1	.5	1275	JULY 01.....	19	25.0	900
FEB. 25.....	12	.5	700	AUG. 16.....	1.0	25.0	940
05294000 POMME DE TERRE RIVER AT APPLETON, MN							
OCT. 04, 1982...	48	15.0	950	APR. 27.....	116	15.0	900
NOV. 22.....	73	.0	760	JULY 01.....	68	25.0	810
JAN. 25, 1983...	48	.0	800	AUG. 08.....	17	29.0	780
MAR. 04.....	127	1.5	650				
05300000 LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MN							
OCT. 05, 1982...	2.5	14.0	1400	MAR. 23.....	219	3.0	1200
DEC. 06.....	54	1.0	1400	APR. 08.....	651	9.0	1100
JAN. 25, 1983...	6.5	.0	1800	JULY 01.....	84	26.0	1400
MAR. 04.....	212	2.0	750	AUG. 09.....	6.0	28.0	1400
05301000 MINNESOTA RIVER NEAR LAC QUI PARLE, MN							
OCT. 13, 1982...	666	11.0	725	MAR. 23.....	1250	5.0	850
NOV. 24.....	349	---	---	APR. 19.....	1410	5.0	1050
JAN. 04, 1983...	217	---	---	JULY 06.....	940	22.0	980
MAR. 11.....	1300	2.0	890	AUG. 17.....	48	---	---
05304500 CHIPPEWA RIVER NEAR MILAN, MN							
OCT. 05, 1982...	215	14.5	675	MAY 11.....	478	17.5	850
DEC. 06.....	425	.5	---	JULY 14.....	376	26.0	720
JAN. 26, 1983...	137	---	925	SEPT. 01.....	442	---	---
MAR. 15.....	950	1.5	710	SEPT. 21.....	335	---	690
05311000 MINNESOTA RIVER AT MONTEVIDEO, MN							
OCT. 13, 1982...	679	11.0	700	MAY 11.....	1180	18.0	1000
OCT. 22.....	1050	---	---	JUNE 02.....	381	21.0	1000
NOV. 22.....	306	.5	700	AUG. 01.....	234	---	---
JAN. 04, 1983...	292	.5	1000	AUG. 19.....	98	---	---
JAN. 28.....	256	---	---	SEPT. 21.....	474	12.0	740
MAR. 07.....	1050	---	---	SEPT. 28.....	275	---	---
MAR. 11.....	1530	---	---				

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05313500 YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MN							
OCT. 04, 1982...	7.4	---	---	APR. 18.....	929	4.5	1475
NOV. 30.....	149	.5	800	MAY 09.....	1900	15.0	940
JAN. 18, 1983...	26	.5	1500	JULY 14.....	227	27.0	1450
MAR. 07.....	1450	---	800	SEPT. 01.....	11	27.0	---
05315000 REDWOOD RIVER NEAR MARSHALL, MN							
OCT. 04, 1982...	30	12.0	1175	MAR. 23.....	311	4.5	1000
NOV. 30.....	151	.5	1200	APR. 08.....	667	7.0	900
JAN. 19, 1983...	24	.0	1500	APR. 18.....	641	5.0	1000
MAR. 02.....	876	2.0	540	MAY 07.....	2640	10.5	420
MAR. 03.....	1370	4.5	520	JUNE 16.....	160	18.5	1100
MAR. 07.....	1150	---	---	AUG. 17.....	10	26.0	1100
MAR. 15.....	579	2.5	480				
05316500 REDWOOD RIVER NEAR REDWOOD FALLS, MN							
OCT. 04, 1982...	112	15.0	1300	MAR. 18.....	1210	3.0	750
DEC. 03.....	539	---	---	APR. 04.....	1510	5.0	1200
DEC. 14.....	209	---	---	MAY 09.....	4130	14.0	780
JAN. 26, 1983...	59	.0	1650	JUNE 17.....	522	17.5	1500
MAR. 03.....	849	2.0	900	AUG. 17.....	33	27.5	1300
MAR. 08.....	1620	.0	900				
05317000 COTTONWOOD RIVER NEAR NEW ULM, MN							
OCT. 27, 1982...	553	8.5	---	MAR. 09.....	4610	.0	---
NOV. 03.....	385	6.0	1550	APR. 19.....	3380	6.0	995
DEC. 08.....	514	.0	1500	APR. 21.....	2970	---	---
JAN. 05, 1983...	193	.0	1450	MAY 10.....	9150	18.0	650
FEB. 23.....	1640	.5	1640	MAY 26.....	990	17.0	1050
MAR. 01.....	2270	1.0	880	JUNE 14.....	781	18.5	900
MAR. 03.....	3020	.5	825	AUG. 10.....	142	24.0	910
05317200 LITTLE COTTONWOOD RIVER NEAR COURTLAND, MN							
OCT. 27, 1982...	102	13.0	---	MAR. 03.....	507	1.0	590
DEC. 09.....	47	.0	800	APR. 20.....	478	9.0	---
JAN. 05, 1983...	34	.5	1040	MAY 10.....	632	---	---
FEB. 23.....	226	.5	505	JUNE 14.....	142	19.0	755
FEB. 24.....	260	---	---	JUNE 16.....	136	---	---
FEB. 28.....	424	.5	---	AUG. 10.....	24	---	1040

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05319500 WATONWAN RIVER NEAR GARDEN CITY, MN							
NOV. 03, 1982...	410	6.0	925	MAR. 08.....	3470	2.0	720
JAN. 06, 1983...	320	.0	1100	APR. 19.....	3160	6.0	710
FEB. 28.....	2520	.5	670	MAY 11.....	1670	13.5	945
MAR. 02.....	2500	---	615	JUNE 16.....	945	16.5	815
MAR. 03.....	2630	2.0	635	AUG. 09.....	89	26.0	710
05320000 BLUE EARTH RIVER NEAR RAPIDAN, MN							
OCT. 29, 1982...	2170	9.5	---	APR. 19.....	11500	5.0	640
JAN. 06, 1983...	1470	.0	990	JUNE 16.....	3220	---	---
FEB. 24.....	4250	.5	485	AUG. 10.....	374	26.0	670
MAR. 01.....	8090	.5	590	SEPT. 13.....	134	16.5	470
MAR. 02.....	9470	---	---				
05320500 LE SUEUR RIVER NEAR RAPIDAN, MN							
OCT. 29, 1982...	763	9.7	---	APR. 18.....	5000	6.0	710
JAN. 07, 1983...	595	.0	880	JUNE 16.....	1580	19.5	655
FEB. 28.....	3290	.5	450	AUG. 11.....	82	21.0	742
MAR. 02.....	5900	---	435	SEPT. 13.....	48	18.0	610
MAR. 03.....	6940	1.0	420				
05325000 MINNESOTA RIVER AT MANKATO, MN							
NOV. 04, 1982...	3580	4.5	1080	MAR. 04.....	23200	3.5	825
JAN. 07, 1983...	3200	.0	830	MAR. 09.....	27600	.5	720
FEB. 24.....	10900	.5	615	APR. 18.....	32300	5.5	805
MAR. 01.....	16400	1.5	665	JUNE 17.....	10300	18.0	850
MAR. 02.....	20400	1.5	615	AUG. 11.....	1170	25.0	850
05327000 HIGH ISLAND CREEK NEAR HENDERSON, MN							
OCT. 13, 1982...	80	11.0	1000	APR. 21.....	559	8.0	900
OCT. 26.....	77	10.0	---	APR. 25.....	404	7.5	850
DEC. 08.....	126	.0	1080	MAY 26.....	106	18.5	620
JAN. 04, 1983...	70	.0	990	JULY 07.....	304	25.0	760
FEB. 08.....	22	.5	1250	JULY 11.....	245	26.0	285
FEB. 25.....	169	.5	455	AUG. 02.....	71	---	---
MAR. 04.....	614	3.0	570	AUG. 29.....	59	25.0	700
MAR. 30.....	243	4.0	820	SEPT. 23.....	42	8.0	880

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05330000 MINNESOTA RIVER NEAR JORDAN, MN							
OCT. 18, 1982...	4090	11.5	1000	MAR. 28.....	14000	3.0	955
NOV. 09.....	3580	4.0	1030	APR. 11.....	27800	5.5	850
DEC. 20.....	4480	1.0	1150	MAY 24.....	13100	16.0	925
JAN. 25, 1983...	2610	.0	1200	JUNE 28.....	11400	18.5	990
FEB. 24.....	8680	.0	545	AUG. 23.....	1130	22.0	850
FEB. 28.....	12000	.5	565	SEPT. 28.....	1650	17.0	825
05331000 MISSISSIPPI RIVER AT ST. PAUL, MN							
MAR. 11, 1983...	59700	1.0	410	JULY 07.....	45100	23.0	---
05336700 KETTLE RIVER BELOW SANDSTONE, MN							
OCT. 01, 1982...	347	13.5	130	MAY 17.....	750	13.0	95
NOV. 23.....	2630	.0	75	AUG. 02.....	273	22.5	155
JAN. 19, 1983...	220	.0	210	SEPT. 28.....	365	15.5	120
MAR. 11.....	2190	.0	---				
05337400 KNIFE RIVER NEAR MORA, MN							
NOV. 14, 1982...	43	.0	165	MAY 17.....	83	18.0	105
JAN. 20, 1983...	20	.0	230	JULY 08.....	214	25.0	---
MAR. 10.....	556	.0	100	AUG. 03.....	12	25.0	145
APR. 08.....	342	4.5	85	AUG. 24.....	12	19.5	160
APR. 13.....	370	3.0	85	SEPT. 06.....	33	8.0	125
05340050 SUNRISE RIVER NEAR LINDSTROM, MN							
OCT. 08, 1982...	76	12.0	285	JUNE 08.....	63	20.0	280
NOV. 16.....	111	1.0	270	AUG. 03.....	108	27.0	285
JAN. 13, 1983...	119	.0	350	AUG. 09.....	100	---	---
MAR. 01.....	90	2.0	350	SEPT. 06.....	54	21.5	270
APR. 22.....	393	13.0	195				
05344500 MISSISSIPPI RIVER AT PRESCOTT, WISCONSIN							
MAR. 03, 1983...	72200	1.5	380	SEPT. 07.....	14800	23.5	470
MAY 04.....	45100	12.0	410	SEPT. 22.....	18500	14.0	---
05345000 VERMILLION RIVER NEAR EMPIRE, MN							
OCT. 29, 1982...	45	9.5	710	APR. 01.....	238	---	---
NOV. 23.....	75	2.0	665	MAY 19.....	159	11.0	600
DEC. 15.....	42	3.5	730	JUNE 16.....	83	15.0	650
DEC. 29.....	91	.5	335	JULY 12.....	55	20.5	700
FEB. 08, 1983...	37	.5	800	AUG. 04.....	57	---	---
FEB. 25.....	96	1.5	545	SEPT. 06.....	41	18.5	630
MAR. 03.....	420	2.0	315				

## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05353800 STRAIGHT RIVER NEAR FARIBAULT, MN							
OCT. 04, 1982...	519	14.5	795	APR. 15.....	2170	---	---
NOV. 29.....	348	2.5	820	MAY 23.....	554	14.0	655
JAN. 21, 1983...	150	.5	815	JULY 11.....	732	24.0	705
MAR. 01.....	1640	1.5	360	AUG. 25.....	536	---	---
MAR. 04.....	2750	4.5	410				
05372995 SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN							
OCT. 05, 1982...	232	---	635	APR. 11.....	756	8.0	540
DEC. 01.....	231	9.0	630	MAY 25.....	290	17.0	620
JAN. 12, 1983...	108	2.0	650	JULY 01.....	1180	---	---
FEB. 24.....	635	3.0	370	JULY 01.....	4400	---	---
MAR. 02.....	1950	---	---	JULY 01.....	5390	---	---
MAR. 03.....	1950	---	---	JULY 06.....	593	18.5	520
MAR. 22.....	355	4.0	625	AUG. 31.....	160	24.0	430
05374900 ZUMBRO RIVER AT KELLOGG, MN							
OCT. 18, 1982...	774	12.0	615	APR. 18.....	3840	6.0	480
DEC. 08.....	1270	1.0	630	MAY 02.....	1720	12.0	585
JAN. 10, 1983...	855	2.5	550	JUNE 09.....	1060	17.0	620
MAR. 02.....	4960	1.0	---	JULY 05.....	5450	---	---
MAR. 03.....	7340	.5	290	AUG. 03.....	651	23.5	635
MAR. 21.....	1740	4.0	600	SEPT. 27.....	1340	15.5	620
05376000 NORTH FORK WHITEWATER RIVER NEAR ELBA, MN							
OCT. 13, 1982...	34	10.5	560	MAY 02.....	109	12.5	560
DEC. 14.....	39	3.0	580	JUNE 02.....	77	14.5	610
MAR. 05, 1983...	358	3.5	280	JUNE 15.....	63	19.0	580
MAR. 06.....	257	---	---	JULY 01.....	82	19.5	570
MAR. 08.....	141	4.0	545	AUG. 02.....	48	18.0	580
APR. 06.....	78	5.0	570				
05376800 WHITEWATER RIVER NEAR BEAVER, MN							
OCT. 14, 1982...	111	11.0	535	MAR. 06.....	649	---	---
OCT. 18.....	111	11.5	525	APR. 18.....	381	4.5	515
DEC. 06.....	167	2.0	605	MAY 02.....	263	11.0	550
JAN. 17, 1983...	128	.5	550	JUNE 08.....	193	15.5	620
FEB. 28.....	165	5.0	550	AUG. 03.....	156	18.0	650
MAR. 05.....	925	3.5	305	SEPT. 27.....	189	12.5	600



## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

## WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

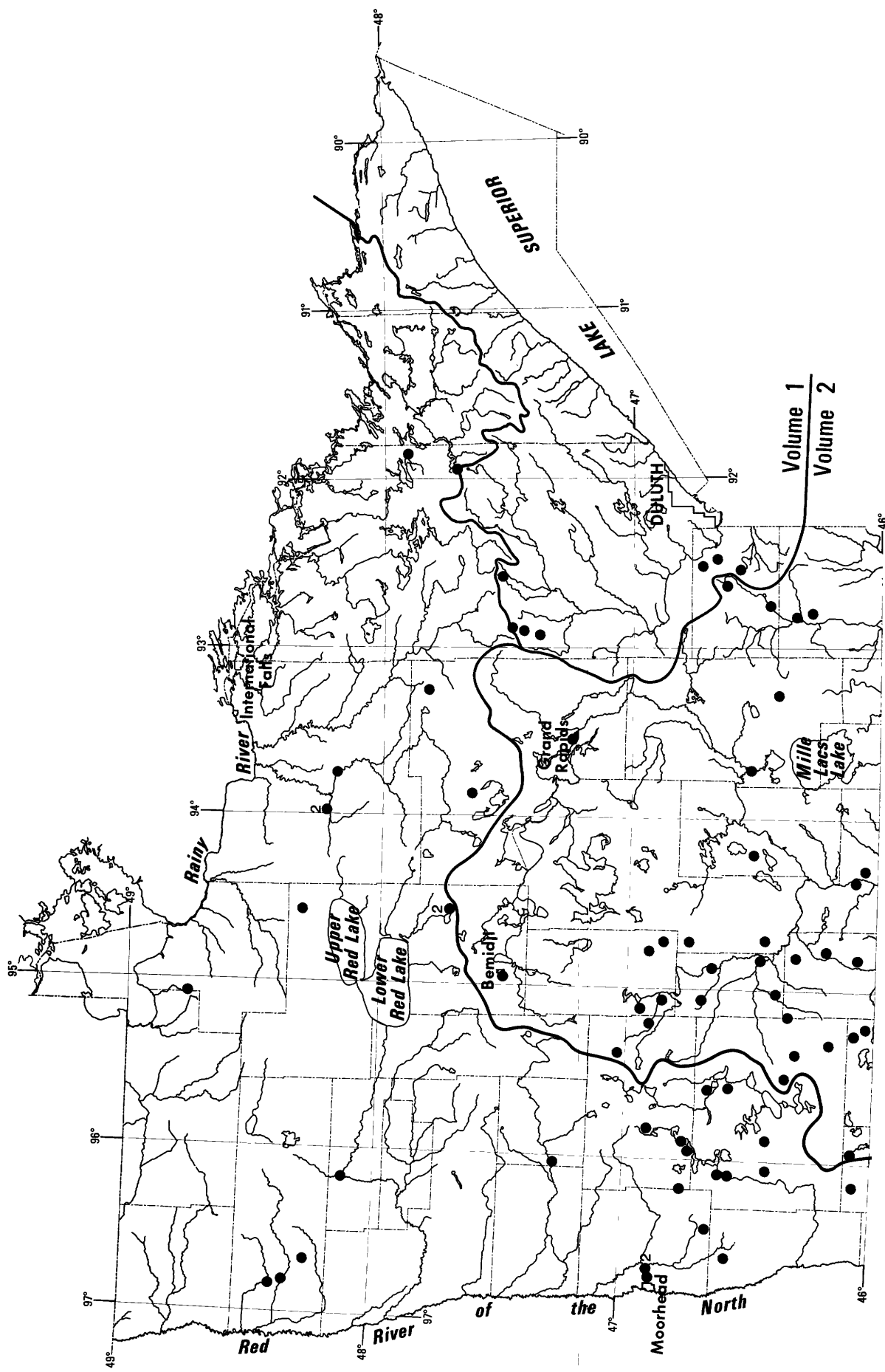
DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05378235 GARVIN BROOK NEAR MINNESOTA CITY, MN							
OCT. 06, 1982...	29	16.5	500	FEB. 28.....	57	6.0	400
OCT. 20.....	104	8.0	415	APR. 18.....	39	11.0	510
DEC. 08.....	29	1.5	505	JUNE 08.....	32	12.5	520
JAN. 17, 1983...	35	.5	450				
05378300 STRAIGHT VALLEY CREEK NEAR ROLLINGSTONE, MN							
OCT. 14, 1982...	1.7	10.5	555	APR. 18.....	2.7	10.0	560
OCT. 20.....	4.8	6.0	425	JUNE 08.....	2.0	14.0	650
DEC. 06.....	25	4.5	620	JULY 27.....	1.8	15.0	590
JAN. 17, 1983...	1.6	2.0	565	SEPT. 27.....	1.6	15.0	710
FEB. 28.....	5.0	5.0	400				
05378500 MISSISSIPPI RIVER AT WINONA, MN							
MAR. 18, 1983...	105000	---	---	AUG. 03.....	25000	---	---
JUNE 22.....	36900	23.5	450				
05384000 ROOT RIVER NEAR LANESBORO, MN							
OCT. 21, 1982...	1590	6.0	485	APR. 12.....	2030	6.5	460
NOV. 30.....	486	4.5	570	APR. 13.....	1730	---	---
JAN. 11, 1983...	422	1.0	540	MAY 25.....	829	16.5	560
FEB. 23.....	1100	3.0	400	JULY 14.....	621	24.0	600
MAR. 02.....	3130	2.0	245	AUG. 30.....	448	23.0	490
05385000 ROOT RIVER NEAR HOUSTON, MN							
OCT. 19, 1982...	671	11.0	565	APR. 19.....	3070	5.5	505
DEC. 07.....	1780	1.0	565	MAY 03.....	1730	11.0	540
JAN. 18, 1983...	752	.5	400	JUNE 07.....	1230	14.0	575
MAR. 01.....	1570	4.0	550	AUG. 02.....	908	26.0	520
MAR. 05.....	6310	4.5	315	SEPT. 28.....	1410	15.0	600
05385500 SOUTH FORK ROOT RIVER NEAR HOUSTON, MN							
OCT. 19, 1982...	156	10.5	520	APR. 19.....	336	7.0	565
OCT. 20.....	314	8.5	435	MAY 03.....	275	9.5	530
DEC. 07.....	230	3.0	535	JUNE 07.....	252	14.0	535
JAN. 18, 1983...	168	.5	430	AUG. 02.....	226	19.0	530
MAR. 01.....	332	5.0	470	SEPT. 28.....	281	14.5	600
MAR. 05.....	488	7.5	450				

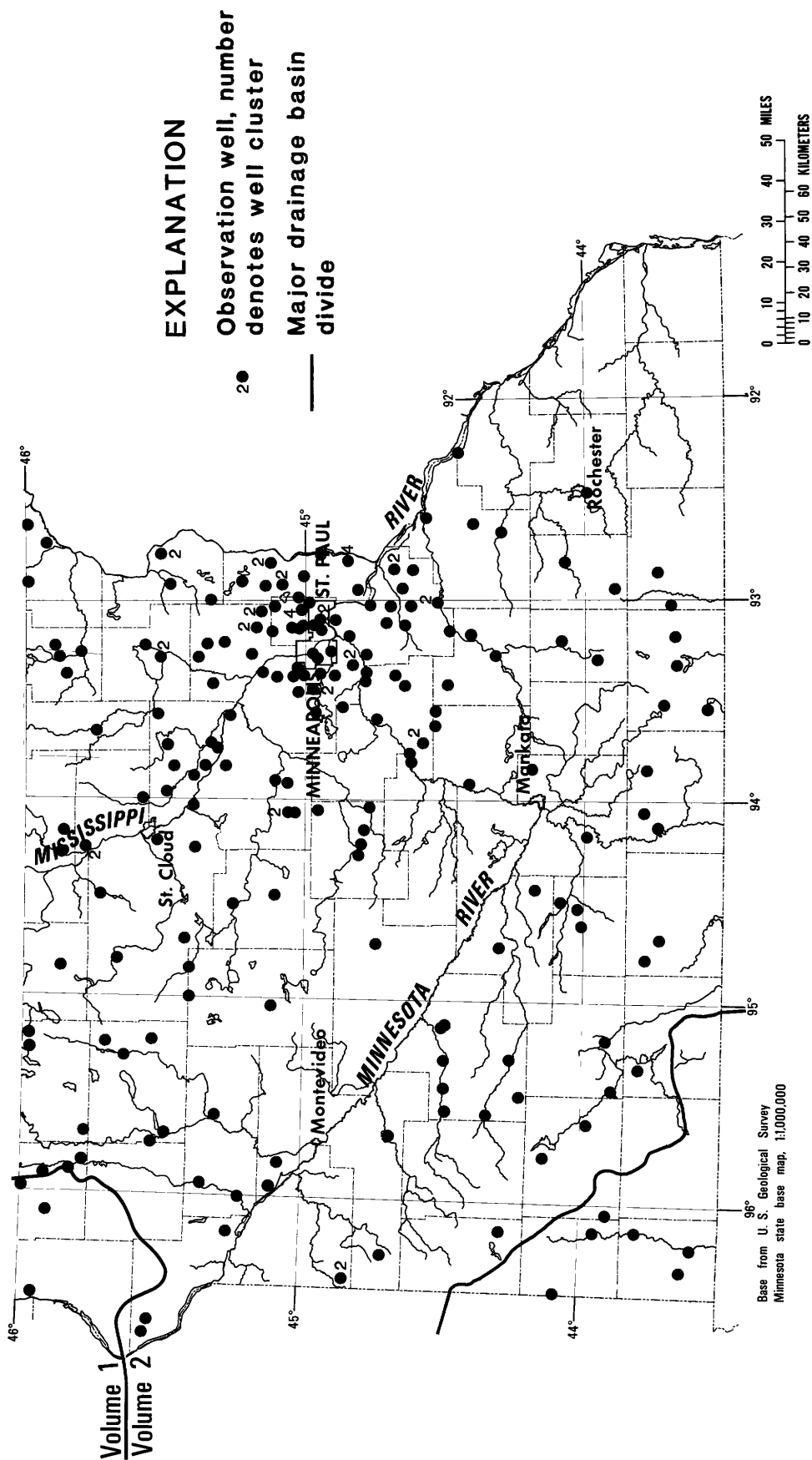
## MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

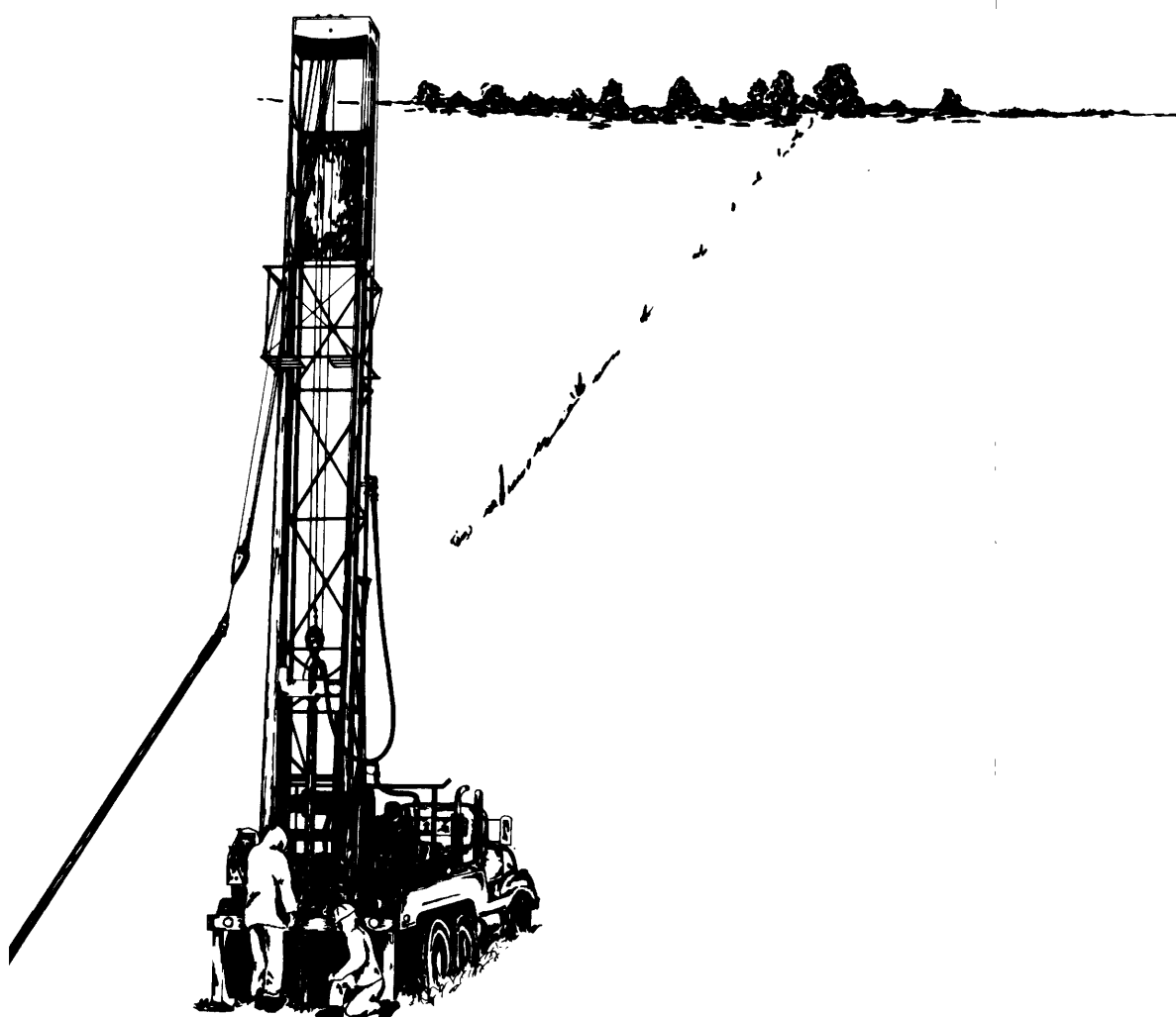
DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft <sup>3</sup> /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05457000 CEDAR RIVER NEAR AUSTIN, MN							
OCT. 05, 1982...	615	15.0	700	APR. 14.....	3170	3.5	427
NOV. 30.....	326	3.5	655	MAY 24.....	417	15.5	610
JAN. 12, 1983...	168	1.0	630	JULY 12.....	317	23.0	630
FEB. 22.....	1320	1.0	300	AUG. 29.....	185	26.5	390
MAR. 03.....	3030	1.5	290				
05476000 DES MOINES RIVER AT JACKSON, MN							
OCT. 06, 1982...	201	15.5	990	APR. 15.....	4440	---	---
NOV. 01.....	486	8.0	1075	APR. 21.....	3730	11.0	850
DEC. 02.....	1160	4.0	1200	MAY 23.....	1640	16.0	900
JAN. 25, 1983...	213	.0	1380	JUNE 24.....	2380	---	---
FEB. 23.....	981	.5	750	JULY 05.....	5180	---	---
MAR. 03.....	2350	4.5	660	JULY 25.....	1230	26.0	850
MAR. 08.....	3370	1.5	670	AUG. 03.....	609	---	---
MAR. 18.....	2520	3.5	800	AUG. 29.....	173	27.0	810
APR. 04.....	2250	4.5	850	SEPT. 22.....	75	11.5	850

**GROUND-WATER RECORDS**





**Figure 11.--Location of ground-water wells**



## GROUND-WATER LEVELS

## AITKIN COUNTY

462447093154401. Local number, 045N23W05ADD01.

LOCATION.--Lat 46°24'47", long 93°15'44", in SE¼SE¼NE¼ sec.5, T.45 N., R.23 W., Hydrologic Unit 07010104, in Solana State Forest.

Owner: U.S. Geological Survey.

AQUIFER.--Shallow buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Hand augered and driven observation water-table well, diameter 1½ in (0.03 m), depth 13 ft (4.0 m), screened 10 to 13 ft (3.0 to 4.0 m).

DATUM.--Altitude of land-surface datum is 1,265 ft (386 m). Measuring point: Top of platform, 0.80 ft (0.24 m) above land-surface datum.

REMARKS.--Water level subject to freezing during winter periods.

PERIOD OF RECORD.--October 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.50 ft (0.15 m) above land-surface datum, Mar. 22, 1976; lowest, 3.12 ft (0.95 m) below land-surface datum, Jan. 10, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 17	0.31	JAN 12	0.35	MAR 10	0.35	MAY 5	0.31	JUN 30	0.36	AUG 24	0.60

463135093433901. Local number, 047N27W26BBC01.

LOCATION.--Lat 46°31'35", long 93°43'39", in SW¼NW¼NW¼ sec.26, T.47 N., R.27 W., Hydrologic Unit 07010104, in city of Aitkin.

Owner: Woodland Container Co.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 52 ft (15.8 m), screened 47 to 52 ft (14.3 to 15.8 m).

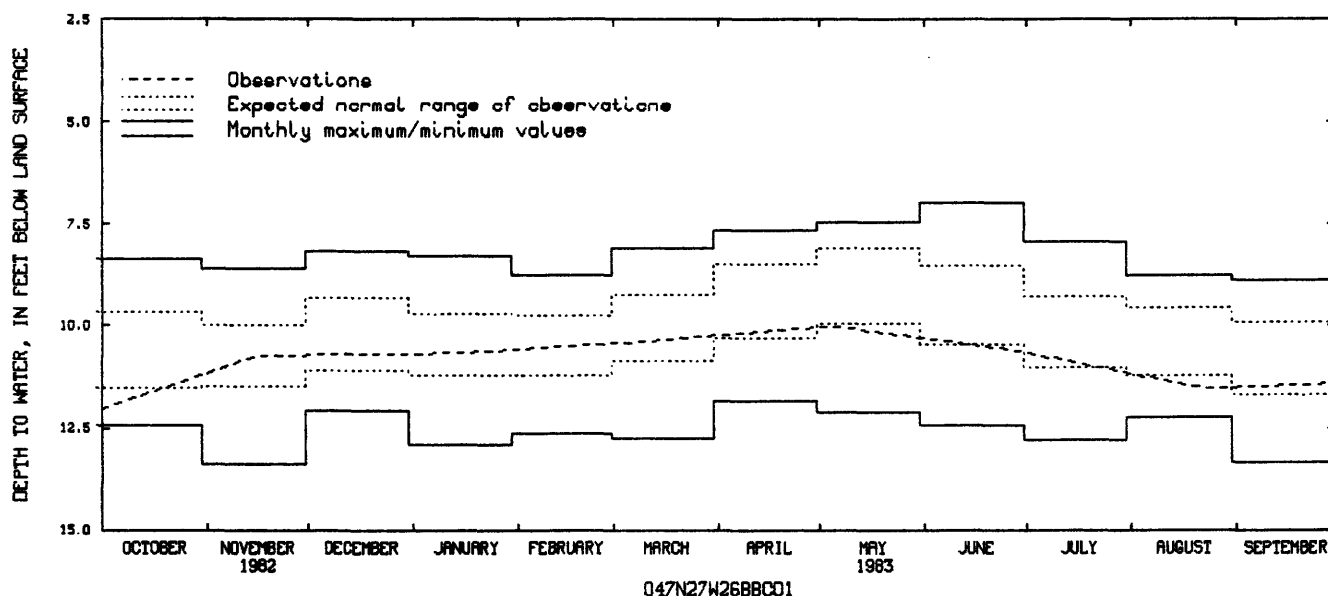
DATUM.--Altitude of land-surface datum is 1,213 ft (370 m). Measuring point: Top of casing, 1.20 ft (0.37 m) above land-surface datum.

PERIOD OF RECORD.--January 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.96 ft (2.12 m) below land-surface datum, June 9, 1965; lowest, 13.38 ft (4.08 m) below land-surface datum, Nov. 29, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	10.73	JAN 13	10.67	MAR 10	10.38	MAY 4	10.00	JUN 29	10.62	AUG 23	11.54



## GROUND-WATER LEVELS

## ANOKA COUNTY

451056093072201. Local number, 031N22W18AAA01.

LOCATION.--Lat 45°10'56", long 93°07'22", in NE¼NE¼NE¼ sec.18, T.31 N., R.22 W., Hydrologic Unit 07010206, at 4th Avenue and Lilac Street, Lino Lakes.

Owner: U.S. Geological Survey.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in (0.15 m), depth 270 ft (82.3 m), screened 260 to 270 ft (79.2 to 82.3 m).

DATUM.--Land-surface datum is 895.8 ft (273.0 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of well cap, 0.80 ft (0.24 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--February 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.39 ft (1.95 m) below land-surface datum, July 7, 1975; lowest, 14.75 ft (4.50 m) below land-surface datum, Aug. 24, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	12.24	JAN 13	11.39	MAR 1	11.12	MAY 13	9.85	JUL 13	11.77	SEP 9	12.26

451056093072205. Local number, 031N22W18AAA05.

LOCATION.--Lat 45°10'56", long 93°07'22", in NE¼NE¼NE¼ sec.18, T.31 N., R.18 W., Hydrologic Unit 07010206, at 4th Avenue and Lilac Street, Lino Lakes.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 13 ft (3.96 m), screened 11 to 13 ft (3.35 to 3.96 m).

DATUM.--Land-surface datum is 895.6 ft (273.0 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.90 ft (0.60 m) above land-surface datum.

PERIOD OF RECORD.--February 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.67 ft (0.81 m) below land-surface datum, July 7, 1975; lowest, 6.03 ft (1.84 m) below land-surface datum, Feb. 14, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	5.83	JAN 13	5.78	MAR 1	5.32	MAY 13	4.87	JUL 13	4.79	SEP 9	5.29

450927093033801. Local number, 031N22W23CBC01.

LOCATION.--Lat 45°09'27", long 93°03'38", in SW¼NW¼SW¼ sec.23, T.31 N., R.22 W., Hydrologic Unit 07010206, at city of Centerville.

Owner: U.S. Geological Survey.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.10 m), depth 95 ft (29.0 m), screened 91 to 95 ft (27.7 to 29.0 m).

DATUM.--Land-surface datum is 901.6 ft (274.8 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of well cap, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--February 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.95 ft (2.12 m) below land-surface datum, Aug. 20, 1975; lowest, 9.78 ft (2.98 m) below land-surface datum, Feb. 14, 1977.

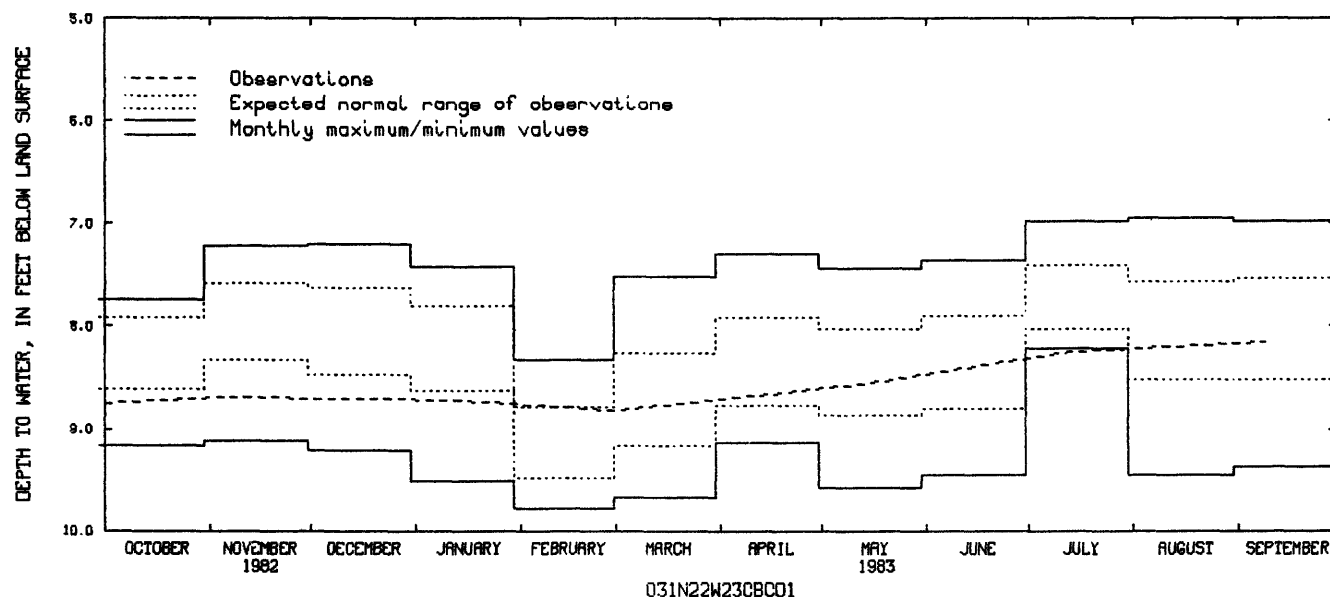
## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	8.69	JAN 13	8.72	MAR 1	8.82	MAY 13	8.56	JUL 13	8.25	SEP 9	8.15



## GROUND-WATER LEVELS

ANOKA COUNTY--Continued



450927093033802. Local number, 031N22W23C8C02.

LOCATION.--Lat 45°09'27", long 93°03'38", in SW¼NW¼SW¼ sec.23, T.31 N., R.22 W., Hydrologic Unit 07010206, at city of Centerville.

Owner: U.S. Geological Survey.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.10 m), depth 277 ft (84.4 m), screened 272 to 277 ft (82.9 to 84.4 m).

DATUM.--Land-surface datum is 901.6 ft (274.8 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder platform, 2.20 ft (0.67 m) above land-surface datum.

REMARKS.--Water level affected by nearby flowing wells.

PERIOD OF RECORD.--February 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 8.10 ft (2.47 m) below land-surface datum, July 5, 1975; lowest, 16.20 ft (4.94 m) below land-surface datum, Sept. 15, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	11.58	JAN 13	11.32	MAR 1	11.19	MAY 13	10.53	JUL 13	10.95	SEP 9	11.23

451210093170201. Local number, 031N24W01C8B01.

LOCATION.--Lat 45°12'10", long 93°17'02", in NW¼NW¼SW¼ sec.1, T.31 N., R.24 W., Hydrologic Unit 07010206, at Golf Course.

Owner: City of Coon Rapids.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 193 ft (58.8 m), screened 163 to 193 ft (49.7 to 58.8 m).

DATUM.--Altitude of land-surface datum is 897 ft (273 m). Measuring point: Top of breather pipe, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--December 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 21.20 ft (6.46 m) below land-surface datum, Dec. 30, 1980; lowest, 31.30 ft (9.54 m) below land-surface datum, July 13, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	22.05	JAN 13	21.42	MAR 1	21.77	MAY 13	22.80	JUL 13	31.30	SEP 9	25.45

## GROUND-WATER LEVELS

## ANOKA COUNTY--Continued

451742093122102. Local number, 032N23W04AAD02.

LOCATION.--Lat 45°17'42", long 93°12'21", in SE¼NE¼NE¼ sec.4, T.32 N., R.23 W., Hydrologic Unit 07030005, 1.5 mi (2.4 km) east of Soderville.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

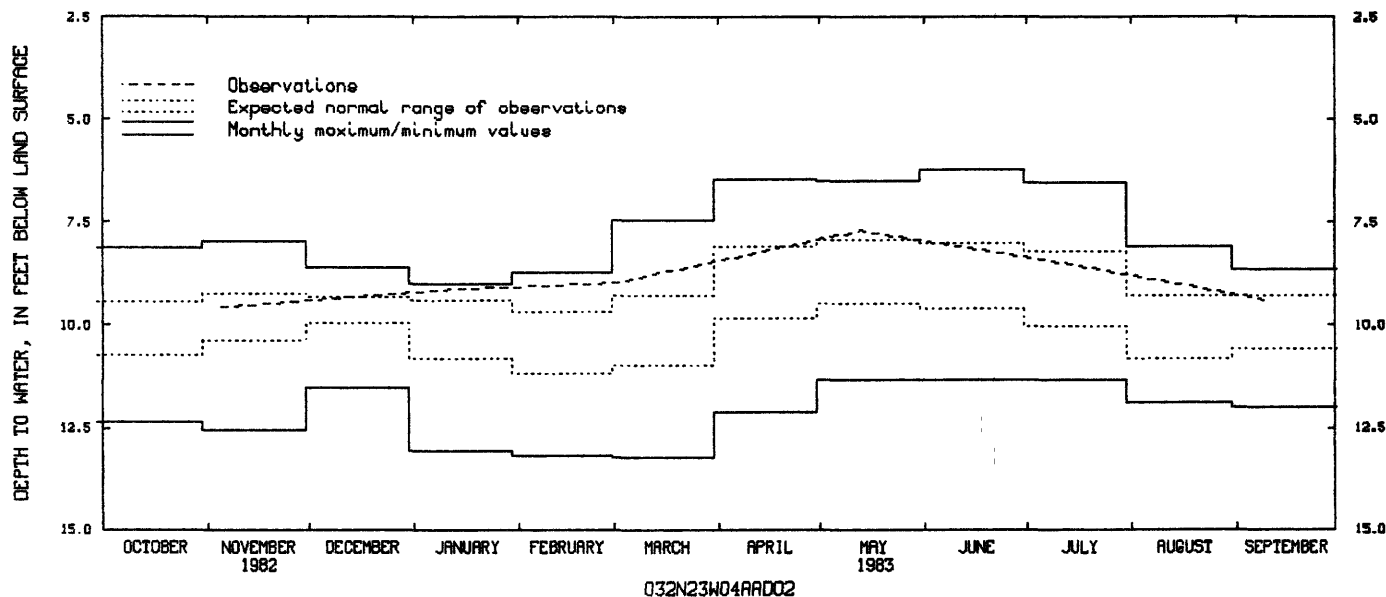
DATUM.--Altitude of land-surface datum is 916 ft (279 m). Measuring point: Top of casing, 3.50 ft (1.07 m) above land-surface datum.

PERIOD OF RECORD.--August 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.20 ft (1.89 m) below land-surface datum, July 30, 1975; lowest, 13.22 ft (4.03 m) below land-surface datum, Mar. 5-9, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	9.56	JAN 13	9.12	MAR 1	8.96	MAY 13	7.70	JUL 13	8.50	SEP 9	9.37



452305093141501. Local number, 033N23W05BAB01.

LOCATION.--Lat 45°23'05", long 93°14'15", in NW¼NE¼NW¼ sec.5, T.33 N., R.23 W., Hydrologic Unit 07010207, at 1300 229th Ave. NE, Bethel.

Owner: Friendship Baptist Church.

AQUIFER.--Franconian Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 141 ft (43.0 m), cased to 126 ft (38.4 m).

DATUM.--Altitude of land-surface datum is 923 ft (281 m). Measuring point: Top of well cap, 0.80 ft (0.24 m) above land-surface datum.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 20.25 ft (6.17 m) below land-surface datum, Sept. 9, 1983; lowest, 22.22 ft (6.77 m) below land-surface datum, Mar. 3, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	21.93	MAR 1	22.05	MAY 13	21.07	JUL 13	20.29	SEP 9	20.25

## GROUND-WATER LEVELS

## ANOKA COUNTY--Continued

451938093223101. Local number, 033N24W30ABB01.

LOCATION.--Lat 45°19'38", long 93°22'31", in NW¼NW¼NE¼ sec.30, T.33 N., R.24 W., Hydrologic Unit 07010207, at 4324 Viking Blvd.

Owner: Northwestern Bell Telephone Co.

AQUIFER.--Ironton-Galesville Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 280 ft (85.3 m), cased to 223 ft (68.0 m).

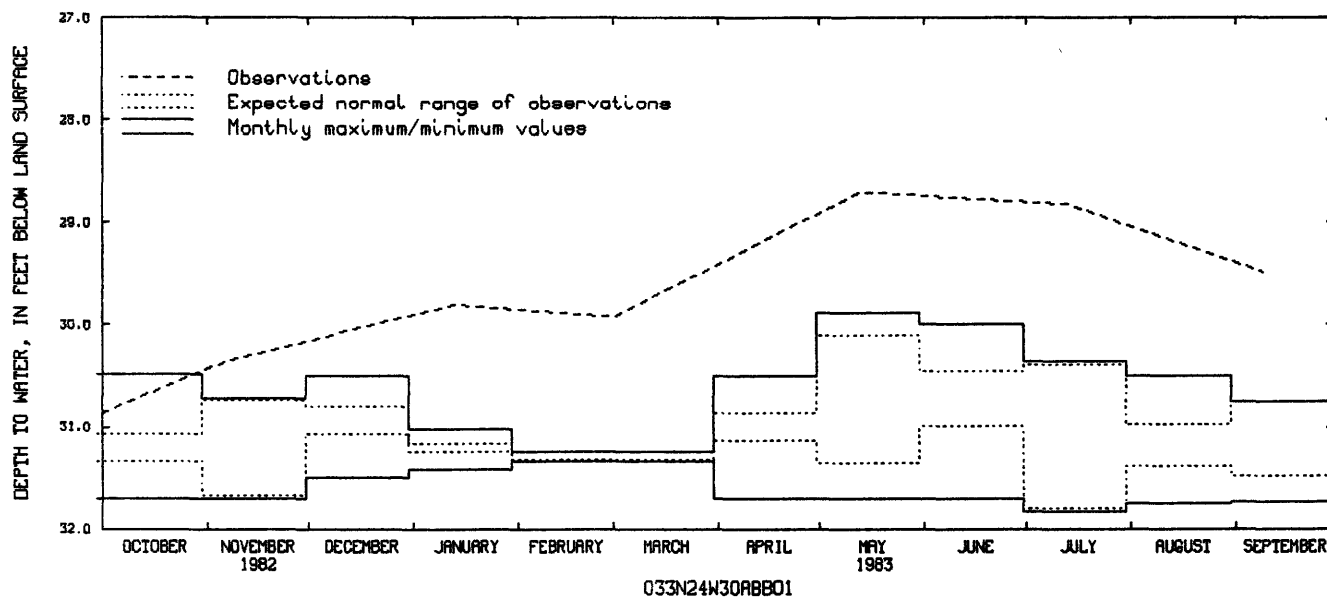
DATUM.--Altitude of land-surface datum is 900 ft (274 m). Measuring point: Top of casing, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--April 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 28.70 ft (8.75 m) below land-surface datum, May 13, 1983; lowest, 31.84 ft (9.70 m) below land-surface datum, July 11, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	30.37	JAN 13	29.80	MAR 1	29.92	MAY 13	28.70	JUL 13	28.82	SEP 9	29.48



452416093160801. Local number, 034N24W25DAC01.

LOCATION.--Lat 45°24'16", long 93°16'08", in SW¼NE¼SE¼ sec.25, T.34 N., R.24 W., Hydrologic Unit 07010207, at city of Bethel.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

DATUM.--Altitude of land-surface datum is 930 ft (283 m). Measuring point: Top of casing, 2.30 ft (0.70 m) above land-surface datum.

PERIOD OF RECORD.--August 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.47 ft (2.28 m) below land-surface datum, July 13, 1983; lowest, 10.87 ft (3.31 m) below land-surface datum, Mar. 10, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	9.38	JAN 13	9.07	MAR 1	9.15	MAY 13	7.84	JUL 13	7.47	SEP 9	9.25

## GROUND-WATER LEVELS

## BECKER COUNTY

465239095121601. Local number, 139N36W02CCC01.

LOCATION.--Lat 46°52'39", long 95°12'16", in SW¼SW¼SW¼ sec.2 T.139 N., R.36 W., Hydrologic Unit 07010106, south-east of Osage.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 18.5 ft (5.6 m), screened 15.5 to 18.5 ft (4.7 to 5.6 m).

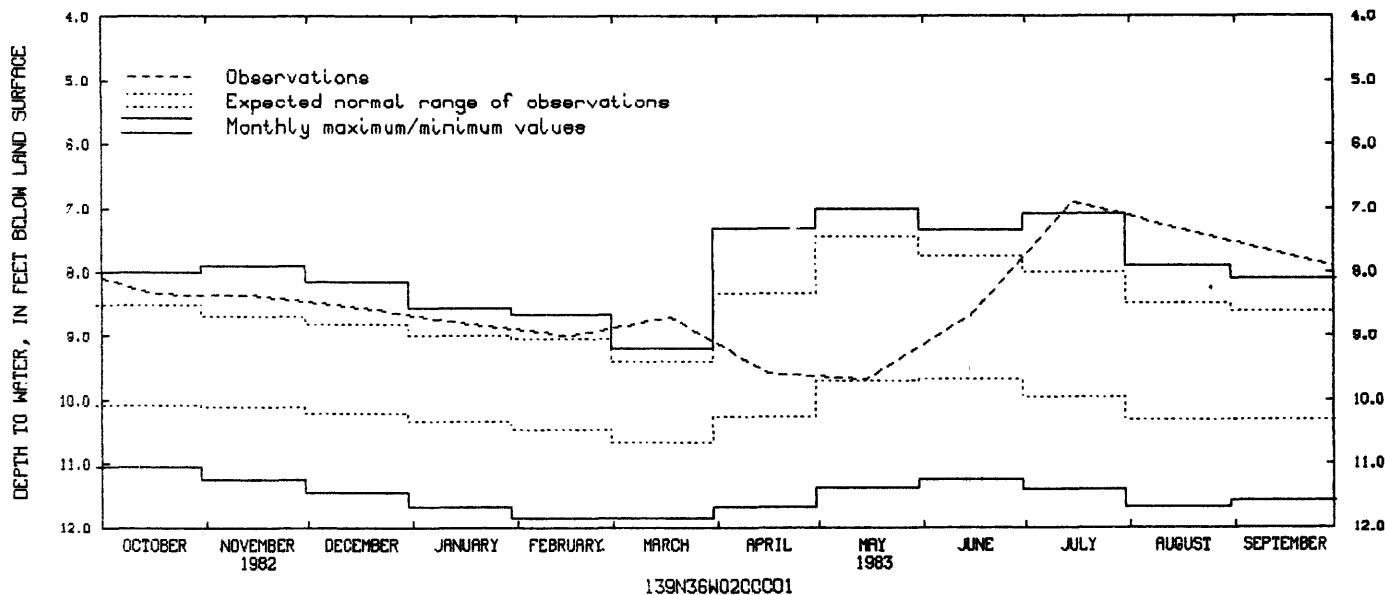
DATUM.--Altitude of land-surface datum is 1,460 ft (445 m): Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.91 ft (2.11 m) below land-surface datum, July 15, 1983; lowest, 11.87 ft (3.62 m) below land-surface datum, Feb. 18, Mar. 18, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	8.34	DEC 21	8.59	FEB 16	9.00	APR 16	9.58	JUN 15	8.67	JUL 15	6.91
NOV 14	8.36	JAN 15	8.79	MAR 18	8.70	MAY 15	9.68				



470206095225301. Local number, 141N37W17AAA01.

LOCATION.--Lat 47°02'06", long 95°22'53", in NE¼NE¼NE¼ sec.17, T.141 N., R.37 W., Hydrologic Unit 07010106, 4.5 mi (7.2 km) north of Ponsford.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 35 ft (10.7 m), screened 33 to 35 ft (10.1 to 10.7 m).

DATUM.--Altitude of land-surface datum is 1,578 ft (481 m): Measuring point: Top of casing, 3.60 ft (1.10 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 26.40 ft (8.05 m) below land-surface datum, May 15, 1982; lowest, 30.64 ft (9.34 m) below land-surface datum, Sept. 15, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	27.82	DEC 21	27.94	FEB 16	28.16	APR 16	27.96	JUN 15	28.29	JUL 15	27.72
NOV 14	27.88	JAN 15	28.01	MAR 18	27.92	MAY 15	28.12				

## GROUND-WATER LEVELS

## BELTRAMI COUNTY

473023094570901. Local number, 147N34W35ADC01.

LOCATION.--Lat 47°30'23", long 94°57'09", in SW¼SE¼NE¼ sec.35, T.147 N., R.34 W., Hydrologic Unit 07010101, on Clarence Hart farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 20 ft (6.1 m), screened 18 to 20 ft (5.5 to 6.1 m).

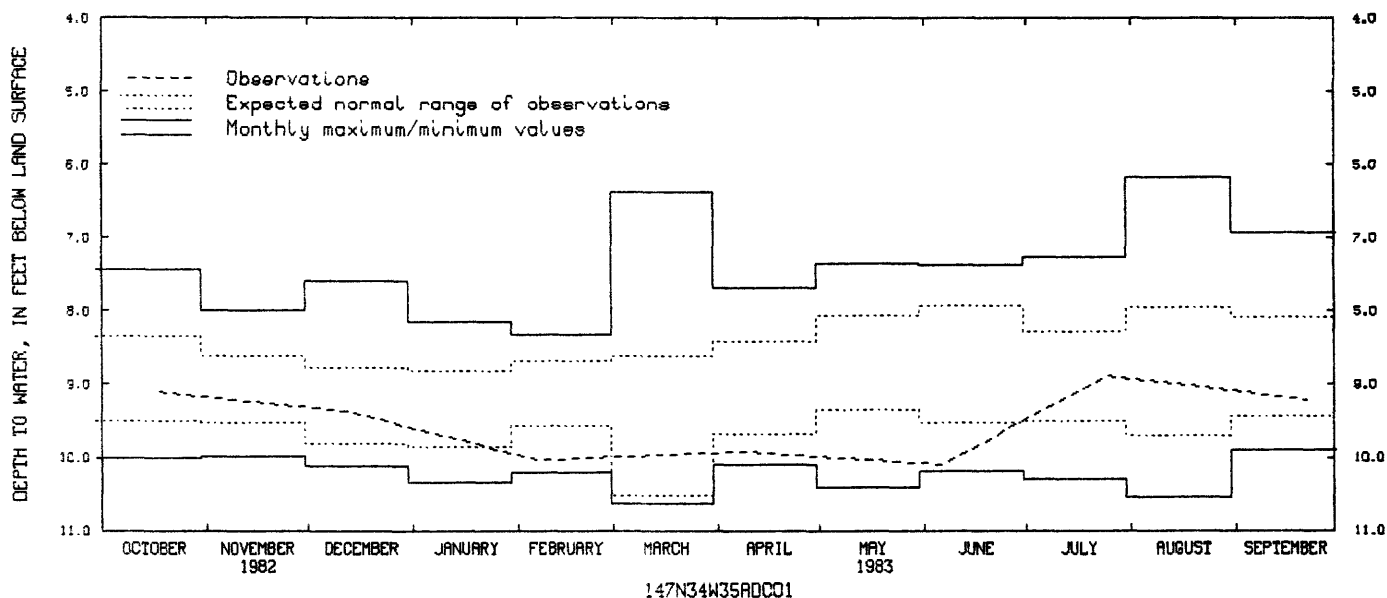
DATUM.--Altitude of land-surface datum is 1,383 ft (421 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.17 ft (1.88 m) below land-surface datum, Aug. 1, 1975; lowest, 10.63 ft (3.22 m) below land-surface datum, Mar. 16, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	9.11	FEB 7	10.04	APR 8	9.92	JUN 6	10.10	JUL 25	8.88	SEP 22	9.21
DEC 13	9.37										



## BENTON COUNTY

453454094002402. Local number, 036N29W30BCC02.

LOCATION.--Lat 45°34'54", long 94°00'24", in SW¼SW¼NW¼ sec. 30, T.36 N., R.29 W., Hydrologic Unit 07010203, 3.7 mi (6.0 km) west of Duell.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 19 ft (5.8 m), screened 17 to 19 ft (5.2 to 5.8 m).

DATUM.--Altitude of land-surface datum is 1,049 ft (320 m). Measuring point: Top of casing, 4.00 ft (1.22 m) above land-surface datum.

PERIOD OF RECORD.--October 1976 to current year.

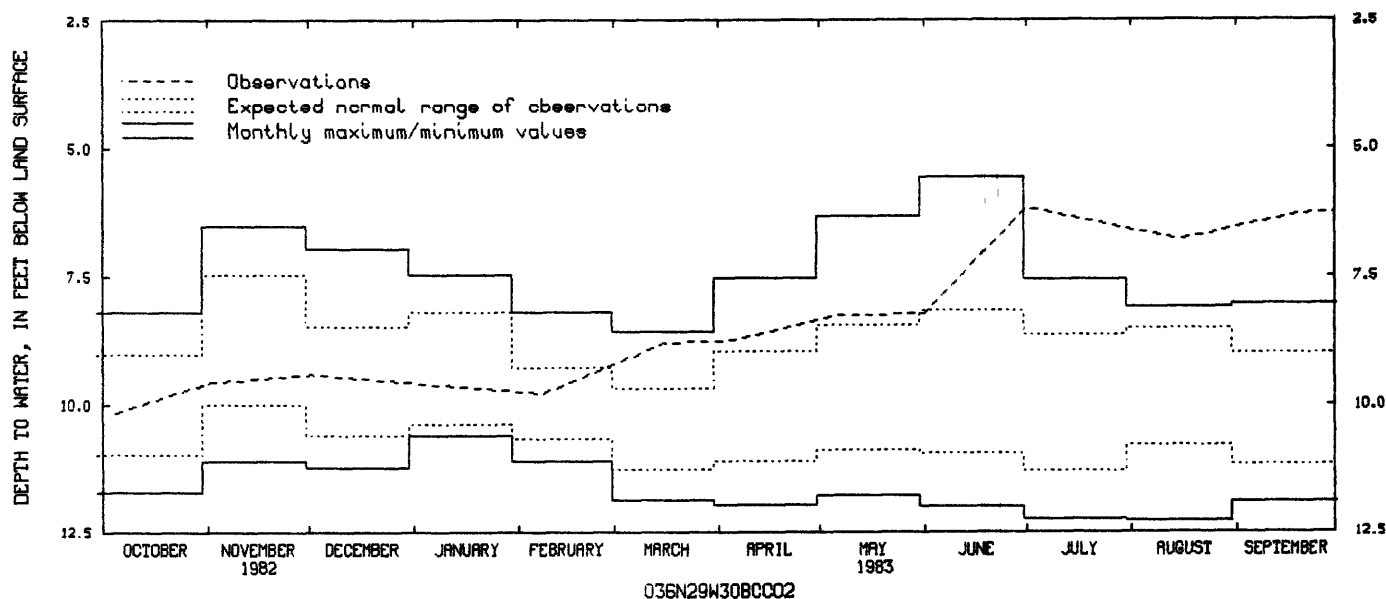
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.58 ft (1.70 m) below land-surface datum, June 30, 1979; lowest, 12.30 ft (3.75 m) below land-surface datum, Aug. 18, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	10.17	DEC 2	9.42	MAR 16	8.80	MAY 6	8.26	JUL 1	6.17	SEP 19	6.30
NOV 2	9.57	FEB 8	9.79	APR 6	8.75	JUN 1	8.24	AUG 15	6.79		

## GROUND-WATER LEVELS

## BENTON COUNTY--Continued



454657094143701. Local number, 038N31W18DCA01.

LOCATION.--Lat 45°46'57", long 94°14'37", in NE¼SW¼SE¼ sec.18, T.38 N., R.31 W., Hydrologic Unit 07010201, 0.25 mi (0.40 km) north of Highway 10.

Owner: Jerry Schlichting.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 130 ft (39.6 m), screened 101 to 106 ft (30.8 to 32.3 m) and 120 to 130 ft (36.6 to 39.6 m).

DATUM.--Altitude of land-surface datum is 1,070 ft (326 m). Measuring point: Hole in pump base, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--December 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 20.91 ft (6.37 m) below land-surface datum, Dec. 6, 1979; lowest, 26.58 ft (8.10 m) below land-surface datum, Sept. 9, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	25.29	DEC 2	23.43	MAR 16	23.65	MAY 6	23.24	JUL 1	23.31	SEP 19	23.70
NOV 2	24.00	FEB 8	23.69	APR 6	23.32	JUN 1	23.69	AUG 15	23.88		

454648094144102. Local number, 038N31W18DCD02.

LOCATION.--Lat 45°46'48", long 94°14'41", in SE¼SW¼SE¼ sec.18, T.38 N., R.31 W., Hydrologic Unit 07010201, 2.4 mi (3.9 km) north of flashing light in Rice.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 36 ft (11.0 m), screened 34 to 36 ft (10.4 to 11.0 m).

DATUM.--Altitude of land-surface datum is 1,065 ft (325 m). Measuring point: Top of casing, 4.60 ft (1.40 m) above land-surface datum.

PERIOD OF RECORD.--October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 23.65 ft (7.21 m) below land-surface datum, Dec. 6, 1979; lowest, 32.36 ft (9.86 m) below land-surface datum, Aug. 10, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	28.30	DEC 2	26.46	MAR 16	24.36	MAY 6	25.95	JUL 1	25.96	SEP 19	26.18
NOV 2	28.13	FEB 8	26.37	APR 6	24.70	JUN 1	25.95	AUG 15	26.25		

## GROUND-WATER LEVELS

## BIG STONE COUNTY

451517096104501. Local number, 121N44W27CCC01.

LOCATION.--Lat 45°15'17", long 96°10'45", in SW¼SW¼SW¼ sec.27, T.121 N., R.44 W., Hydrologic Unit 07020001, north of Correll.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 16 ft (4.9 m), screened 14 to 16 ft (4.3 to 4.9 m).

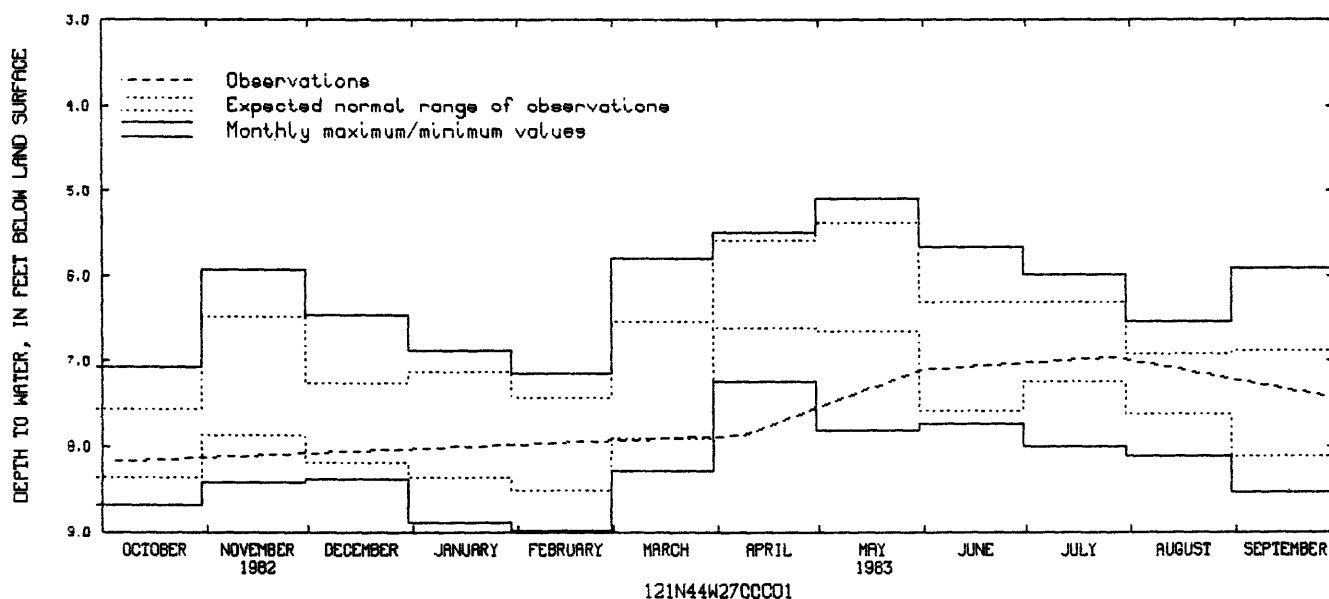
DATUM.--Altitude of land-surface datum is 1,018 ft (310 m). Measuring point: Top of casing, 3.10 ft (0.94 m) above land-surface datum.

PERIOD OF RECORD.--September 1972 to February 1974, August 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.09 ft (1.55 m) below land-surface datum, May 28, 1973; lowest, 8.99 ft (2.74 m) below land-surface datum, Feb. 8, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	8.18	NOV 29	8.08	APR 8	7.87	MAY 31	7.10	JUL 27	6.95



453330096420201. Local number, 124N48W17AAA01.

LOCATION.--Lat 45°33'30", long 96°42'02", in NE¼NE¼NE¼ sec.17, T.124 N., R.48 W., Hydrologic Unit 07020001, 0.5 mi (0.8 km) east of Beardsley.

Owner: U.S. Geological Survey.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 282 ft (86.0 m), screened 242 to 282 ft (73.8 to 86.0 m).

DATUM.--Land-surface datum is 1,086.8 ft (331.3 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.70 ft (0.82 m) above land-surface datum.

PERIOD OF RECORD.--November 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.90 ft (3.32 m) below land-surface datum, Apr. 11, 1979; lowest, 21.75 ft (6.63 m) below land-surface datum, Aug. 25, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 29	16.77	JAN 19	17.00	APR 27	16.96	JUL 19	20.16

## GROUND-WATER LEVELS

## BIG STONE COUNTY--Continued

453237096381601. Local number, 124N48W23AAA04.

LOCATION.--Lat 45°32'37", long 96°38'16", in NE¼NE¼NE¼ sec.23, T.124 N., R.48 W., Hydrologic Unit 07020001, 3.5 mi (5.6 km) southeast of Beardsley.

Owner: U.S. Geological Survey.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 240 ft (73.2 m), screened 200 to 240 ft (61.0 to 73.2 m).

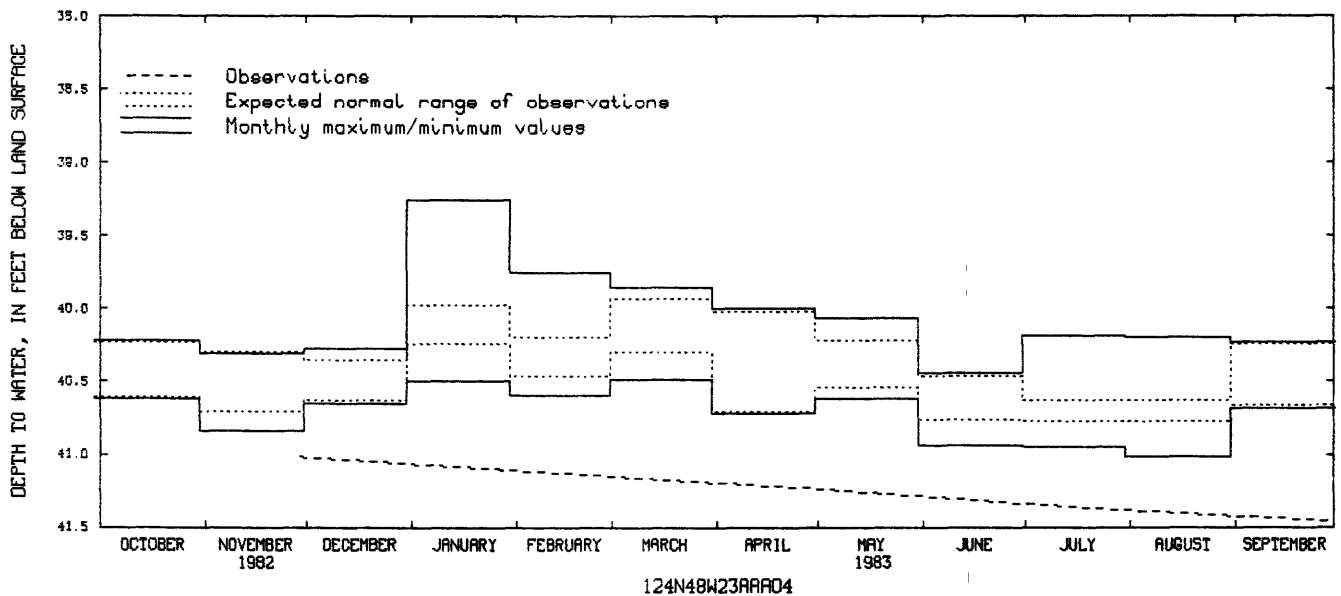
DATUM.--Land-surface datum is 1,087.2 ft (331.4 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--November 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 39.25 ft (11.96 m) below land-surface datum, Jan. 28., 1979; lowest, 41.37 ft (12.61 m) below land-surface datum, July 19, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 29	41.02	JAN 19	41.09	APR 27	41.23	JUL 19	41.37





## GROUND-WATER LEVELS

## BLUE EARTH COUNTY

440050094102801. Local number, 106N28W03DBA01.

LOCATION.--Lat 44°00'50", long 94°10'28", in NE¼NW¼SE¼ sec.3, T.106 N., R.28 W., Hydrologic Unit 07020010, at Farmland Industries Ammonia Plant, 3.2 mi (5.2 km) north of Vernon Center.

Owner: Farmland Industries.

AQUIFER.--Ironton-Galesville Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 16 in (0.41 m), depth 390 ft (119 m), cased to 150 ft (45.7 m).

DATUM.--Altitude of land-surface datum is 1,005 ft (306 m). Measuring point: Top of recorder floor, 2.00 ft (0.61 m) above land-surface datum.

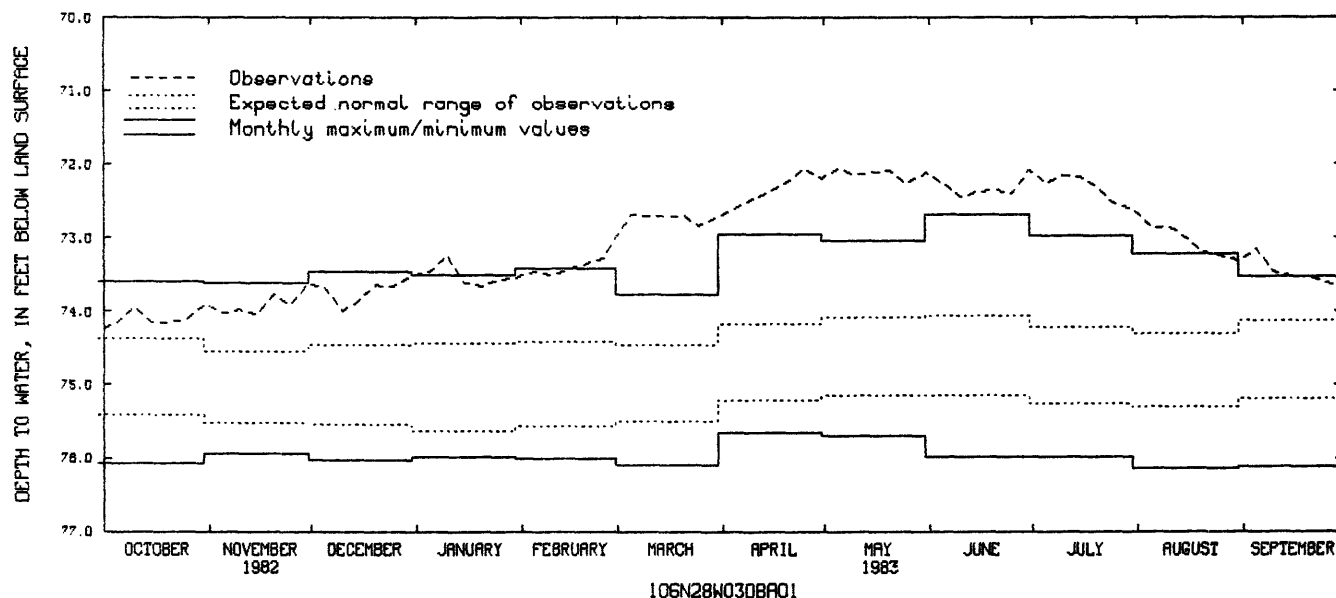
PERIOD OF RECORD.--October 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 71.81 ft (21.89 m) below land-surface datum, Apr. 26, 1983; lowest, 76.17 ft (23.22 m) below land-surface datum, Aug. 17, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	74.15	74.02	73.67	73.45	73.45	72.68	.....	72.06	72.27	72.25	72.86	73.14
10	73.93	73.97	73.98	73.23	73.50	72.71	.....	72.14	72.44	72.15	72.85	73.46
15	74.15	74.04	73.85	73.61	.....	72.71	.....	72.11	72.37	72.17	72.98	73.53
20	74.14	73.77	73.64	73.66	.....	72.69	72.24	72.08	72.35	72.30	73.19	73.52
25	74.11	73.91	73.66	73.57	73.27	72.83	72.06	72.26	72.40	72.52	73.24	.....
EOM	73.89	73.62	73.51	73.53	73.03	.....	72.19	72.11	72.07	72.61	73.31	73.69

WTR YEAR 1983      HIGHEST 71.81 APR 26, 1983      LOWEST 74.23 OCT 1, 1982



441134093505301. Local number, 108N25W04BBC01.

LOCATION.--Lat 44°11'34", long 93°50'53", in SW¼NW¼NW¼ sec.4, T.108 N., R.25 W., Hydrologic Unit 07020011, 1.3 mi (2.1 km) west of Madison Lake at waste treatment plant.

Owner: City of Madison Lake.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 6 in (0.15 m), depth 313 ft (95.4 m), cased to 296 ft (90.2 m).

DATUM.--Altitude of land-surface datum is 1,036 ft (316 m). Measuring point: Top of casing, 1.60 ft (0.49 m) above land-surface datum.

PERIOD OF RECORD.--May 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 93.55 ft (28.51 m) below land-surface datum, July 20, 1983; lowest, 95.42 ft (29.08 m) below land-surface datum, July 16, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	94.73	JAN 10	94.28	MAR 7	94.02	JUL 20	93.55	SEP 14	93.88

## GROUND-WATER LEVELS

## BROWN COUNTY

441030094254501. Local number, 108N30W09ADD01.

LOCATION.--Lat 44°10'30", long 94°25'45", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.9, T.108 N., R.30 W., Hydrologic Unit 07020007, 3.7 mi (6.0 km) northeast of Hanska.

Owner: Erwin Kjelshus.

AQUIFER.--Deposits of Pleistocene Age.

WELL CHARACTERISTICS.--Bored unused water-table well, diameter 16 in (0.41 m), depth 32 ft (9.8 m), cased to 32 ft (9.8 m), open end.

DATUM.--Altitude of land-surface datum is 1,003 ft (306 m). Measuring point: Top of concrete cover, at land-surface datum.

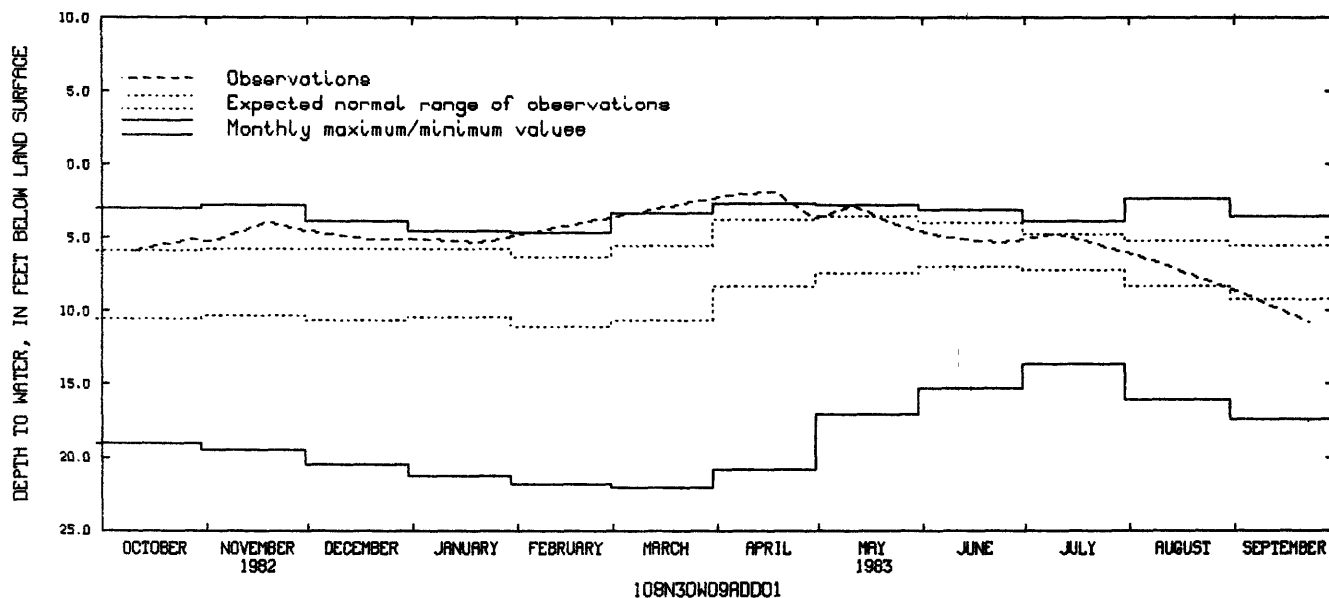
REMARKS.--Measured by Erwin Kjelshus. Water level used in monthly Water Resources Review.

PERIOD OF RECORD.--July 1942 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.82 ft (0.55 m) below land-surface datum, Apr. 18, 1983; lowest, 22.00 ft (6.71 m) below land-surface datum, Mar. 2, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	5.80	DEC 2	4.55	APR 4	2.06	MAY 25	4.20	JUL 10	4.70	AUG 20	7.58
28	5.07	20	5.10	18	1.82	JUN 3	4.74	21	5.33	SEP 5	8.92
NOV 3	5.22	JAN 5	5.05	30	3.68	11	5.03	AUG 2	6.10	23	10.73
19	3.91	21	5.28	MAY 11	2.76	25	5.28	10	6.70		



441800094434301. Local number, 110N32W30DDB01.

LOCATION.--Lat 44°18'00", long 94°43'43", in NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 30, T.110 N., R.32 W., Hydrologic Unit 07020008, in Sleepy Eye at hospital.

Owner: City of Sleepy Eye.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 176 ft (53.6 m).

DATUM.--Altitude of land-surface datum is 1,030 ft (314 m). Measuring point: Top of casing, 1.30 ft (0.40 m) above land-surface datum.

REMARKS.--Water level affected by pumping from nearby wells.

PERIOD OF RECORD.--August 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 49.20 ft (15.00 m) below land-surface datum, June 1, 1983; lowest, 118.1 ft (36.00 m) below land-surface datum, Sept. 15, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	59.16	JAN 3	54.20	JUN 1	49.20	JUL 1	51.20	AUG 1	56.70	SEP 1	63.00
DEC 1	54.90	MAY 2	49.70								

## CARLTON COUNTY

462712092453401. Local number, 046N19W21CBB01.

LOCATION.--Lat 46°27'12", long 92°45'34", in NW¼NW¼SW¼ sec.21, T.46 N., R.19 W., Hydrologic Unit 07030003, in Moose Lake at water tower.

Owner: City of Moose Lake.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 120 in (3.0 m), depth 43 ft (13.1 m), screened 33 to 43 ft (10.1 to 13.1 m).

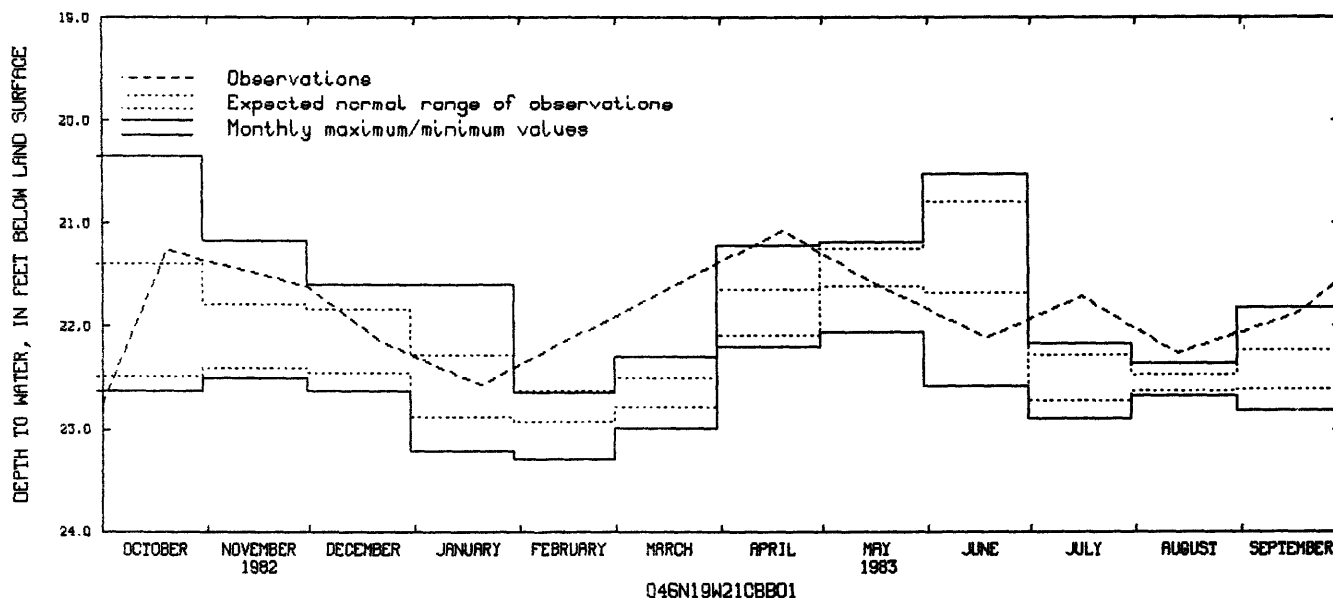
DATUM.--Altitude of land-surface datum is 1,061 ft (323 m). Measuring point: Top of concrete cover, 1.10 ft (0.34 m) above land-surface datum.

PERIOD OF RECORD.--August 1967 to May 1969, July 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 20.35 ft (6.20 m) below land-surface datum, Oct. 25, 1968; lowest, 23.30 ft (7.10 m) below land-surface datum, Feb. 20, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	21.26	DEC 22	22.15	APR 19	21.07	JUN 18	22.11	AUG 13	22.26	SEP 18	21.87
NOV 30	21.61	JAN 20	22.57	MAY 15	21.57	JUL 16	21.71				



463747092372701. Local number, 048N18W21ACD01.

LOCATION.--Lat 46°37'47", long 92°37'27", in SE¼SW¼NE¼ sec.21, T.48 N., R.18 W., Hydrologic Unit 07030003, on Clarence Gustafson farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 52 ft (15.8 m), screened 50 to 52 ft (15.2 to 15.8 m).

DATUM.--Altitude of land-surface datum is 1,280 ft (390 m). Measuring point: Top of casing, 3.80 ft (1.16 m) above land-surface datum.

PERIOD OF RECORD.--December 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 19.88 ft (6.06 m) below land-surface datum, May 15, 1983; lowest, 23.37 ft (7.12 m) below land-surface datum, Mar. 29, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	20.70	DEC 22	20.52	APR 19	19.96	JUN 18	20.08	AUG 13	20.30	SEP 18	20.39
NOV 30	20.60	JAN 20	20.61	MAY 15	19.88	JUL 16	20.18				

## GROUND-WATER LEVELS

## CARVER COUNTY

445155093320101. Local number, 116N23W12CDB01.

LOCATION.--Lat 44°51'55", long 93°32'01", in NW¼SE¼SW¼ sec.12, T.116 N., R.23 W., Hydrologic Unit 07020012, at Chanhassen water tower.

Owner: City of Chanhassen, well 1.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled public supply artesian well, diameter 10 in (0.25 m), depth 518 ft (158 m), cased to 424 ft (129.2 m).

DATUM.--Altitude of land-surface datum is 990 ft (302 m). Measuring point: Edge of vent pipe, 2.40 ft (0.73 m) above land-surface datum.

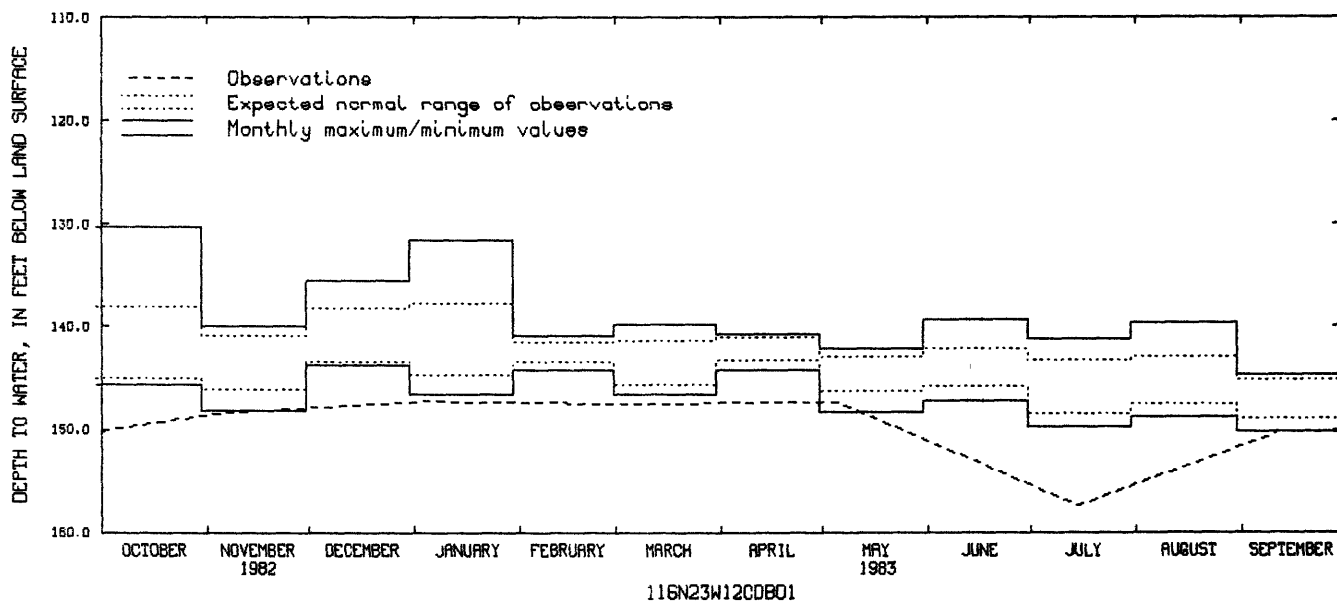
REMARKS.--Water level affected by pumping from nearby wells.

PERIOD OF RECORD.--June 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 130.3 ft (39.72 m) below land-surface datum, Oct. 13, 1965; lowest, 157.4 ft (47.98 m) below land-surface datum, July 15, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	148.4	JAN 4	147.3	MAR 3	147.5	MAY 5	147.3	JUL 15	157.4	SEP 12	150.3



## GROUND-WATER LEVELS

323

## CASS COUNTY

462720094433801. Local number, 135N32W33CDD01.

LOCATION.--Lat  $46^{\circ}27'20''$ , long  $94^{\circ}43'38''$ , in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec.33, T.135 N., R.32 W., Hydrologic Unit 07010106, northwest of Motley.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter  $1\frac{1}{4}$  in (0.03 m), depth 15 ft (4.6 m), screened 13 to 15 ft (4.0 to 4.6 m).

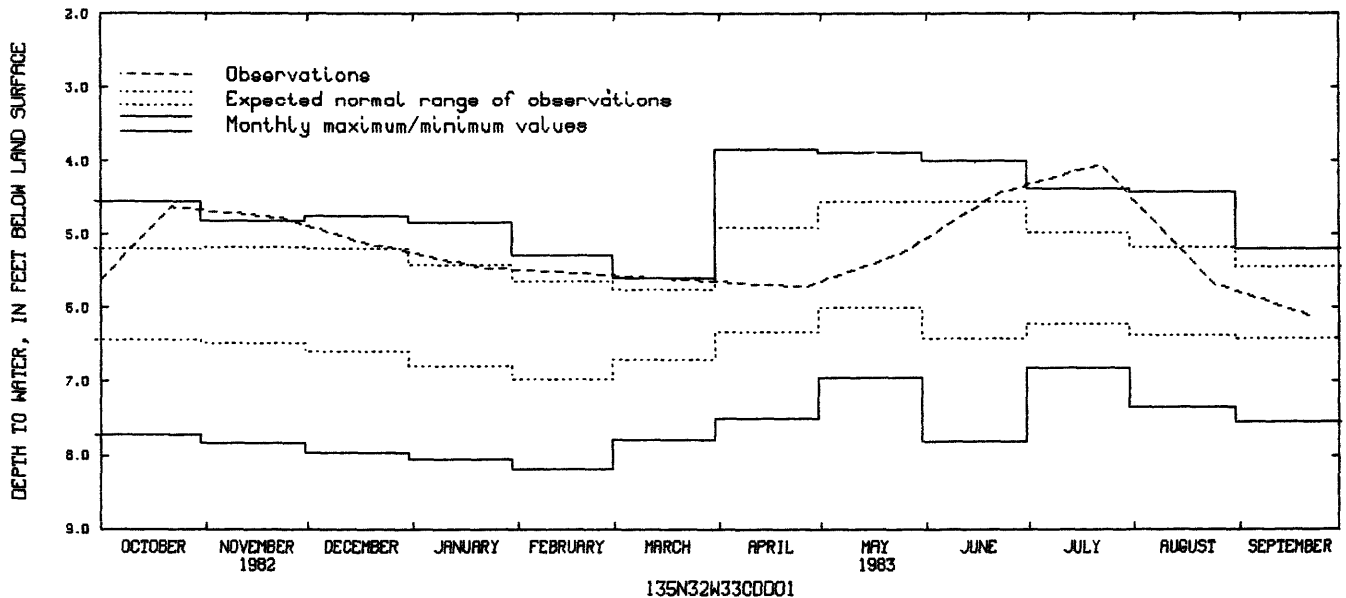
DATUM.--Altitude of land-surface datum is 1,264 ft (385 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.83 ft (1.17 m) below land-surface datum, Apr. 23, 1982; lowest, 8.18 ft (2.49 m) below land-surface datum, Feb. 16, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	4.62	DEC 16	5.09	MAR 31	5.64	MAY 25	5.24	JUL 22	4.04	SEP 22	6.11
NOV 23	4.77	JAN 20	5.44	APR 26	5.71	JUN 22	4.43	AUG 24	5.66		



464629094420901. Local number, 138N32W15AAA01.

LOCATION.--Lat  $46^{\circ}46'29''$ , long  $94^{\circ}42'09''$ , in NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.15, T.138 N., R.32 W., Hydrologic Unit 07010106, 6 mi (9.6 km) south of Badoura State Nursery.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter  $1\frac{1}{4}$  in (0.03 m), depth 15 ft (4.6 m), screened 13 to 15 ft (4.0 to 4.6 m).

DATUM.--Altitude of land-surface datum is 1,418 ft (432 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.86 ft (1.48 m) below land-surface datum, May 24, 1980; lowest, 12.04 ft (3.67 m) below land-surface datum, Apr. 15, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	7.87	DEC 16	8.54	MAR 31	9.07	MAY 25	8.68	JUL 22	7.12	SEP 22	8.28
NOV 23	8.19	JAN 20	8.65	APR 26	9.13	JUN 22	7.82	AUG 24	7.81		

## GROUND-WATER LEVELS

## CHIPPEWA COUNTY

450447095490101. Local number, 119N41W29DDD01.

LOCATION.--Lat 45°04'47", long 95°49'01", in SE¼SE¼SE¼ sec.29, T.119 N., R.41 W., Hydrologic Unit 07020005, 5 mi (8.1 km) north of Watson.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 19 ft (5.8 m), screened 17 to 19 ft (5.2 to 5.8 m).

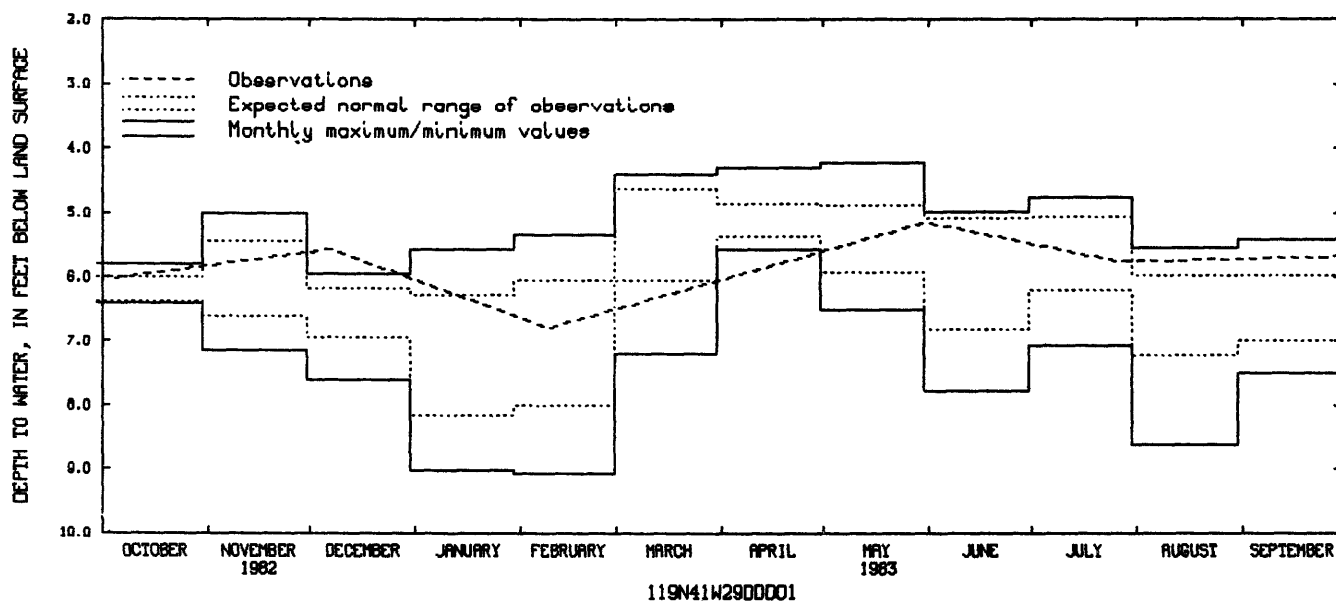
DATUM.--Altitude of land-surface datum is 992 ft (302 m). Measuring point: Top of casing, 3.75 ft (1.14 m) above land-surface datum.

PERIOD OF RECORD.--September 1972 to February 1974, January 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.23 ft (1.29 m) below land-surface datum, May 7, 1973; lowest, 9.06 ft (2.76 m) below land-surface datum, Feb. 8, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	6.02	DEC 7	5.57	FEB 9	6.79	MAY 31	5.15	JUL 27	5.76



450631095562201. Local number, 119N42W17DDD01.

LOCATION.--Lat 45°06'31", long 95°56'22", in SE¼SE¼SE¼ sec.17, T.119 N., R.42 W., Hydrologic Unit 07020001, west of Milan.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial silt of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 19 ft (5.8 m), screened 17 to 19 ft (5.2 to 5.8 m).

DATUM.--Altitude of land-surface datum is 1,027 ft (313 m). Measuring point: Top of casing, 4.50 ft (1.37 m) above land-surface datum.

PERIOD OF RECORD.--September 1972 to October 1973, April 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.50 ft (0.46 m) below land-surface datum, May 7, 1973; lowest, 17.46 ft (5.32 m) below land-surface datum, Apr. 1, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	8.04	DEC 3	6.98	FEB 9	9.48	MAY 31	5.08	JUL 27	5.64

## GROUND-WATER LEVELS

## CHISAGO COUNTY

452014092595102. Local number, 033N21W20BBC02.

LOCATION.--Lat 45°20'14", long 92°59'51", in SW¼NW¼NW¼ sec.20, T.33 N., R.21 W., Hydrologic Unit 07030005, at city of Wyoming.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 20 ft (6.1 m), screened 18 to 20 ft (5.5 to 6.1 m).

DATUM.--Altitude of land-surface datum is 905 ft (276 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--August 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.57 ft (2.00 m) below land-surface datum, July 11, 1975; lowest, 11.70 ft (3.57 m) below land-surface datum, Feb. 24, 1970.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	9.53	NOV 14	9.02	JAN 13	9.17	MAR 1	9.40	APR 11	8.17

453138092445502. Local number, 035N19W17BAB02.

LOCATION.--Lat 45°31'38", long 92°44'55", in NW¼NE¼NW¼ sec.17, T.35 N., R.19 W., Hydrologic Unit 07030005, at Wild River State Park.

Owner: State of Minnesota.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled domestic water-table well, diameter 6 in (0.15 m), depth 110 ft (33.5 m), screened 104 to 110 ft (31.7 to 33.5 m).

DATUM.--Altitude of land-surface datum is 860 ft (262 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 52.64 ft (16.04 m) below land-surface datum, June 8, 1983; lowest, 55.81 ft (17.01 m) below land-surface datum, Nov. 17, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	53.65	JAN 13	54.58	APR 8	53.24	JUN 8	52.64	SEP 28	52.90

453125092445401. Local number, 035N19W17BDB01.

LOCATION.--Lat 45°31'25", long 92°44'54", in NW¼SE¼NW¼ sec.17, T.35 N., R.19 W., Hydrologic Unit 07030005, at Wild River State Park.

Owner: State of Minnesota.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 6 in (0.15 m), depth 270 ft (82.3 m), cased to 230 ft (70.1 m).

DATUM.--Altitude of land-surface datum is 820 ft (250 m). Measuring point: Top of casing, 0.70 ft (0.21 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 42.14 ft (12.84 m) below land-surface datum, Jan. 13, 1983; lowest, 44.19 ft (13.47 m) below land-surface datum, June 8, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	43.56	JAN 13	42.14	APR 8	43.00	JUN 8	44.19	SEP 28	42.81

## GROUND-WATER LEVELS

## CHISAGO COUNTY--Continued

452936092561901. Local number, 035N21W26BCC01.

LOCATION.--Lat 45°29'36", long 92°56'19", in SW¼SW¼NW¼ sec.26, T.35 N., R.21 W., Hydrologic Unit 07030005, southeast of North Branch.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 26 ft (7.9 m), screened 24 to 26 ft (7.3 to 7.9 m).

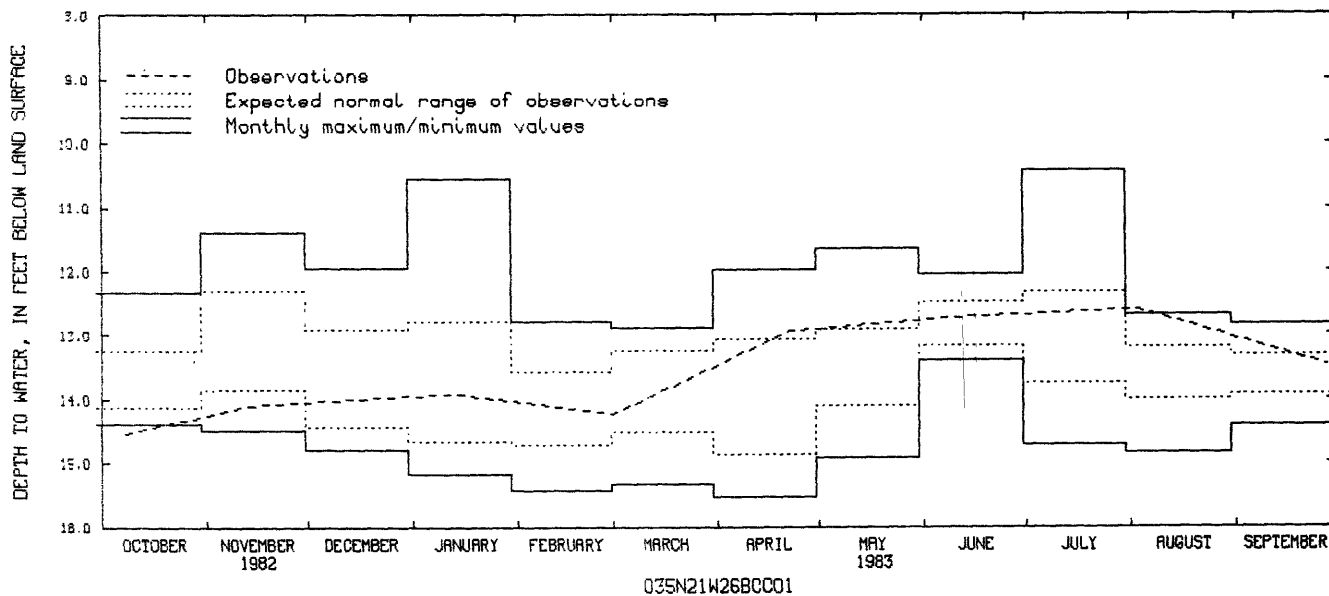
DATUM.--Altitude of land-surface datum is 894 ft (272 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--September 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.42 ft (3.18 m) below land-surface datum, July 11, 1975; lowest, 15.54 ft (4.74 m) below land-surface datum, Apr. 4, 1975.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	14.54	JAN 13	13.92	APR 22	12.95	JUN 8	12.74	AUG 3	12.60	SEP 28	13.48
NOV 14	14.10	MAR 1	14.24								





## GROUND-WATER LEVELS

## COTTONWOOD COUNTY

435458095110801. Local number, 105N36W08ACA01.

LOCATION.--Lat 43°54'58", long 95°11'08", in NE¼SW¼NE¼, sec.8, T.105 N., R.36 W., Hydrologic Unit 0710001, 4 mi (6.4 km) northwest of Windom.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 25 ft (7.6 m), screened 23 to 25 ft (7.0 to 7.6 m).

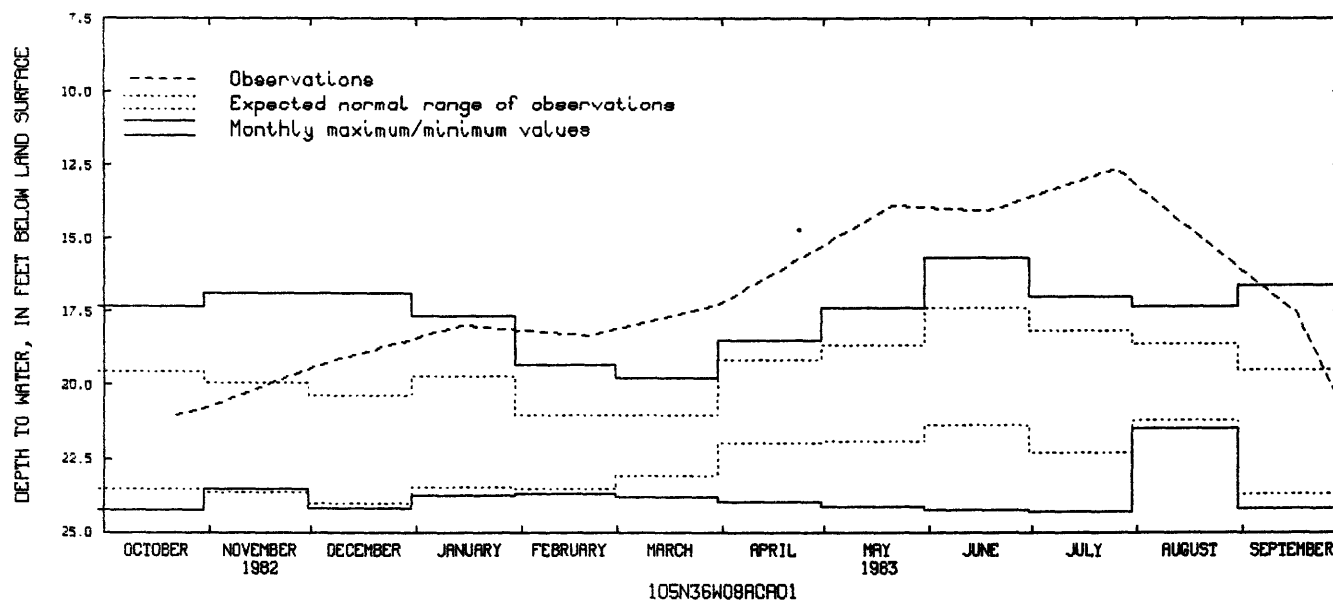
DATUM.--Altitude of land-surface datum is 1,370 ft (418 m): Measuring point: Top of casing, 3.20 ft (0.98 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 12.60 ft (3.84 m) below land-surface datum, July 26, 1983; lowest, 24.28 ft (7.40 m) below land-surface datum, July 25, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	21.05	DEC 4	19.29	FEB 21	18.31	MAY 21	13.87	JUL 26	12.60	SEP 17	17.55
NOV 2	20.69	JAN 14	17.97	MAR 31	17.26	JUN 18	14.06	AUG 20	14.98		



435258095255301. Local number, 105N38W20BAA01.

LOCATION.--Lat 43°52'58", long 95°25'53", in NE¼NE¼NW¼, sec.20, T.105 N., R.38 W., Hydrologic Unit 07100001, 4.5 mi (7.2 km) northeast of Dundee.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 12.5 ft (3.8 m), screened 10.5 to 12.5 ft (3.2 to 3.8 m).

DATUM.--Altitude of land-surface datum is 1,415 ft (431 m): Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.17 ft (1.88 m) below land-surface datum, Apr. 23, 1983; lowest, 10.68 ft (3.26 m) below land-surface datum, Dec. 20, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	7.95	DEC 4	7.68	FEB 21	8.50	APR 23	6.17	JUN 18	7.13	AUG 20	7.98
NOV 2	7.88	JAN 14	8.43	MAR 31	7.54	MAY 21	6.46	JUL 26	6.99	SEP 17	8.45

## GROUND-WATER LEVELS

## CROW WING COUNTY

463006094131201. Local number, 135N28W16CCD01.

LOCATION.--Lat 46°30'06", long 94°13'12", in SE¼SW¼ sec.16, T.135 N., R.28 W., Hydrologic Unit 07010106, northwest of Merrifield.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 18 ft (5.5 m), screened 16 to 18 ft (4.9 to 5.5 m).

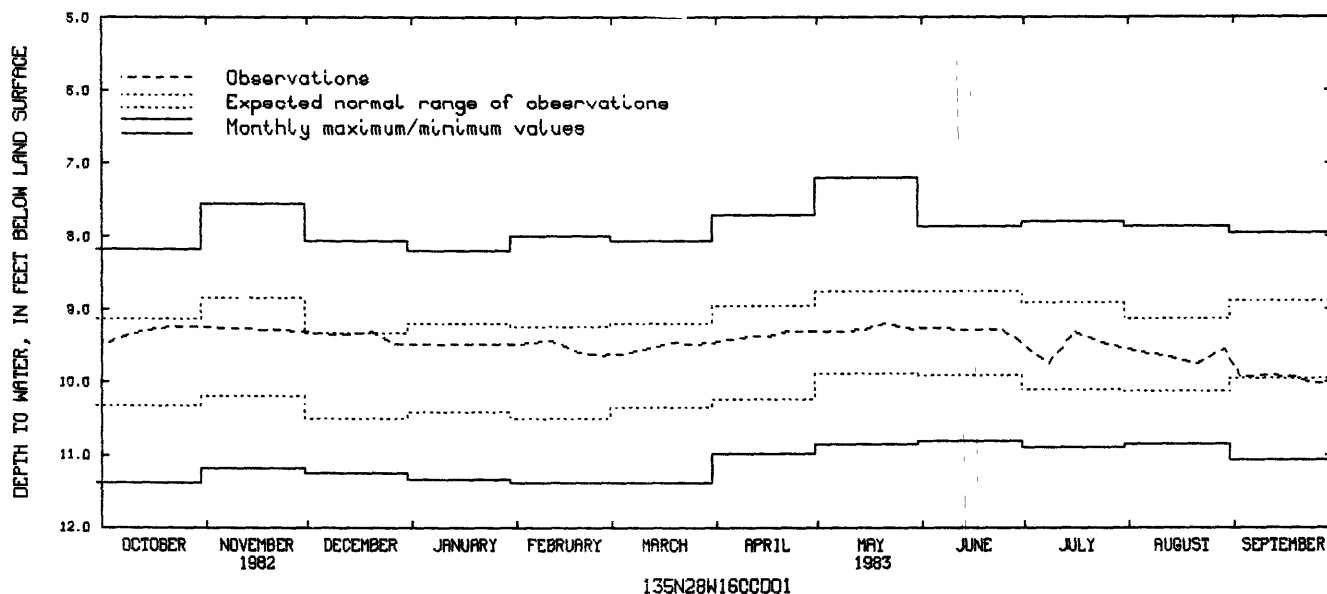
DATUM.--Altitude of land-surface datum is 1,212 ft (369 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--October 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.20 ft (2.19 m) below land-surface datum, May 1, 1982; lowest, 11.38 ft (3.47 m) below land-surface datum, Oct. 16, 1970, Mar. 11, 1977.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	9.45	DEC 11	9.35	FEB 19	9.58	APR 16	9.36	JUN 4	9.26	AUG 21	9.75
9	9.34	20	9.30	26	9.63	23	9.30	11	9.27	29	9.55
17	9.25	27	9.48	MAR 5	9.60	30	9.30	18	9.27	3	9.94
31	9.23	JAN 15	9.48	19	9.46	MAY 7	9.31	25	9.29	10	9.90
NOV 6	9.26	22	9.49	26	9.48	15	9.27	JUL 8	9.74	18	9.92
13	9.26	29	9.49	APR 2	9.43	21	9.19	16	9.30	25	10.01
27	9.29	FEB 11	9.43	9	9.38	29	9.27	23	9.45		



## DAKOTA COUNTY

445044093102401. Local number, 027N23W09ABD01.

LOCATION.--Lat 44°50'44", long 93°10'24", in SE¼NW¼NE¼ sec.9, T.27 N., R.23 W., Hydrologic Unit 07020012, at Eagan.

Owner: City of Eagan, Timberline Addition.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 10 in (0.25 m), depth 503 ft (153 m), cased to 401 ft (122 m).

DATUM.--Altitude of land-surface datum is 900 ft (274 m). Measuring point: Hole in well cap, 2.60 ft (0.79 m) above land-surface datum.

REMARKS.--Water-level affected by pumping.

PERIOD OF RECORD.--December 1965, April 1966, December 1966, March 1967, December 1970, August 1971, August 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 141.4 ft (43.10 m) below land-surface datum, Apr. 5, 1966; lowest, 161.6 ft (49.26 m) below land-surface datum, July 15, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	149.1	JAN 7	148.4	MAR 3	147.9	MAY 5	150.2	JUL 15	161.6	SEP 8	152.6

## GROUND-WATER LEVELS

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## DAKOTA COUNTY--Continued

444702093170101. Local number, 027N24W34BDC01.

LOCATION.--Lat 44°47'02", long 93°17'01", in SW¼SE¼NW¼ sec.34, T.27 N., R.24 W., Hydrologic Unit 07020012, at Burnsville recycling center.

Owner: City of Burnsville.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 220 ft (67.1 m), cased to 180 ft (54.9 m).

DATUM.--Altitude of land-surface datum is 725 ft (221 m). Measuring point: Top of well cap, 2.70 ft (0.82 m) above land-surface datum.

REMARKS.--Water level affected by pumping from nearby city wells.

PERIOD OF RECORD.--July 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.50 ft (2.29 m) above land-surface datum, Sept. 12, 1975; lowest, 42.00 ft (12.80 m) below land-surface datum, July 22, 1975.

WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	+0.80	JAN 5	10.20	MAR 10	+0.62	MAY 5	+0.50	JUL 15	35.20	SEP 8	+0.70

445330093054301. Local number, 028N22W19DCC02.

LOCATION.--Lat 44°53'30", long 93°05'43", in SW¼SW¼SE¼ sec.19, T.28 N., R.22 W., Hydrologic Unit 07010206, in West St. Paul.

Owner: U.S. Geological Survey, 2-N.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in (0.15 m), depth 539 ft (164 m), cased to 407 ft (124 m).

DATUM.--Land-surface datum is 1,036.8 ft (316.0 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.60 ft (0.79 m) above land-surface datum.

REMARKS.--Water level affected by regional pumping.

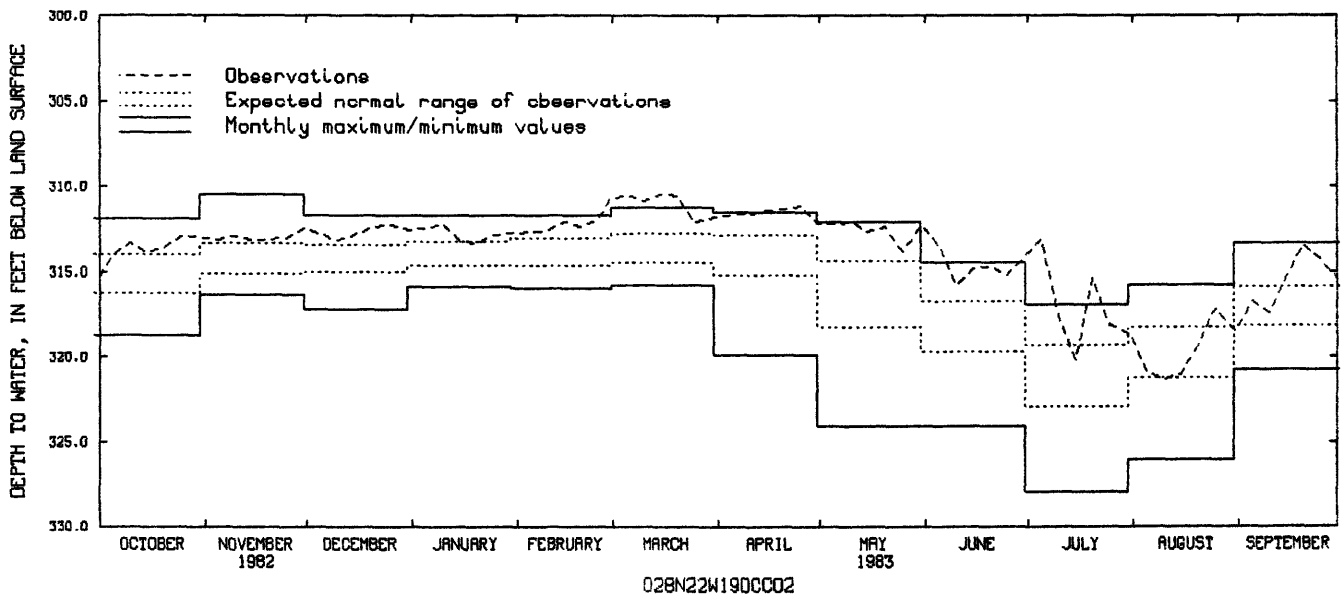
PERIOD OF RECORD.--January 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 309.8 ft (94.43 m) below land-surface datum, Mar. 7, 1983; lowest, 328.0 ft (99.97 m) below land-surface datum, July 31, 1975.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	314.0	313.1	312.8	312.4	312.6	310.4	311.6	312.2	313.6	313.1	320.8	316.8
10	313.3	312.9	313.2	312.2	312.6	310.8	311.6	312.0	315.8	317.6	321.3	317.4
15	313.8	313.1	312.8	313.2	312.1	310.4	311.4	312.7	314.8	320.2	321.0	315.3
20	313.6	313.1	312.4	313.3	312.3	310.5	311.3	312.4	314.7	315.4	319.4	313.4
25	312.9	313.0	312.2	312.8	311.8	312.1	311.1	313.8	315.2	318.1	319.2	314.3
EOM	313.0	312.4	312.5	312.8	310.7	311.7	312.1	312.2	314.1	318.6	318.5	315.5

WTR YEAR 1983      HIGHEST 309.8 MAR 7, 1983      LOWEST 322.8 AUG 9, 1983



## GROUND-WATER LEVELS

## DAKOTA COUNTY--Continued

443146093002201. Local number, 112N18W08ABA01.

LOCATION.--Lat 44°31'46", long 93°00'22", in NE¼NW¼NE¼ sec.8, T.112 N., R.18 W., Hydrologic Unit 07040002, northeast of Randolph.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 44 (13.4 m), screened 42 to 44 ft (12.8 to 13.4 m).

DATUM.--Altitude of land-surface datum is 880 ft (268 m). Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

PERIOD OF RECORD.--April 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 18.13 ft (5.53 m) below land-surface datum, May 3, 1983; lowest, 23.80 ft (7.25 m) below land-surface datum, Feb. 21, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	19.90	JAN 17	20.00	MAR 2	19.53	MAY 3	18.13	JUL 12	18.33	SEP 7	19.45

443134093010601. Local number, 112N18W08BBC01.

LOCATION.--Lat 44°31'34", long 93°01'06", in SW¼NW¼NW¼ sec.8, T.112 N., R.18 W., Hydrologic Unit 07040002, at Randolph Fire Station.

Owner: City of Randolph.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled fire protection artesian well, diameter 10 in (0.25 m), depth 150 ft (45.7 m), cased to 64 ft (19.5 m).

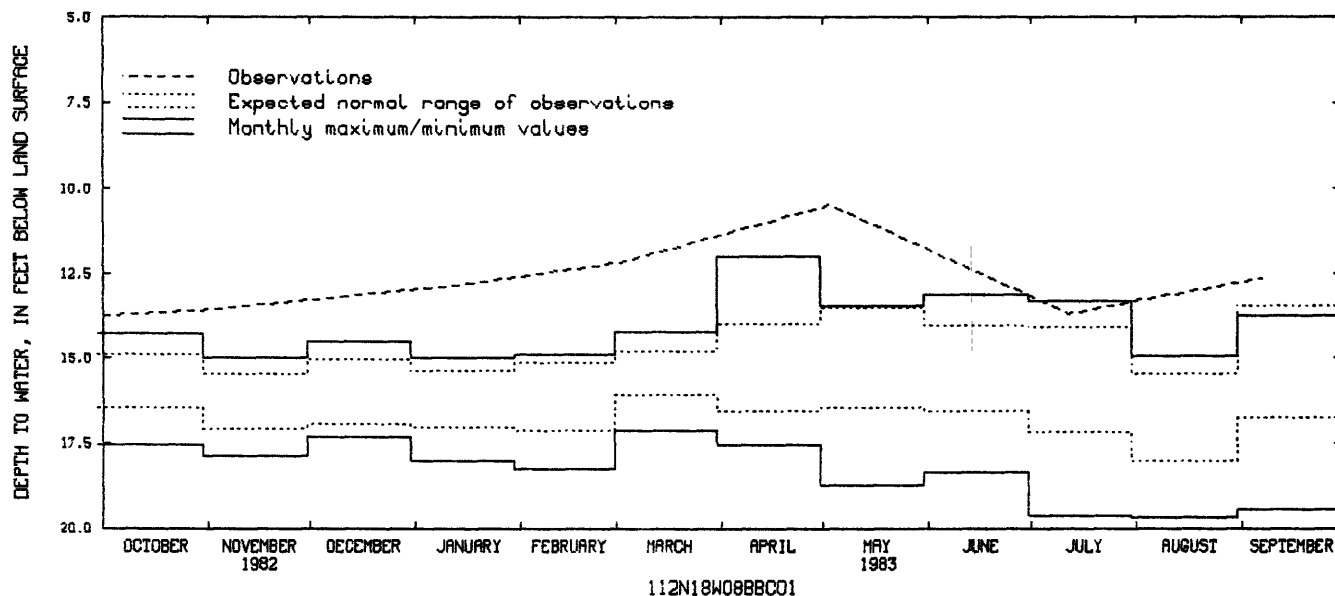
DATUM.--Altitude of land-surface datum is 883 ft (269 m). Measuring point: Top of 3/4-inch (0.02 m) breather pipe, 2.20 ft (0.67 m) above land-surface datum.

PERIOD OF RECORD.--July 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.47 ft (3.19 m) below land-surface datum, May. 3, 1983; lowest, 19.70 ft (6.00 m) below land-surface datum, Aug. 11, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	13.56	JAN 17	12.80	MAR 2	12.16	MAY 3	10.47	JUL 12	13.68	SEP 7	12.64



## GROUND-WATER LEVELS

## DAKOTA COUNTY--Continued

442830093085201. Local number, 112N19W30DBD01.

LOCATION.--Lat 44°28'30", long 93°08'52", in SE¼NW¼SE¼ sec.30, T.112 N., R.19 W., Hydrologic Unit 07040002, at Northfield waste treatment plant.

Owner: City of Northfield.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 6 in (0.15 m), depth 275 ft (83.8 m), cased to 212 ft (64.6 m).

DATUM.--Altitude of land-surface datum is 890 ft (271 m). Measuring point: Center of pressure guage, 2.05 ft (0.62 m) above land-surface datum.

PERIOD OF RECORD.--May 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 18.54 ft (5.65 m) above land-surface datum, July 12, 1983; lowest, 9.44 ft (2.88 m) above land-surface datum, July 10, 1981, Mar. 4, 1982.

## WATER LEVEL, IN FEET ABOVE LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	11.29	MAR 11	15.31	MAY 3	17.15	JUL 12	18.54	SEP 7	12.15

443645093014701. Local number, 113N18W07BAC01.

LOCATION.--Lat 44°36'45", long 93°01'47", in SW¼NE¼NW¼ sec.7, T.113 N., R.18 W., Hydrologic Unit 07040001, west of Hampton.

Owner: Eugene Dohmen.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 16 in (0.41 m), depth 325 ft (99.1 m), cased to 65 ft (19.8 m).

DATUM.--Altitude of land-surface datum is 915 ft (217 m). Measuring point: Hole in pump base, 1.60 ft (0.49 m) above land-surface datum.

PERIOD OF RECORD.--April 1977 to August 1977, January 1978, June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 26.15 ft (7.97 m) below land-surface datum, July 19, 1983; lowest, 33.19 ft (10.12 m) below land-surface datum, Aug. 12, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	31.10	JAN 12	30.10	MAR 2	29.63	MAY 3	27.55	JUL 19	26.15	SEP 7	26.76

44420592500001. Local number, 114N17W10AAA01.

LOCATION.--Lat 44°42'05", long 92°50'00", in NE¼NE¼NE¼ sec.10, T.114 N., R.17 W., Hydrologic Unit 07040001, southeast of Hastings.

Owner: John Conzemius.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), depth 151 ft (46.0 m), depth of casing unknown.

DATUM.--Altitude of land-surface datum is 827 ft (252 m). Measuring point: Top of platform, 2.50 ft (0.76 m) above land-surface datum.

PERIOD OF RECORD.--April 1976 to current year.

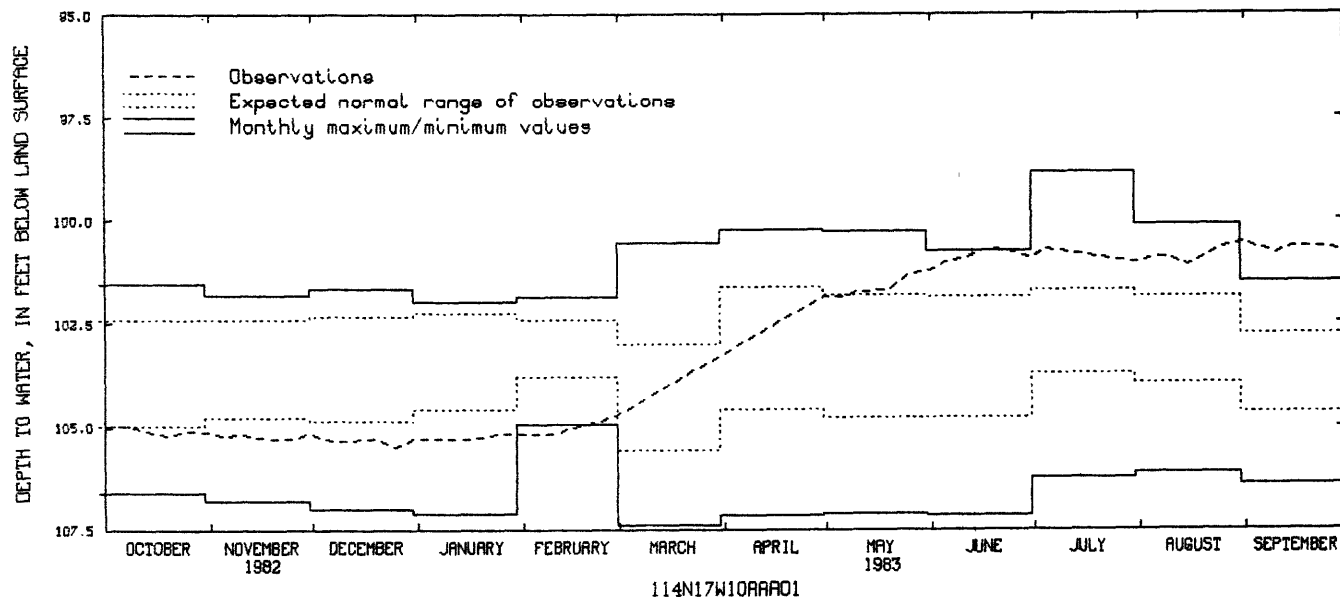
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 98.82 ft (30.12 m) below land-surface datum, July 26, 1978; lowest, 107.4 ft (32.74 m) below land-surface datum, Mar. 12, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	105.0	105.2	105.3	105.3	105.2	.....	.....	101.9	101.0	100.7	100.9	.....
10	105.0	105.2	105.4	105.3	105.2	.....	.....	101.7	100.9	.....	100.9	100.8
15	105.2	105.2	105.3	105.3	.....	.....	.....	101.7	100.8	.....	101.1	100.6
20	105.2	105.3	105.3	105.2	.....	.....	.....	101.6	100.7	.....	100.9	100.7
25	105.1	105.3	105.5	105.2	.....	.....	.....	101.3	100.8	.....	100.7	100.6
EOM	105.2	105.2	105.3	105.2	104.7	.....	101.8	101.2	100.9	101.0	100.5	100.7
WTR YEAR 1983	HIGHEST	100.3	SEP 17, 1983	LOWEST	105.5	DEC 24, 1982						

## GROUND-WATER LEVELS

DAKOTA COUNTY--Continued



444047092521901. Local number, 114N17W16CBB01.

LOCATION.--Lat 44°40'47", long 92°52'19", in NW¼NW¼SW¼ sec.16, T.114 N., R.17 W., Hydrologic Unit 07040001, Kirby Avenue, 0.5 mi (0.8 km) north of 190th Street.

Owner: Jim Huneke Construction Company.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled domestic water-table well, diameter 4 in (0.10 m), depth 170 ft (51.8 m), screened 164 to 170 ft (50.0 to 51.8 m).

DATUM.--Altitude of land-surface datum is 823 ft (251 m). Measuring point: Top of casing, 1.10 ft (0.34 m) above land-surface datum.

PERIOD OF RECORD.--March 1976, March 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 80.98 ft (24.68 m) below land-surface datum, Apr. 7, 1980; lowest, 87.75 ft (26.75 m) below land-surface datum, June 27, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	85.58	JAN 6	85.20	MAR 2	84.90	MAY 2	83.38	JUL 11	82.14	SEP 7	82.22

443827092521801. Local number, 114N17W33BBC01.

LOCATION.--Lat 44°38'27", long 92°52'18", in SW¼NW¼NW¼ sec.33, T.114 N., R.17 W., Hydrologic Unit 07040001, 39 ft (11.9 m) south of irrigation well.

Owner: Rainer Kimmes.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 16 in (0.41 m), depth 290 ft (88.4 m), cased to 25 ft (7.6 m).

DATUM.--Altitude of land-surface datum is 862 ft (263 m). Measuring point: Hole in plate over well, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--August 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 61.77 ft (18.83 m) below land-surface datum, Sept. 7, 1983; lowest, 78.52 ft (23.02 m) below land-surface datum, Aug. 10, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	73.00	JAN 6	69.54	MAR 2	68.02	MAY 2	63.98	JUL 11	63.35	SEP 7	61.77

## GROUND-WATER LEVELS

## DAKOTA COUNTY--Continued

444117092595701. Local number, 114N18W17AAB01.

LOCATION.--Lat 44°41'17", long 92°59'57", in NW¼NE¼NE¼ sec.17, T.114 N., R.18 W., Hydrologic Unit 07040001, 180th Street, 0.25 mi (0.40 km) west of Emery Avenue.

Owner: Joe Ries.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 16 in (0.41 m), depth 280 ft (85.3 m), cased to 39 ft (11.9 m).

DATUM.--Altitude of land-surface datum is 905 ft (276 m). Measuring point: Edge of vent pipe, 1.40 ft (0.43 m) above land-surface datum.

PERIOD OF RECORD.--June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 65.81 ft (20.06 m) below land-surface datum, June 11, 1979; lowest, 73.52 ft (22.41 m) below land-surface datum, Sept. 13, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	72.60	JAN 6	70.85	MAR 2	69.55	MAY 2	68.50	JUL 11	70.45	SEP 7	66.82

443801092571301. Local number, 114N18W35CCB01.

LOCATION.--Lat 44°38'01", long 92°57'13", in NW¼SW¼SW¼ sec.35, T.114 N., R.18 W., Hydrologic Unit 07040001, Goodwin Avenue, 1.1 mi (1.8 km) south of Northfield Boulevard.

Owner: Al Wagner, Jr.

AQUIFER.--Buried gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 203 ft (61.9 m), screened 173 to 203 ft (52.7 to 61.9 m).

DATUM.--Altitude of land-surface datum is 898 ft (274 m). Measuring point: Hole in pump base, 1.25 ft (0.38 m) above land-surface datum.

PERIOD OF RECORD.--June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.41 ft (7.44 m) below land-surface datum, July 11, 1983; lowest, 38.28 ft (11.67 m) below land-surface datum, Sept. 13, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	37.35	JAN 6	34.91	MAR 2	33.67	MAY 2	32.62	JUL 11	24.41	SEP 7	27.15

444220093055001. Local number, 114N19W04DAC01.

LOCATION.--Lat 44°42'20", long 93°05'50", in SW¼NE¼SE¼ sec.4, T.114 N., R.19 W., Hydrologic Unit 07040001, 2.1 mi (3.4 km) southeast of Rosemount.

Owner: University of Minnesota Agricultural Experiment Station (Plant Pathology).

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 6 in (0.15 m), depth 415 ft (126 m), cased to 355 ft (108 m).

DATUM.--Altitude of land-surface datum is 947 ft (289 m). Measuring point: Top of 1-inch breather pipe, 2.10 ft (0.64 m) above land-surface datum.

PERIOD OF RECORD.--August 1970 to current year.

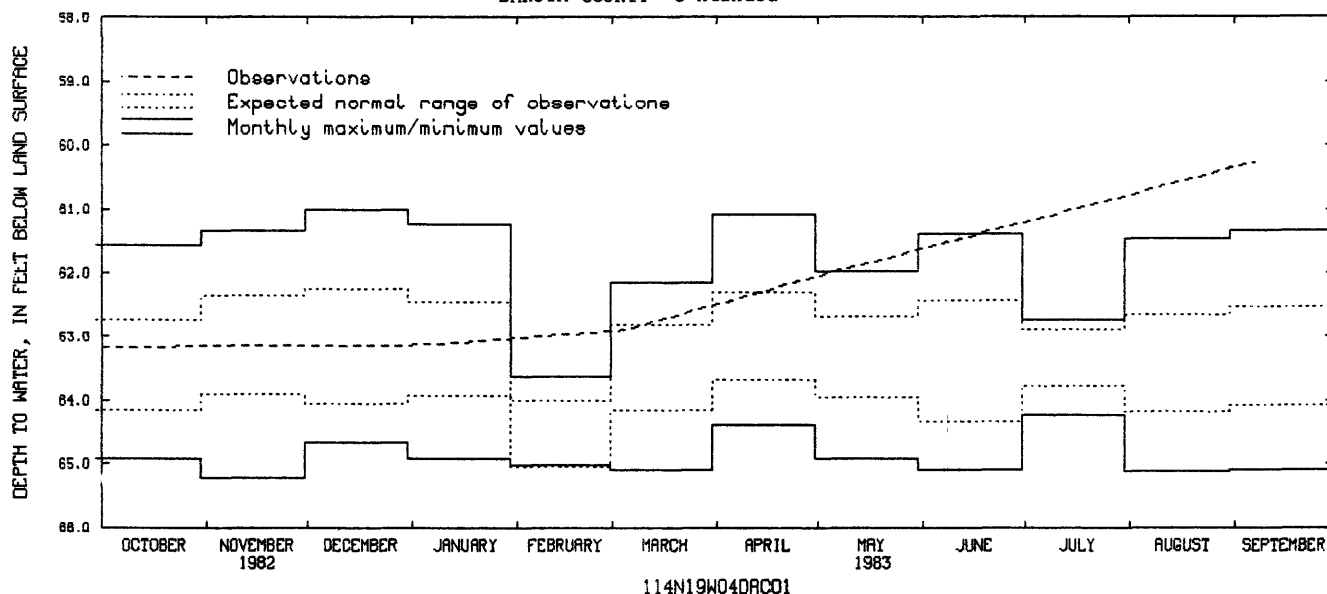
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 60.27 ft (18.37 m) below land-surface datum, Sept. 7, 1983; lowest, 65.23 ft (19.88 m) below land-surface datum, Nov. 27, 1970.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	63.15	JAN 5	63.13	MAR 4	62.90	MAY 3	62.02	SEP 7	60.27

## GROUND-WATER LEVELS

## DAKOTA COUNTY--Continued



443831093074201. Local number, 114N19W32BAD01.

LOCATION.--Lat 44°38'31", long 93°07'42", in SE¼NE¼NW¼ sec.32, T.114 N., R.19 W., Hydrologic Unit 07040001, at city of Farmington.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 23 ft (7.0 m), screened 21 to 23 ft (6.4 to 7.0 m).

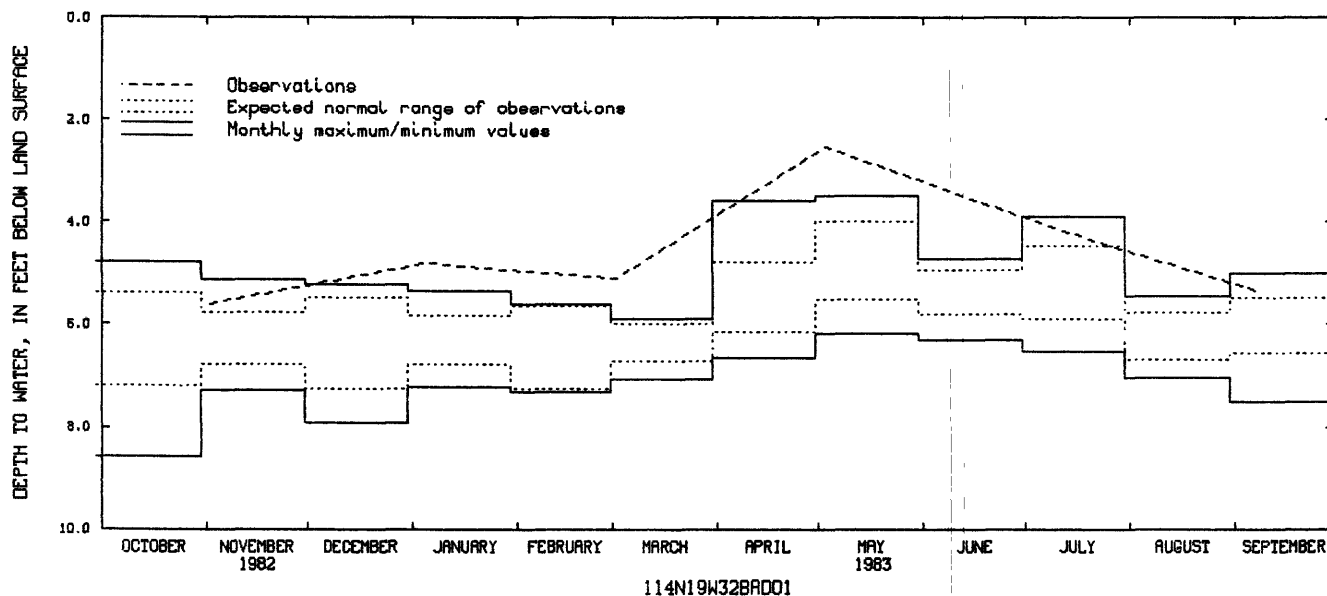
DATUM.--Altitude of land-surface datum is 895 ft (273 m). Measuring point: Top of casing, 3.75 ft (1.14 m) above land-surface datum.

PERIOD OF RECORD.--August 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.53 ft (0.77 m) below land-surface datum, May 3, 1983; lowest, 8.60 ft (2.62 m) below land-surface datum, Oct. 26, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	5.60	JAN 5	4.81	MAR 2	5.11	MAY 3	2.53	JUL 12	4.17	SEP 7	5.34





## GROUND-WATER LEVELS

## DAKOTA COUNTY--Continued

444616093020101. Local number, 115N18W18BCB01.

LOCATION.--Lat 44°46'16", long 93°02'01", in NW¼SW¼NW¼ sec.18, T.115 N., R.18 W., Hydrologic Unit 07010206, southwest corner of Pine Bend Cemetery.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 189 ft (57.6 m), screened 187 to 189 ft (57.0 to 57.6 m).

DATUM.--Altitude of land-surface datum is 930 ft (283 m). Measuring point: Top of casing, 3.80 ft (1.16 m) above land-surface datum.

PERIOD OF RECORD.--May and June 1973, January 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 167.3 ft (50.99 m) below land-surface datum, Mar. 31, 1973; lowest, 178.9 ft (54.53 m) below land-surface datum, May 6, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	176.9	JAN 5	175.3	MAR 4	173.7	MAY 3	172.8	JUL 12	171.6	SEP 7	171.1

## DODGE COUNTY

435336092553201. Local number, 105N18W13DDD01.

LOCATION.--Lat 43°53'36", long 92°55'32", in SE¼SE¼SE¼ sec.13, T.105 N., R.18 W., Hydrologic Unit 07080201, 3 mi (4.8 km) west of Hayfield.

Owner: James Barry.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 5 in (0.13 m), depth 82 ft (25.0 m), screen information not available.

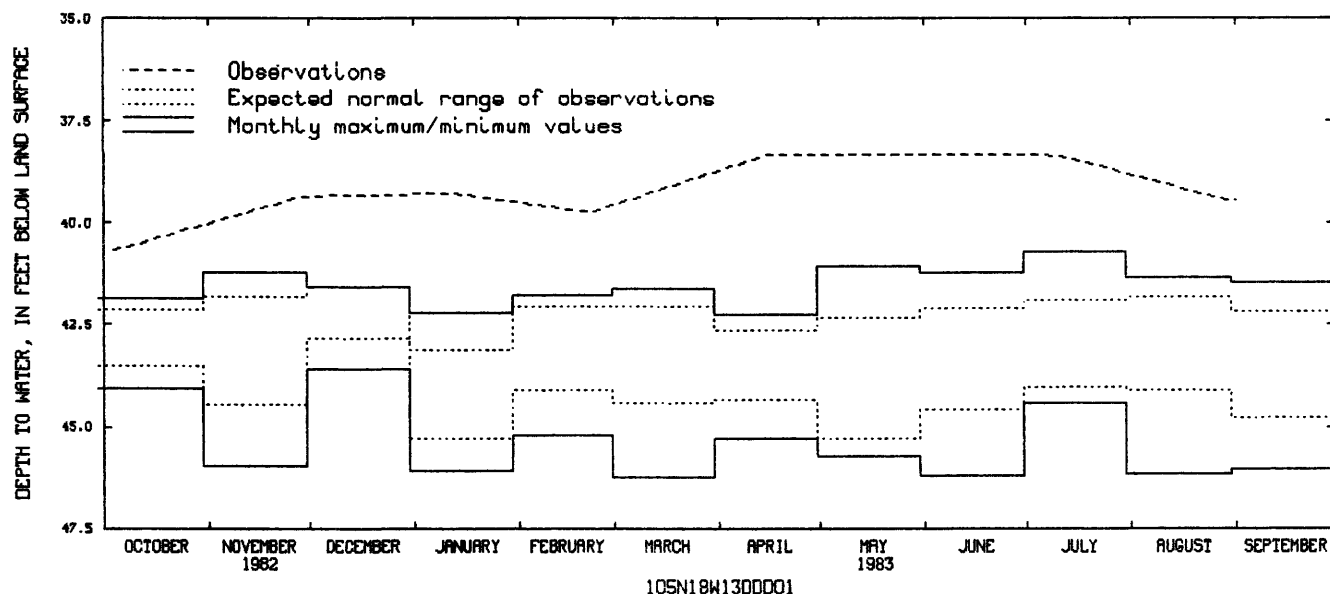
DATUM.--Altitude of land-surface datum is 1,288 ft (393 m). Measuring point: Top of casing, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--June 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 38.31 ft (11.68 m) below land-surface datum, May 23, 1983; lowest, 46.25 ft (14.10 m) below land-surface datum, Mar. 30, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	40.67	JAN 12	39.27	APR 15	38.33	MAY 23	38.31	JUL 11	38.34	AUG 29	39.43
NOV 29	39.34	FEB 22	39.73								



## GROUND-WATER LEVELS

## DODGE COUNTY--Continued

440448092485501. Local number, 107N17W13BBA01.

LOCATION.--Lat 44°04'48", long 92°48'55", in NE¼NW¼ sec.13, T.107 N., R.17 W., Hydrologic Unit 07040004, in city of Wasioja.

Owner: Wasioja Township Garage.

AQUIFER.--Galena Formation of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled maintenance artesian well, diameter 6 in (0.15 m), depth 100 ft (30.5 m), cased to 52 ft (15.8 m).

DATUM.--Altitude of land-surface datum is 1,185 ft (361 m). Measuring point: Top of casing, 1.60 ft (0.49 m) above land-surface datum.

PERIOD OF RECORD.--January 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 12.94 ft (3.94 m) below land-surface datum, May 23, 1983; lowest, 26.88 ft (8.19 m) below land-surface datum, Jan. 5, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	19.47	NOV 29	16.55	FEB 25	17.81	APR 11	14.95	MAY 23	12.94	AUG 25	16.55

## DOUGLAS COUNTY

454643095413201. Local number, 127N40W27CBB01.

LOCATION.--Lat 45°46'43", long 95°41'32", in NW¼NW¼SW¼ sec.27, T.127 N., R.40 W., Hydrologic Unit 07020005, at Kensington.

Owner: City of Kensington.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 10 in (0.25 m), depth 259 ft (78.9 m), screened 251 to 261 ft (76.5 to 79.6 m).

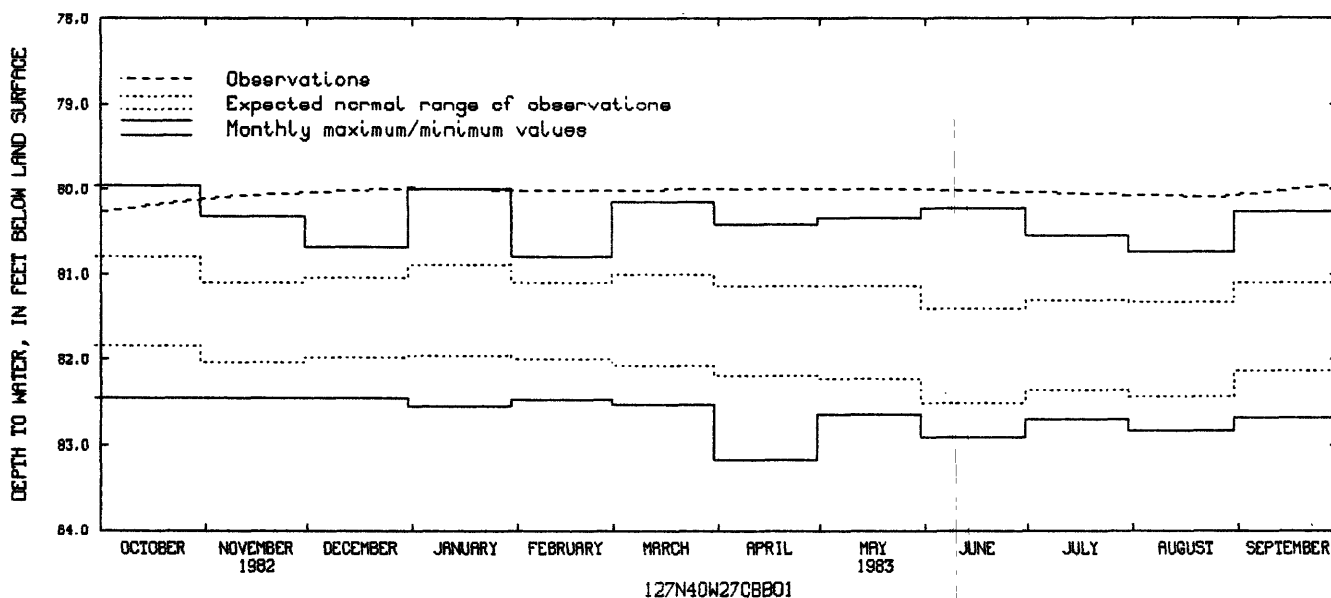
DATUM.--Altitude of land-surface datum is 1,332 ft (406 m). Measuring point: Top of casing, 2.10 ft (0.64 m) above land-surface datum.

PERIOD OF RECORD.--March 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 79.95 ft (24.37 m) below land-surface datum, Oct. 2, 1972; lowest, 83.17 ft (25.35 m) below land-surface datum, Apr. 5, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	80.08	DEC 31	79.98	FEB 1	80.01	MAY 24	79.99	AUG 26	80.09



## DOUGLAS COUNTY--Continued

455926095122901. Local number, 129N36W15BBB01.

LOCATION.--Lat 45°59'26", long 95°12'29", in NW¼NW¼NW¼ sec.15, T.129 N., R.36 W., Hydrologic Unit 07010108, 1 mi (1.6 km) east of Belle River.

Owner: George Schuneman.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused water-table well, depth 18 ft (5.5 m).

DATUM.--Altitude of land-surface datum is 1,345 ft (410 m). Measuring point: Top casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--February 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.98 ft (0.91 m) below land-surface datum, June 30, 1979; lowest, 8.40 ft (2.56 m) below land-surface datum, Feb. 28, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	5.54	DEC 31	5.82	FEB 28	6.04	APR 30	5.27	JUN 30	5.37	AUG 31	5.94
NOV 30	5.65	JAN 31	6.10	MAR 31	5.46	MAY 31	5.58	JUL 31	5.60	SEP 30	6.12

455900095162001. Local number, 129N36W18CBB01.

LOCATION.--Lat 45°59'00", long 95°16'20", in NW¼NW¼SW¼ sec.18, T.129 N., R.36 W., Hydrologic Unit 07010108, 1.5 mi (2.4 km) northeast of Carlos.

Owner: Ray Beilke.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 29 ft (8.8 m), screened 27 to 29 ft (8.2 to 8.8 m).

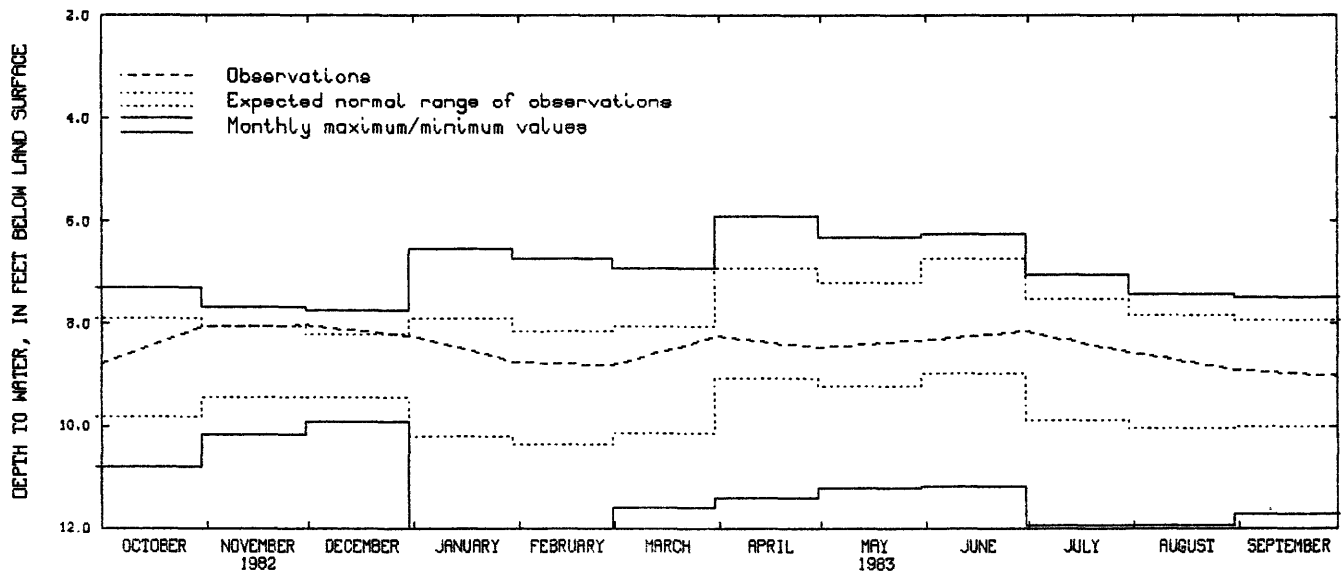
DATUM.--Altitude of land-surface datum is 1,362 ft (415 m). Measuring point: Top of casing, 3.50 ft (1.07 m) above land-surface datum.

PERIOD OF RECORD.--January 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.90 ft (1.80 m) below land-surface datum, Apr. 30, 1973; lowest, 12.00 ft (3.66 m) below land-surface datum, Jan. 31, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	8.06	DEC 31	8.24	FEB 28	8.82	APR 30	8.46	JUN 30	8.15	AUG 31	8.90
NOV 30	8.03	JAN 31	8.75	MAR 31	8.25	MAY 31	8.32	JUL 31	8.56	SEP 30	9.02



## GROUND-WATER LEVELS

## DOUGLAS COUNTY--Continued

460604095134401. Local number, 130N36W04BCC01.

LOCATION.--Lat 46°06'04", long 95°13'44", in SW¼SW¼NW¼ sec.4, T.130 N., R.36 W., Hydrologic Unit 07010108, northwest of Rose City.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 17 ft (5.2 m), screened 15 to 17 ft (4.6 to 5.2 m).

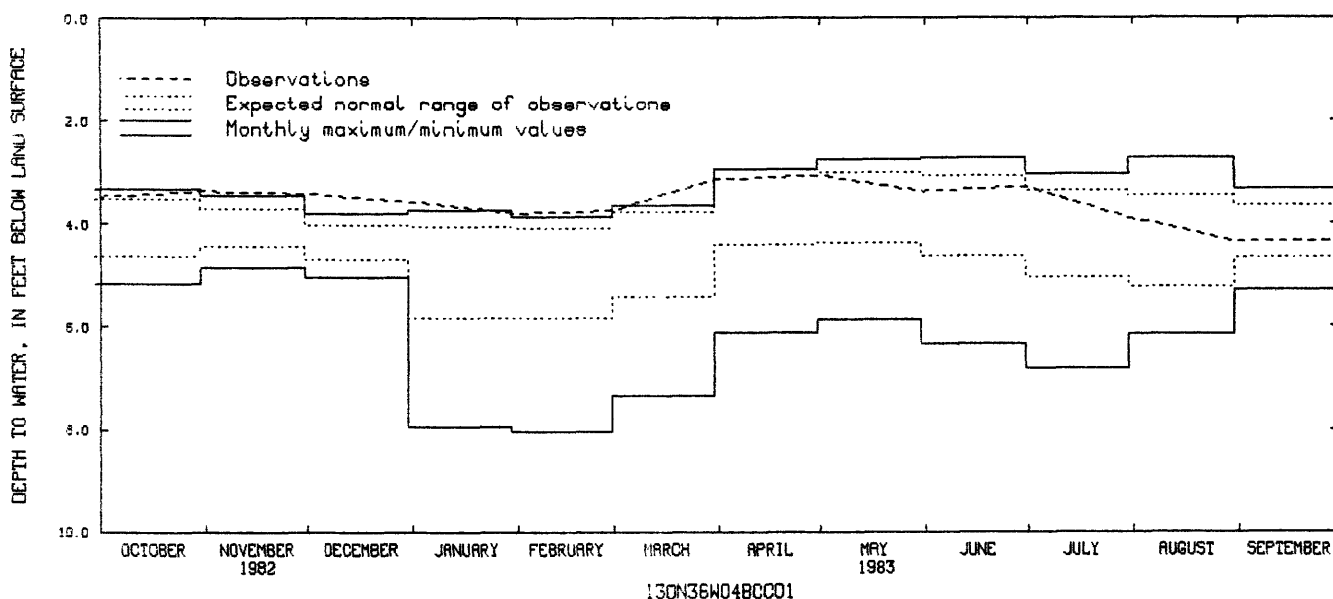
DATUM.--Altitude of land-surface datum is 1,417 ft (432 m). Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

PERIOD OF RECORD.--January 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.72 ft (0.83 m) below land-surface datum, June 30, 1979; lowest, 8.05 ft (2.45 m) below land-surface datum, Feb. 28, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	3.36	DEC 31	3.56	FEB 28	3.74	APR 30	3.06	JUN 30	3.28	AUG 31	4.35
NOV 30	3.41	JAN 31	3.79	MAR 31	3.14	MAY 31	3.37	JUL 31	3.89	SEP 30	4.32



460300095100201. Local number, 130N36W23DDD01.

LOCATION.--Lat 46°03'00", long 95°10'02", in SE¼SE¼SE¼ sec.23, T.130 N., R.36 W., Hydrologic Unit 07010108, 1 mi (1.6 km) south of Rose City.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 14 ft (4.3 m), screened 12 to 14 ft (3.7 to 4.3 m).

DATUM.--Altitude of land-surface datum is 1,405 ft (428 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--Highest water level, 4.77 ft (1.45 m) below land-surface datum, June 30, 1979; lowest, 12.90 ft (3.93 m) below land-surface datum, Feb. 28, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	7.85	DEC 31	8.85	FEB 28	8.07	APR 30	7.29	JUN 30	7.68	AUG 31	8.21
NOV 30	7.91	JAN 31	8.06	MAR 31	7.53	MAY 31	7.56	JUL 31	7.96	SEP 30	8.33

## GROUND-WATER LEVELS

## FARIBAUT COUNTY

434237094082901. Local number, 103N28W24BDC01.

LOCATION.--Lat 43°42'37", long 94°08'29", in SW¼SE¼NW¼ sec.24, T.103 N., R.28 W., Hydrologic Unit 07020009, 4.5 mi (7.2 km) south of Winnebago.

Owner: Riverside Town and Country Club.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 8 in (0.20 m), depth 352 ft (107 m), cased to 291 ft (88.7 m).

DATUM.--Altitude of land-surface datum is 1,085 ft (331 m). Measuring point: Top of coupling, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--July 1979, April 1980, May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 34.82 ft (10.61 m) below land-surface datum, May 10, 1983; lowest, 39.30 ft (11.98 m) below land-surface datum, July 31, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	36.85	JAN 12	36.50	MAR 24	35.62	MAY 10	34.82	SEP 15	38.32

434558093540001. Local number, 104N26W36CAC01.

LOCATION.--Lat 43°45'58", long 93°54'00", in SW¼NE¼SW¼ sec.36, T.104 N., R.26 W., Hydrologic Unit 07020011, at Easton Creamery.

Owner: City of Easton.

AQUIFER.--Platteville Formation of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled public supply artesian well, diameter 6 in (0.15 m), depth 145 ft (44.2 m), cased to 120 ft (36.6 m).

DATUM.--Altitude of land-surface datum is 1,060 ft (323 m). Measuring point: Top of well cap, 1.20 ft (0.37 m) above land-surface datum.

PERIOD OF RECORD.--August 1979, April 1980, May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 29.97 ft (9.13 m) below land-surface datum, May 10, 1983; lowest, 35.25 ft (10.74 m) below land-surface datum, Aug. 1, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	31.30	JAN 12	31.05	MAR 8	30.40	MAY 10	29.97	JUL 21	32.15	SEP 15	32.68

434902094042901. Local number, 104N27W16ABA01.

LOCATION.--Lat 43°49'02", long 94°04'29", in NE¼NW¼NE¼ sec.16, T.104 N., R.27 W., Hydrologic Unit 07020011, at Bass Lake.

Owner: Baptist Camp.

AQUIFER.--St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 240 ft (73.2 m), cased to 190 ft (57.9 m).

DATUM.--Altitude of land-surface datum is 1,050 ft (320 m). Measuring point: Hole in well cap, 0.90 ft (0.27 m) above land-surface datum.

PERIOD OF RECORD.--September 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 27.48 ft (8.38 m) below land-surface datum, May 10, 1983; lowest, 29.75 ft (9.07 m) below land-surface datum, Sept. 15, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	29.10	JAN 12	28.35	MAR 8	28.17	MAY 10	27.48	SEP 15	29.75

## GROUND-WATER LEVELS

## FREEBORN COUNTY

433434093331201. Local number, 101N23W02DAC01.

LOCATION.--Lat 43°34'34", long 93°33'12", in SW¼NE¼SE¼ sec.2, T.101 N., R.23 W., Hydrologic Unit 07080203, 3 mi (4.8 km) southwest of Conger.

Owner: Richard Steele.

AQUIFER.--Upper Carbonates of Devonian and Ordovician Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 16 in (0.41 m), depth 373 ft (114 m), cased to 156 ft (47.6 m).

DATUM.--Altitude of land-surface datum is 1,280 ft (390 m). Measuring point: Vent pipe, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 65.58 ft (19.99 m) below land-surface datum, Mar. 8, 1983; lowest, 68.90 ft (21.00 m) below land-surface datum, July 8, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	68.40	JAN 12	66.12	MAR 8	65.58	MAY 10	65.60	SEP 15	68.30

433846093220601. Local number, 102N21W09CCB01.

LOCATION.--Lat 43°38'46", long 93°22'06", in NW¼SW¼SW¼ sec.9, T.102 N., R.21 W., Hydrologic Unit 07080202, at Freeborn County Courthouse.

Owner: Freeborn County.

AQUIFER.--Cedar Valley Formation of Middle Devonian Age.

WELL CHARACTERISTICS.--Drilled public supply artesian well, diameter 5 in (0.13 m), depth 150 ft (45.7 m), cased to 138 ft (42.1 m).

DATUM.--Altitude of land-surface datum is 1,240 ft (378 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--November 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 40.50 ft (12.34 m) below land-surface datum, Mar. 8, 1983; lowest, 45.67 ft (13.92 m) below land-surface datum, July 21, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	42.20	JAN 12	41.45	MAR 8	40.50	MAY 10	41.92	JUL 21	45.67	SEP 15	44.27

434032093111801. Local number, 103N20W36CCB01.

LOCATION.--Lat 43°40'32", long 93°11'18", in NW¼SW¼SW¼ sec.36, T.103 N., R.20 W., Hydrologic Unit 07080201, at Pillsbury Grain Station.

Owner: Pillsbury Co.

AQUIFER.--Cedar Valley Formation of Middle Devonian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 5 in (0.13 m), depth 231 ft (70.4 m), cased to 136 ft (41.4 m).

DATUM.--Altitude of land-surface datum is 1,255 ft (383 m). Measuring point: Top of casing, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 49.20 ft (15.00 m) below land-surface datum, Jan. 12, 1983; lowest, 51.40 ft (15.67 m) below land-surface datum, July 8, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	49.67	JAN 12	49.20	MAR 8	49.29	MAY 10	50.58	JUL 21	50.03	SEP 15	51.25

## GROUND-WATER LEVELS

## FREEBORN COUNTY--Continued

434308093322001. Local number, 103N23W13CDA01.

LOCATION.--Lat 43°43'08", long 93°32'20", in NE¼SE¼SW¼ sec.13, T.103 N., R.23 W., Hydrologic Unit 07020011, 3.3 mi (5.3 km) northeast of Alden.

Owner: Oakview Golf Course.

AQUIFER.--Galena Formation of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 6 in (0.15 m), depth 270 ft (82.3 m), cased to 158 ft (48.2 m).

DATUM.--Altitude of land-surface datum is 1,250 ft (381 m). Measuring point: Hole in well cap, 1.90 ft (0.58 m) above land-surface datum.

PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 42.00 ft (12.80 m) below land-surface datum, May 10, 1983; lowest, 45.77 ft (13.95 m) below land-surface datum, Nov. 10, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	43.65	JAN 12	42.60	MAR 8	42.32	MAY 10	42.00	SEP 15	45.22

## GOODHUE COUNTY

441737092400501. Local number, 110N15W31BBD01.

LOCATION.--Lat 44°17'37", long 92°40'05", in SE¼NW¼NW¼ sec.31, T.110 N., R.15 W., Hydrologic Unit 07040004, at Zumbrota Fire Station.

Owner: City of Zumbrota, well 3.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 210 ft (64.0 m), cased to 50 ft (15.2 m).

DATUM.--Altitude of land-surface datum is 1,000 ft (305 m). Measuring point: Hole in pump base, 2.20 ft (0.67 m) above land-surface datum.

PERIOD OF RECORD.--June 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 19.41 ft (5.92 m) below land-surface datum, May 26, 1983; lowest, 27.00 ft (8.23 m) below land-surface datum, Jan. 5, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	23.66	DEC 2	22.72	FEB 25	23.04	APR 11	21.82	MAY 26	19.41	AUG 29	20.41

442401092372501. Local number, 111N15W21CDA01.

LOCATION.--Lat 44°24'01", long 92°37'25", in NE¼SE¼SW¼ sec.21, T.111 N., R.15 W., Hydrologic Unit 07040004, in Goodhue clerk's office.

Owner: City of Goodhue, creamery well.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 12 in (0.30 m), depth 310 ft (94.5 m), cased to 175 ft (53.3 m).

DATUM.--Altitude of land-surface datum is 1,125 ft (343 m). Measuring point: Top of 1½ in (0.03 m) elbow, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--June 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 124.4 ft (37.92 m) below land-surface datum, Aug. 23, 1974; lowest, 156.5 ft (47.70 m) below land-surface datum, May 26, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	152.0	DEC 2	134.6	APR 11	146.7	MAY 26	156.5	AUG 29	137.8

## GROUND-WATER LEVELS

## GOODHUE COUNTY--Continued

443012092362201. Local number, 113N15W27BAB01.

LOCATION.--Lat 44°30'12", long 92°36'22", in NW¼NE¼NW¼ sec.27, T.113 N., R.15 W., Hydrologic Unit 07040002, at Red Wing.

Owner: City of Red Wing, Anderson Park.

AQUIFER.--Eau Claire-Mount Simon Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 684 ft (208 m), cased to 243 ft (74.1 m).

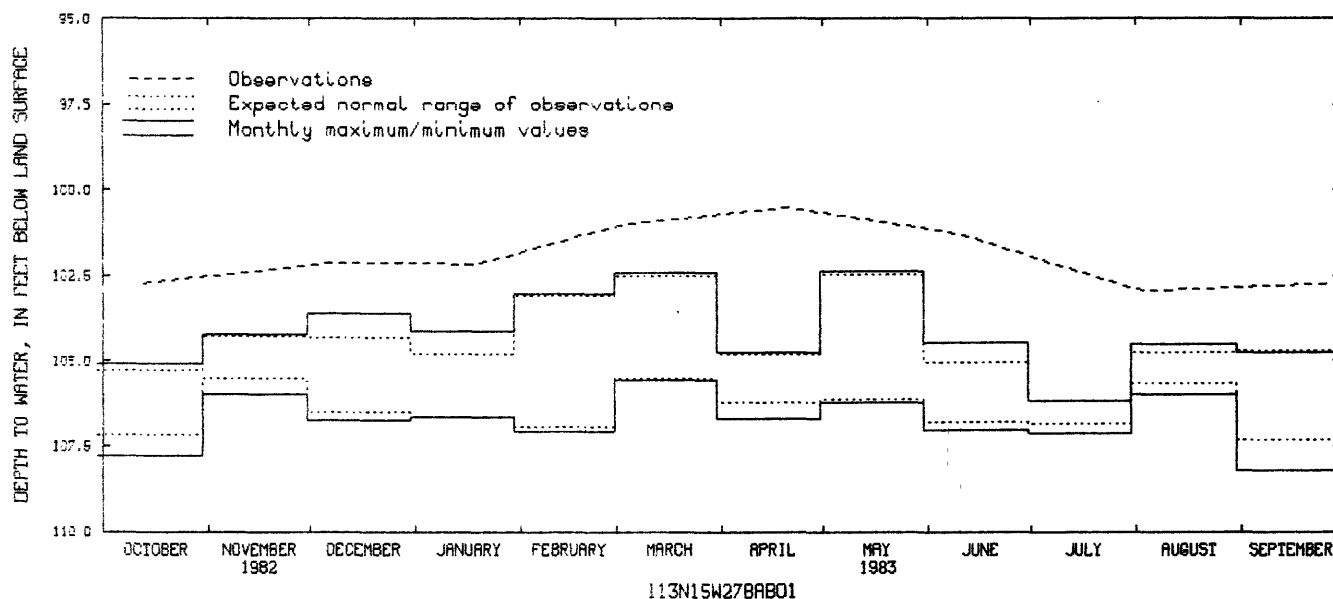
DATUM.--Altitude of land-surface datum is 800 ft (244 m). Measuring point: Edge of casing, 2.70 ft (0.82 m) above land-surface datum.

PERIOD OF RECORD.--April 1976, June 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 100.5 ft (30.63 m) below land-surface datum, Apr. 20, 1983; lowest, 108.2 ft (32.98 m) below land-surface datum, Sept. 14, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	102.7	JAN 19	102.2	APR 20	100.5	JUN 9	101.2	AUG 3	103.0	SEP 27	102.7
DEC 9	102.1	MAR 2	101.0								



## GRANT COUNTY

455010095523701. Local number, 127N41W06CAC01.

LOCATION.--Lat 45°50'10", long 95°52'37", in SW¼NE¼SW¼ sec.6, T.127 N., R.41 W., Hydrologic Unit 07020002.

Owner: Lee Hedstrom.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 70 ft (21.3 m), screened 50 to 70 ft (15.2 to 21.3 m).

DATUM.--Altitude of land-surface datum is 1,175 ft (358 m). Measuring point: Top of casing, 1.20 ft (0.37 m) above land-surface datum.

PERIOD OF RECORD.--May 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 35.30 ft (10.76 m) below land-surface datum, May 31, 1978; lowest, 39.80 ft (12.13 m) below land-surface datum, May 26, June 22, July 6, 19, Aug. 19, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	36.41	DEC 15	36.44	APR 5	36.34	MAY 4	36.37	JUN 22	36.37	JUL 12	36.40
NOV 16	36.43	MAR 7	36.30								



454624095513201. Local number, 127N41W32BBA01.

LOCATION.--Lat 45°46'24", long 95°51'32", in NE¼NW¼NW¼ sec.32, T.127 N., R.41 W., Hydrologic Unit 07020002.

Owner: Charles Musser.

AQUIFER.--Surficial gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored irrigation water-table well, diameter 16 in (0.41 m), depth 44 ft (13.4 m), screened 12 to 44 ft (3.7 to 13.4 m).

DATUM.--Altitude of land-surface datum is 1,129 ft (344 m). Measuring point: Top of casing, 0.90 ft (0.27 m) above land-surface datum.

PERIOD OF RECORD.--May 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.10 ft (0.94 m) below land-surface datum, May 31, 1978;  
lowest, 8.10 ft (2.47 m) below land-surface datum, Sept. 6, 1978.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	6.18	DEC 15	6.23	APR 5	6.24	MAY 4	6.34	JUN 22	6.32	JUL 12	6.39
NOV 16	6.20	MAR 7	6.29								

455641095524001. Local number, 129N41W31ACA01.

LOCATION.--Lat 45°56'41", long 95°52'40", in NE<sub>1</sub>SW<sub>1</sub>NE<sub>1</sub> sec.31, T.129 N., R.41 W., Hydrologic Unit 07020002.

Owner: Paul Sanford.

**AQUIFER.**--Surficial gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored irrigation water-table well, diameter 16 in (0.41 m), depth 51 ft (15.5 m), screened 15 to 51 ft (4.6 to 15.5 m).

DATUM.--Altitude of land-surface datum is 1,165 ft (355 m). Measuring point: Top of casing, 0.80 ft (0.24 m) above land-surface datum.

PERIOD OF RECORD.--July 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 13.05 ft (3.98 m) below land-surface datum, Oct. 21, 1982;  
lowest, 14.20 ft (4.33 m) below land-surface datum, Sept. 25, 1979 to Nov. 4, 1980.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	13.05	DEC 15	13.08	APR 5	13.12	MAY 4	13.19	JUN 22	13.33	JUL 12	13.10
NOV 16	13.10	MAR 7	13.21								

460316095551301. Local number, 130N42W23DBD01.

LOCATION.--Lat 46°03'16", long 95°55'13", in SE1NW1SE1 sec.23, T.130 N., R.42 W., Hydrologic Unit 07020002.

Owner: George Haberer.

AQUIFER.--Buried gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 52 ft (15.8 m), screened 32 to 52 ft (9.8 to 15.8 m).

DATUM.--Altitude of land-surface datum is 1,189 ft (362 m). Measuring point: Top of plastic pipe, 0.65 ft (0.20 m) above land-surface datum.

PERIOD OF RECORD.--May 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 11.35 ft (3.46 m) below land-surface datum, July 31, 1979;  
lowest, 15.35 ft (4.68 m) below land-surface datum, Aug. 23, 1978, Sept. 10, 1980.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	12.24	DEC 15	12.22	APR 5	12.17	MAY 4	12.20	JUN 22	12.20	JUL 12	12.24
NOV 16	12.20	MAR 7	12.19								

## GROUND-WATER LEVELS

## HENNEPIN COUNTY

444815093194901. Local number, 027N24W30AAA01.

LOCATION.--Lat 44°48'15", long 93°19'49", in NE¼NE¼NE¼ sec.30, T.27 N., R.24 W., Hydrologic Unit 07020012, at 4001 West 110th Street, Bloomington.

Owner: Transfiguration Church.

AQUIFER.--Buried Sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 139 ft (42.4 m), screened 135 to 139 ft (41.2 to 42.4 m).

DATUM.--Altitude of land-surface datum is 832 ft (254 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--March 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 63.97 ft (19.50 m) below land-surface datum, Mar. 2, 1979; lowest, 69.64 ft (21.23 m) below land-surface datum, Sept. 10, 1982.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	68.85	MAR 3	69.33	MAY 5	69.25	JUL 15	69.10	SEP 8	68.66

444801093202801. Local number, 027N24W30BDA01.

LOCATION.--Lat 44°48'01", long 93°20'28", in NE¼SE¼NW¼ sec.30, T.27 N., R.24 W., Hydrologic Unit 07020012, in Bloomington.

Owner: City of Bloomington, at Southwood Terrace.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 330 ft (101 m), cased to 269 ft (82.0 m).

DATUM.--Altitude of land-surface datum is 815 ft (248 m). Measuring point: Top of recorder platform, 2.20 ft (0.67 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

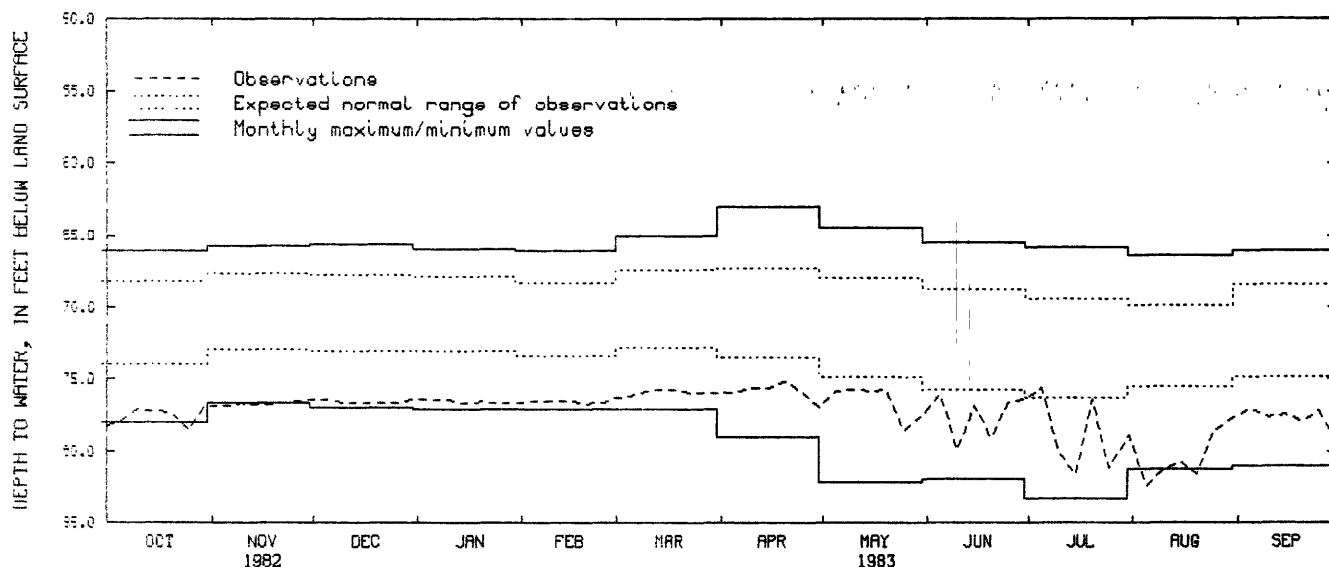
PERIOD OF RECORD.--March 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 63.05 ft (19.22 m) below land-surface datum, Apr. 15, 1969; lowest, 83.24 ft (25.37 m) below land-surface datum, July 5-6, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	77.90	76.90	76.44	76.40	76.55	76.16	75.93	75.88	76.06	75.63	82.38	77.10
10	77.11	76.70	76.63	76.42	76.55	75.90	75.58	75.76	79.88	80.05	81.35	77.61
15	77.22	76.75	76.70	76.69	76.54	75.67	75.67	75.81	76.83	81.66	80.75	77.44
20	77.36	76.71	76.65	76.57	76.73	75.83	75.14	75.79	79.06	76.43	81.62	77.91
25	78.51	76.55	76.66	76.64	76.59	75.99	75.92	78.59	76.69	81.19	78.56	77.25
EOM	76.85	76.45	76.42	76.61	76.36	75.93	76.96	77.43	76.44	78.90	77.68	79.28

WTR YEAR 1983      HIGHEST 75.12 APR 20, 1983      LOWEST 82.46 AUG 2, 9, 1983



027N24W30BDA01

## GROUND-WATER LEVELS

## HENNEPIN COUNTY--Continued

445356093145301. Local number, 028N24W23ADD01.

LOCATION.--Lat 44°53'56", long 93°14'53", in SE¼SE¼NE¼ sec.23, T.28 N., R.24 W., Hydrologic Unit 07010206, at 5728 Cedar Avenue, Minneapolis.

Owner: Hope Lutheran Church.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 6 in (0.15 m), depth 245 ft (74.7 m), cased to 172 ft (52.4 m).

DATUM.--Altitude of land-surface datum is 835 ft (254 m). Measuring point: Top of casing, 0.30 ft (0.09 m) above land-surface datum.

PERIOD OF RECORD.--April 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 37.42 ft (11.41 m) below land-surface datum, Jan. 23, 1980; lowest, 52.90 ft (16.12 m) below land-surface datum, July 15, 1983.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	40.06	JAN 7	38.82	MAR 4	38.92	MAY 5	39.40	JUL 15	52.90	SEP 12	45.04

450116093205301. Local number, 029N24W06CCC01.

LOCATION.--Lat 45°01'16", long 93°20'53", in SW¼SW¼SW¼ sec.6, T.29 N., R.24 W., Hydrologic Unit 07010206, at 3610 Unity Avenue North, Robbinsdale.

Owner: Minnesota Department of Transportation.

AQUIFER.--St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 5 in (0.13 m), depth 200 ft (61.0 m), cased to 152 ft (46.3 m).

DATUM.--Altitude of land-surface datum is 870 ft (265 m). Measuring point: Top of casing, 3.50 ft (1.07 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

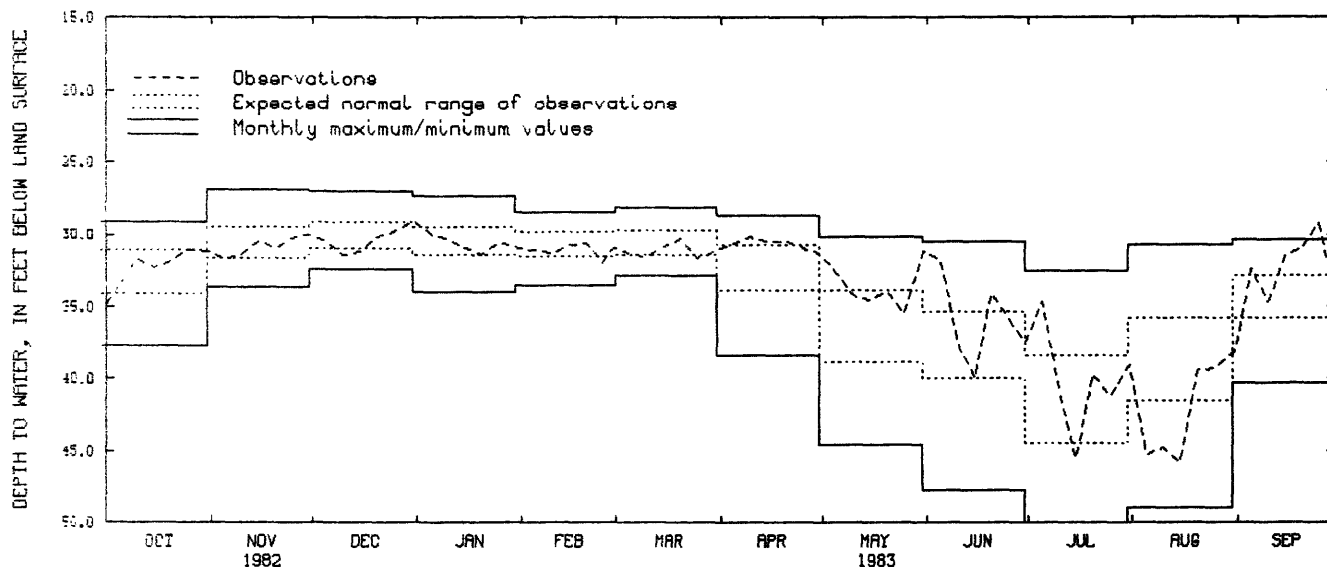
PERIOD OF RECORD.--March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.54 ft (7.48 m) below land-surface datum, Dec. 28-29, 1975; lowest, 50.11 ft (15.27 m) below land-surface datum, July 14, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	33.50	31.71	30.50	29.98	31.10	31.29	30.60	32.61	31.78	34.65	45.24	32.42
10	31.72	31.76	31.41	30.27	31.26	31.54	30.20	34.25	37.50	40.66	44.85	34.65
15	32.26	30.44	31.20	30.96	30.76	30.87	30.49	34.51	39.95	45.56	45.81	31.54
20	31.89	30.89	30.18	31.35	30.61	30.32	30.50	33.94	34.10	39.70	39.45	30.98
25	31.09	30.24	29.82	30.54	31.94	31.61	30.90	35.47	35.78	41.23	39.32	29.25
EOM	31.17	30.02	29.14	30.96	30.92	31.03	31.29	31.19	37.52	39.08	38.12	34.22

WTR YEAR 1983      HIGHEST 27.85 JAN 3, 1983      LOWEST 45.98 JUL 14, 1983



029N24W06CCC01

## GROUND-WATER LEVELS

## HENNEPIN COUNTY--Continued

445849093155802. Local number, 029N24W23CCB02.

LOCATION.--Lat 44°58'49", long 93°15'58", in NW¼SW¼SW¼ sec.23, T.29 N., R.24 W., Hydrologic Unit 07010206, at 245 Marquette Avenue, Minneapolis.

Owner: IBM Corporation.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 10 in (0.25 m), depth 430 ft (131 m), cased to 250 ft (76.2 m).

DATUM.--Altitude of land-surface datum is 840 ft (256 m). Measuring point: Edge of 2 in (0.05 m) vent pipe, 9.60 ft (2.93 m) below land-surface datum.

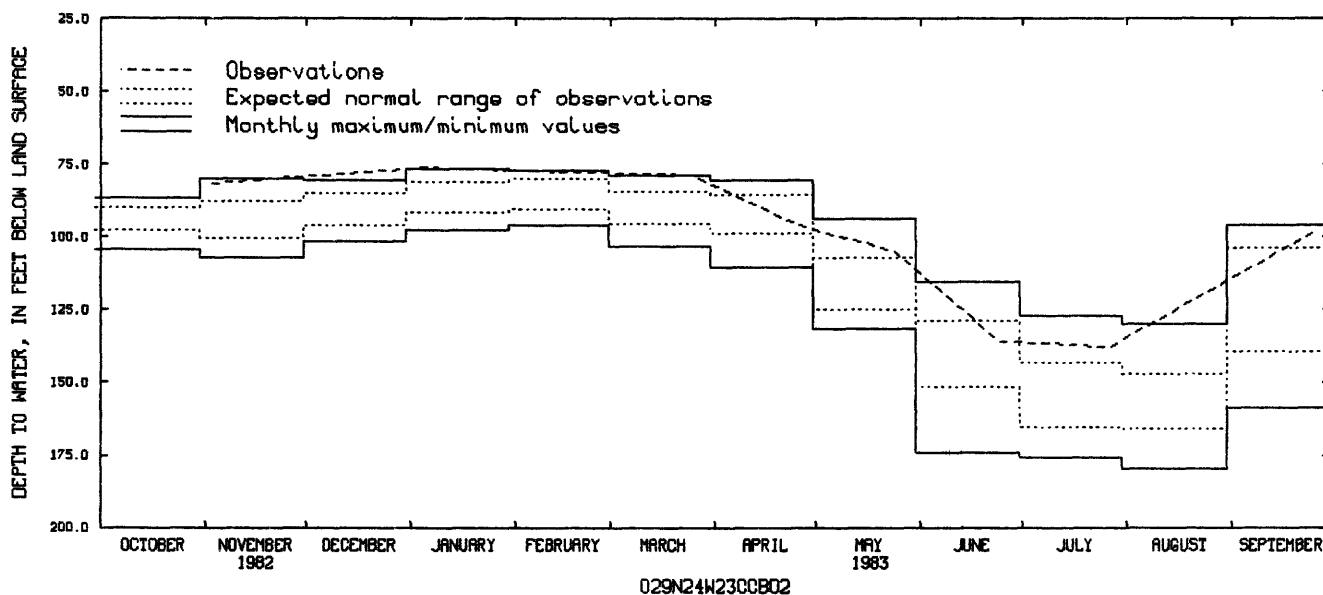
REMARKS.--Water level affected by pumping of nearby wells.

PERIOD OF RECORD.--July 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 76.00 ft (23.16 m) below land-surface datum, Jan. 4, 1983; lowest, 179.6 ft (54.74 m) below land-surface datum, Aug. 16, 1972.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	81.50	FEB 24	77.70	APR 26	96.00	JUN 24	135.6	JUL 27	137.6	SEP 26	97.75
JAN 4	76.00	MAR 25	78.50	MAY 24	104.7						



445833093154301. Local number, 029N24W26BAB01.

LOCATION.--Lat 44°58'33", long 93°15'43", in NW¼NE¼NW¼ sec.26, T.29 N., R.24 W., Hydrologic Unit 07010206, at 425 Portland Avenue.

Owner: Minneapolis Star and Tribune.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 16 in (0.41 m), depth 445 ft (136 m), cased to 252 ft (76.8 m).

DATUM.--Altitude of land-surface datum is 835 ft (254 m). Measuring point: Top of steel cover, 7.60 ft (7.90 m) below land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 56.45 ft (17.21 m) below land-surface datum, Jan. 10, 1983; lowest, 145.2 ft (44.26 m) below land-surface datum, July 22, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	67.07	JAN 20	66.64	FEB 15	67.43	MAR 10	72.62	JUN 5	77.06	JUN 30	109.6
10	75.34	25	66.76	20	59.39	15	72.87	10	91.33	JUL 27	124.6
JAN 5	71.35	31	66.51	25	68.74	MAY 15	69.29	15	97.28	AUG 3	137.9
10	64.98	FEB 5	61.76	28	66.41	20	74.36	20	90.08	SEP 26	92.40
15	62.51	10	66.86	MAR 5	68.14	31	72.66	25	111.3		

## GROUND-WATER LEVELS

## HENNEPIN COUNTY--Continued

445829093162901. Local number, 029N24W27ABD01.

LOCATION.--Lat 44°58'29", long 93°16'29", in SE¼NW¼NE¼ sec.27, T.29 N., R.24 W., Hydrologic Unit 07010206, at 911 LaSalle Avenue, Minneapolis.

Owner: American Linen Supply Co.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age and Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 16 in (0.41 m), depth 1,094 ft (333 m), cased to 812 ft (248 m).

DATUM.--Altitude of land-surface datum is 850 ft (259 m). Measuring point: Hole in pump base, 22.00 ft (6.71 m) below land-surface datum.

REMARKS.--Water level affected by regional pumping.

PERIOD OF RECORD.--July 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 169.8 ft (51.76 m) below land-surface datum, Apr. 15, 1980; lowest, 235.1 ft (71.66 m) below land-surface datum, Oct. 6, 1970.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	215.0	FEB 24	204.6	APR 26	201.9	JUN 24	217.8	AUG 29	224.7	SEP 26	225.8
JAN 4	205.8	MAR 25	202.4	MAY 24	207.0	JUL 27	213.9				

445158093225101. Local number, 116N21W07DAD01.

LOCATION.--Lat 44°51'58", long 93°22'51", in SE¼NE¼SE¼ sec.7, T.116 N., R.21 W., Hydrologic Unit 07020012, at Braemer Golf Course.

Owner: City of Edina, well 14.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 16 in (0.41 m), depth 420 ft (128 m), cased to 325 ft (99.1 m).

DATUM.--Altitude of land-surface datum is 848 ft (258 m). Measuring point: Vent pipe at land-surface datum.

PERIOD OF RECORD.--April 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.26 ft (9.53 m) below land-surface datum, Apr. 4, 1966; lowest, 63.20 ft (19.26 m) below land-surface datum, July 21, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	47.42	JAN 7	49.43	MAR 4	49.42	MAY 5	50.08	JUL 18	56.82	SEP 12	49.30

445615093212301. Local number, 117N21W16CCA01.

LOCATION.--Lat 44°56'15", long 93°21'23", in NE¼SW¼SW¼ sec.16, T.117 N., R.21 W., Hydrologic Unit 07010206, at 6021 36th Street West by water tower.

Owner: City of St. Louis Park, old well 1.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 16 in (0.41 m), depth 421 ft (128 m), cased to 280 ft (85.3 m).

DATUM.--Land-surface datum is 917.4 ft (279.6 m), revised, National Geodetic Vertical Datum of 1929. Measuring point: Top of well cover, 0.70 ft (0.21 m) above land-surface datum.

REMARKS.--Water level affected by pumping of nearby wells.

PERIOD OF RECORD.--February 1953 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 66.0 ft (20.11 m) below land-surface datum, Mar. 23, 1953; lowest, 110.5 ft (33.68 m) below land-surface datum, July 31, 1959.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	.....	82.45	80.96	80.69	80.97	81.03	80.51	84.37	84.09	84.82	99.59	86.69
10	.....	82.10	83.74	80.80	81.06	81.38	80.08	85.06	90.56	.....	101.3	88.33
15	.....	81.09	82.47	81.37	80.32	80.71	80.87	83.31	90.40	102.6	102.0	82.54
20	.....	81.81	80.74	81.95	80.41	79.76	81.08	82.84	87.78	92.46	96.52	80.48
25	.....	81.42	79.45	80.07	82.93	81.64	82.05	84.91	89.92	94.35	91.58	79.47
EOM	.....	81.68	78.27	81.03	81.04	81.34	83.04	82.38	88.43	93.05	89.81	85.79

WTR YEAR 1983 HIGHEST 77.44 NOV 29, 1982

LOWEST 103.0 AUG 16, 1983

## GROUND-WATER LEVELS

## HENNEPIN COUNTY--Continued

445618093211801. Local number, 117N21W16CDB01.

LOCATION.--Lat 44°56'18", long 93°21'18", in NW¼SE¼SW¼ sec.16, T.117 N., R.21 W., Hydrologic Unit 07010206, at 2565 Wooddale Avenue South, St. Louis Park.

Owner: D-A Lubricant Co.

AQUIFER.--Ironton-Galesville Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.10 m), depth 691 ft (211 m), screened 651 to 661 ft (198 to 202 m).

DATUM.--Altitude of land-surface datum is 917.2 ft (279.6 m), National Geodetic Vertical Datum of 1929.

Measuring point: Hole in well seal, 3.60 ft (1.10 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 131.8 ft (40.17 m) below land-surface datum, Apr. 16, 1982; lowest, 146.7 ft (44.71 m) below land-surface datum, Aug. 31, 1982.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	143.5	NOV 26	138.1	DEC 29	135.3	FEB 23	132.4	MAY 12	132.6	JUL 15	137.4
NOV 2	140.2	DEC 4	137.1	JAN 4	134.7	MAR 4	132.0	24	132.7	19	138.1
12	138.9	11	136.9	28	133.1	15	132.1	JUN 15	133.0	SEP 12	144.5
18	138.5	21	135.8	FEB 14	132.5	APR 12	131.9	22	133.6	20	144.1

445347093213901. Local number, 117N21W32DAD01.

LOCATION.--Lat 44°53'47", long 93°21'39", in SE¼NE¼SE¼ sec.32, T.117 N., R.21 W., Hydrologic Unit 07010206, at Hanson Road and Benton Avenue.

Owner: City of Edina, well 9.

AQUIFER.--Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 16 in (0.41 m), depth 1,130 ft (344 m), cased to 1,010 ft (308 m).

DATUM.--Land-surface datum is 933.3 ft (284.5 m) National Geodetic Vertical Datum of 1929. Measuring point: Hole in east side of pump base, 2.00 ft (0.61 m) above land-surface datum.

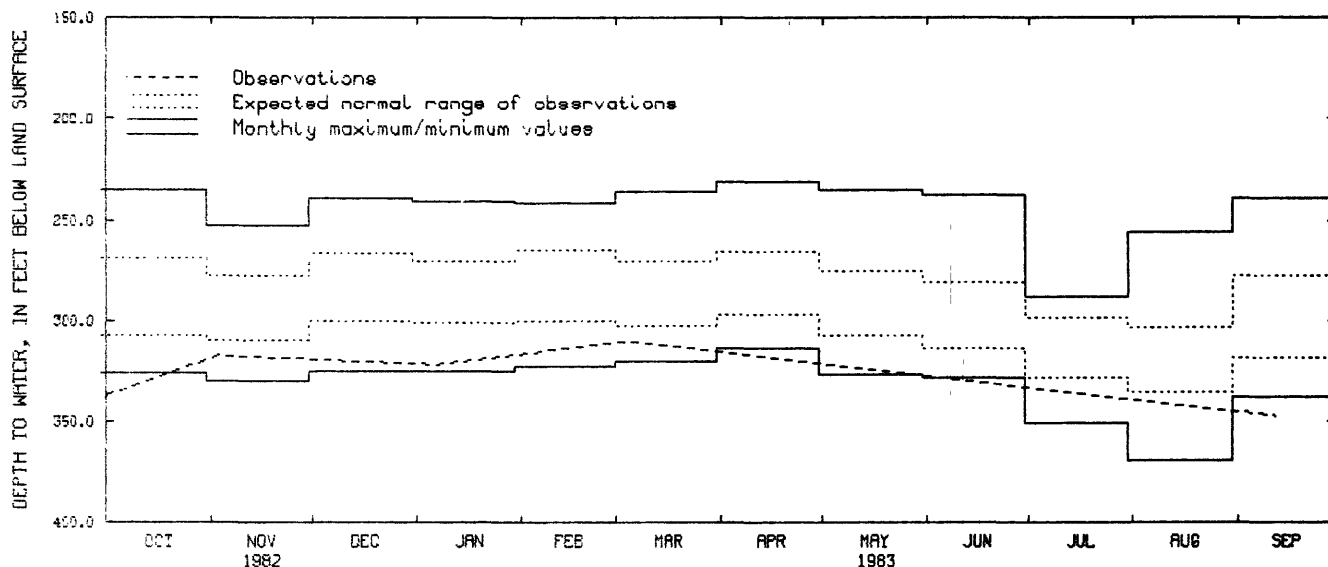
REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--August 1961 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 230.8 ft (70.35 m) below land-surface datum, Apr. 20, 1962; lowest, 369.6 ft (112.6 m) below land-surface datum, Aug. 28, 1970.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	317.3	JAN 7	321.6	MAR 4	310.2	JUL 18	336.6	SEP 12	347.2



117N21W32DAD01

## GROUND-WATER LEVELS

## HENNEPIN COUNTY--Continued

445818093264101. Local number, 117N22W03ADC01.

LOCATION.--Lat 44°58'18", long 93°26'41", in SW¼SE¼NE¼ sec.3, T.117 N., R.22 W., Hydrologic Unit 07010206, at 13106 Wayzata Boulevard.

Owner: Standard Oil Co.

AQUIFER.--Platteville Formation of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), depth 143 ft (43.6 m), cased to 120 ft (36.6 m).

DATUM.--Altitude of land-surface datum is 970 ft (296 m). Measuring point: Top of casing, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--April 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 59.94 ft (18.27 m) below land-surface datum, Dec. 5, 1979; lowest, 62.20 ft (18.96 m) below land-surface datum, Mar. 3, 1983.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	61.73	JAN 14	61.95	MAR 3	62.20

445740093333001. Local number, 117N23W11BBD01.

LOCATION.--Lat 44°57'40", long 93°33'30", in SE¼NW¼NW¼ sec.11, T.117 N., R.23 W., Hydrologic Unit 07010206, 2 mi (3.2 km) southwest of Wayzata, at Lake Minnetonka.

Owner: Minnetonka Boat Works, Inc., Orono.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in (0.15 m), depth 437 ft (133 m), cased to 270 ft (82.3 m).

DATUM.--Altitude of land-surface datum is 930.8 ft (283.7 m) National Geodetic Vertical Datum of 1929.

Measuring point: Wood floor of instrument shelter, 3.30 ft (1.01 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--August 1942 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 14.05 ft (4.33 m) below land-surface datum, Apr. 30, 1954; lowest, 37.49 ft (11.43 m) below land-surface datum, Aug. 16, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	28.13	27.65	27.30	27.11	.....	26.84	26.73	27.35	28.33	27.74	34.73	30.20
10	28.08	27.43	27.51	27.52	.....	26.91	26.72	27.57	30.11	30.96	36.82	30.09
15	27.92	27.27	27.32	27.24	.....	26.81	26.88	27.26	29.26	35.41	37.10	29.67
20	27.75	26.88	27.46	27.40	.....	26.70	26.64	27.49	29.06	31.48	33.41	28.82
25	27.86	27.27	.....	.....	27.16	26.89	27.05	27.57	29.11	32.37	30.84	28.61
EOM	.....	26.90	.....	.....	27.01	26.61	27.48	27.89	28.51	32.73	29.92	29.21

WTR YEAR 1983 HIGHEST 26.50 MAR 31, 1983 LOWEST 37.49 AUG 16, 1983

450223093231801. Local number, 118N21W07DCB01.

LOCATION.--Lat 45°02'23", long 93°23'18", in NW¼SW¼SE¼ sec.7, T.118 N., R.21 W., Hydrologic Unit 07010206, at 47th Avenue North and Aquila Avenue.

Owner: City of New Hope.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 16 in (0.41 m), depth 422 ft (129 m), cased to 339 ft (103 m).

DATUM.--Altitude of land-surface datum is 933 ft (284 m). Measuring point: Top of wood platform, 3.00 ft (0.91 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--October 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 60.46 ft (18.43 m) below land-surface datum, Dec. 17, 1967; lowest, 72.96 ft (22.24 m) below land-surface datum, Aug. 9, 1983.

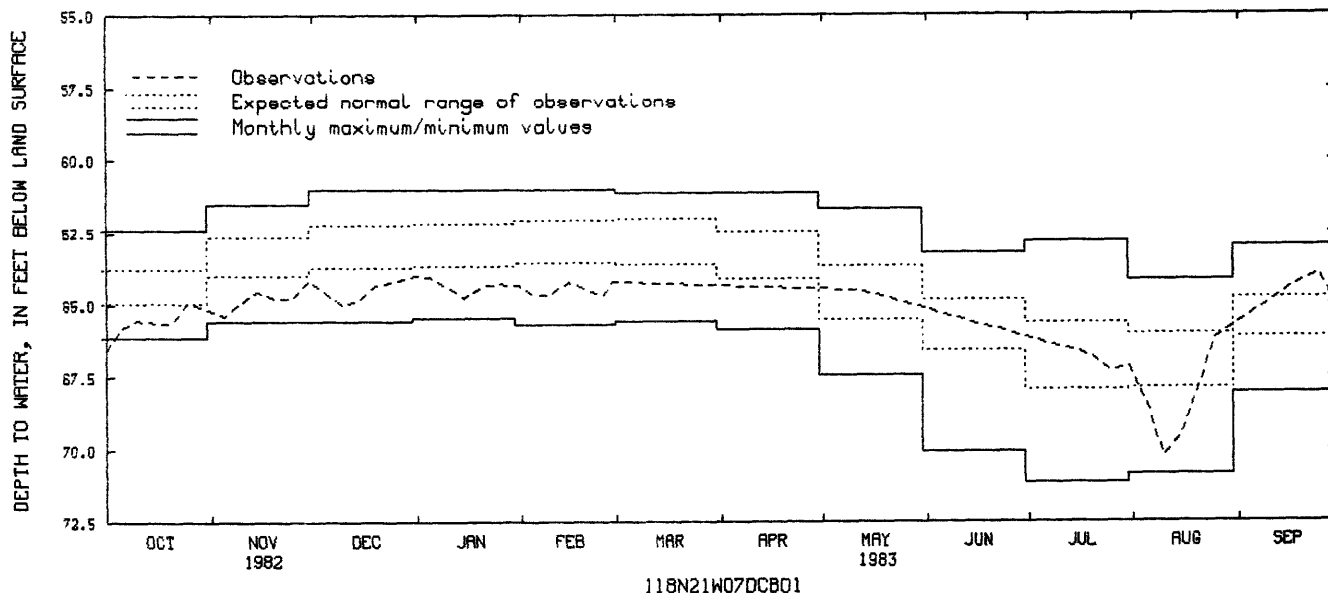
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	65.81	65.37	64.61	64.06	64.70	.....	.....	.....	.....	.....	68.43	.....
10	65.51	64.90	65.02	64.39	64.60	.....	.....	.....	.....	.....	70.23	.....
15	65.63	64.54	64.78	64.76	64.24	.....	.....	.....	.....	.....	69.53	.....
20	65.65	64.81	64.33	64.37	64.47	.....	.....	.....	.....	66.79	67.93	64.19
25	64.92	64.79	64.22	64.29	64.69	.....	.....	.....	.....	67.29	66.17	63.96
EOM	65.16	64.14	63.99	64.33	64.21	.....	.....	.....	.....	67.15	.....	65.13

WTR YEAR 1983 HIGHEST 63.47 DEC 27, 1982 LOWEST 72.96 AUG 9, 1983

## GROUND-WATER LEVELS

HENNEPIN COUNTY--Continued



445905093224401. Local number, 118N21W32CBB01.

LOCATION.--Lat 44°59'05", long 93°22'44", in NW¼NW¼SW¼ sec.32, T.118 N., R.21 W., Hydrologic Unit 07010206, at Winnetka Avenue and Highway 55, Golden Valley.

Owner: Red Owl Store.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in (0.16 m), depth 95 ft (29.0 m), screened 87 to 95 ft (26.5 to 29.0 m).

DATUM.--Altitude of land-surface datum is 895 ft (273 m). Measuring point: Top of well cap, 0.80 ft (0.24 m) above land-surface datum.

PERIOD OF RECORD.--May 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 18.76 ft (5.72 m) below land-surface datum, Sept. 16, 1983; lowest, 21.05 ft (6.42 m) below land-surface datum, May 5, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	20.34	MAR 25	19.57	MAY 12	18.87	JUL 18	19.00	SEP 16	18.76

445857093223101. Local number, 118N21W32CBD01.

LOCATION.--Lat 44°58'57", long 93°22'31", in SE¼NW¼SW¼ sec.32, T.118 N., R.21 W., Hydrologic Unit 07010206, at 760 Harold Avenue, Golden Valley.

Owner: Golden Valley Methodist Church.

AQUIFER.--St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 265 ft (80.8 m), cased to 200 ft (61.0 m).

DATUM.--Altitude of land-surface datum is 890 ft (271 m). Measuring point: Top of well cap, 0.70 ft (0.21 m) above land-surface datum.

PERIOD OF RECORD.--February 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.44 ft (9.58 m) below land-surface datum, Mar. 9, 1976; lowest, 37.51 ft (11.43 m) below land-surface datum, Aug. 24, 1971.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	33.05	JAN 14	32.62	MAR 3	32.44	MAY 12	32.28	JUL 18	34.00	SEP 16	32.50



## GROUND-WATER LEVELS

## HENNEPIN COUNTY--Continued

450854093212801. Local number, 119N21W04BBA01.

LOCATION.--Lat 45°08'54", long 93°21'28", in NE¼NW¼NW¼ sec.4, T.119 N., R.21 W., Hydrologic Unit 07010206, 109th Avenue North, 0.15 mi (0.24 km) east of Zane Avenue North, Brooklyn Park.

Owner: Walter Tessman.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation water-table well, diameter 12 in (0.30 m), depth 80 ft (24.4 m), screened 62 to 80 ft (18.9 to 24.4 m).

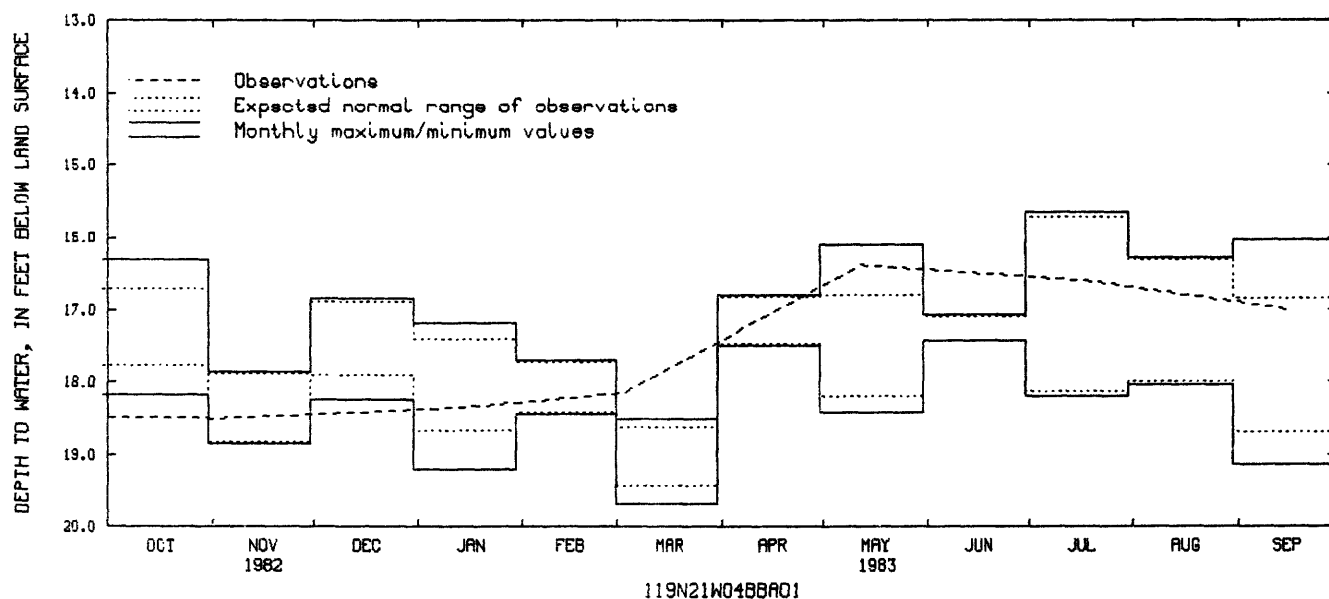
DATUM.--Altitude of land-surface datum is 876 ft (267 m). Measuring point: Hole in pump base, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--September 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 15.66 ft (4.77 m) below land-surface datum, July 26, 1978; lowest, 19.67 ft (6.00 m) below land-surface datum, Mar. 11, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	18.50	JAN 14	18.35	MAR 3	18.15	MAY 12	16.38	JUL 18	16.60	SEP 16	17.00



450519093281401. Local number, 119N22W28ACC01.

LOCATION.--Lat 45°05'19", long 93°28'14", in SW¼SW¼NE¼ sec.28, T.119 N., R.22 W., Hydrologic Unit 07010206, at 7349 Mariner Drive, Maple Grove.

Owner: Cliff Lake.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), depth 192 ft (58.5 m), cased to 187 ft (57.0 m).

DATUM.--Altitude of land-surface datum is 925 ft (288 m). Measuring point: Top of well cap, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 28.37 ft (8.65 m) below land-surface datum, Sept. 16, 1983; lowest, 29.94 ft (9.13 m) below land-surface datum, Mar. 11, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	29.54	JAN 14	29.52	MAR 3	29.17	MAY 12	28.72	JUL 18	28.47	SEP 16	28.37

## GROUND-WATER LEVELS

## HUBBARD COUNTY

465142094433201. Local number, 139N32W16AAA01.

LOCATION.--Lat 46°51'42", long 94°43'32", in NE¼NE¼NE¼ sec.16, T.139 N., R.32 W., Hydrologic Unit 07010106, at Badoura Nursery.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

DATUM.--Altitude of land-surface datum is 1,419 ft (433 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

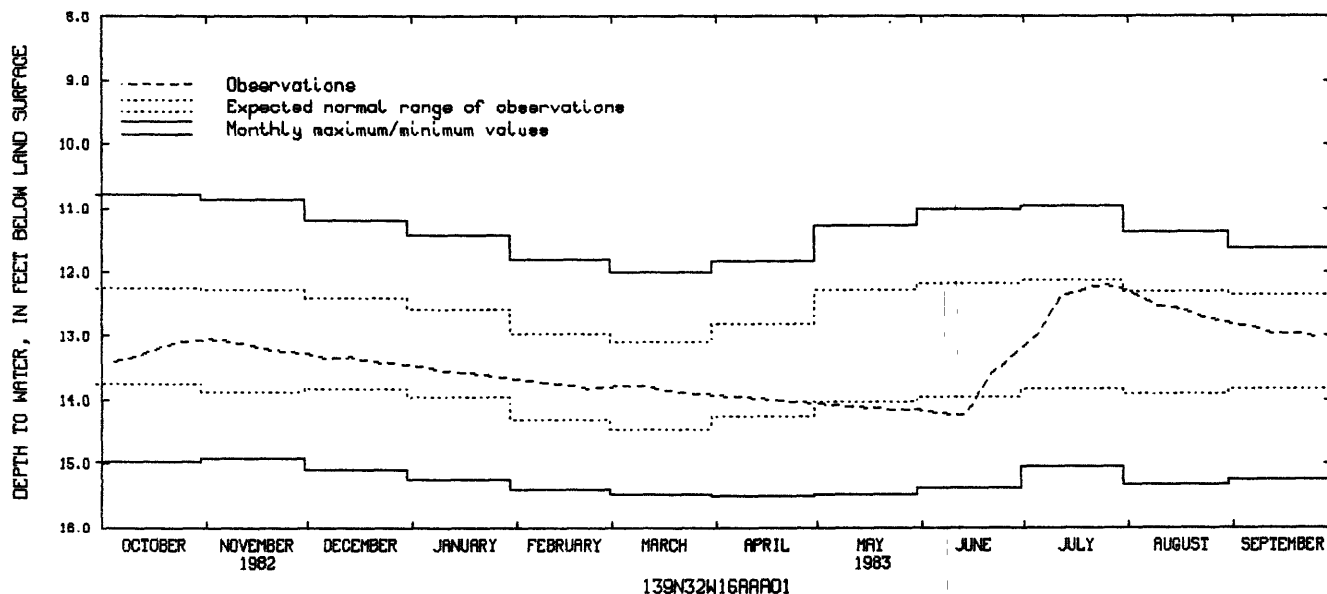
REMARKS.--Measured weekly by Archie Hakala.

PERIOD OF RECORD.--September 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.78 ft (3.29 m) below land-surface datum, Oct. 30, 1973; lowest, 15.51 ft (4.73 m) below land-surface datum, Apr. 12, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	13.40	DEC 14	13.33	FEB 17	13.78	APR 19	14.01	JUN 28	13.29	AUG 15	12.57
12	13.32	21	13.41	22	13.82	26	14.03	JUL 5	13.00	23	12.70
20	13.14	28	13.44	MAR 8	13.76	MAY 3	14.07	12	12.38	30	12.80
NOV 2	13.04	JAN 3	13.47	15	13.83	24	14.16	19	12.27	SEP 5	12.85
16	13.16	11	13.55	22	13.88	31	14.17	25	12.20	13	12.96
23	13.24	18	13.58	28	13.91	JUN 7	14.22	31	12.28	20	12.97
DEC 1	13.27	FEB 1	13.68	APR 5	13.95	14	14.23	AUG 9	12.52	27	13.03
7	13.36	8	13.72	12	13.97	21	13.62				



465112095021501. Local number, 139N35W13DAD01.

LOCATION.--Lat 46°51'12", long 95°02'15", in SE¼NE¼SE¼ sec.13, T.139 N., R.35 W., Hydrologic Unit 07010106, 1 mi (1.6 km) west and 1 mi (1.6 km) north of Hubbard.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 52 ft (15.8 m), screened 50 to 52 ft (15.2 to 15.8 m).

DATUM.--Altitude of land-surface datum is 1,409 ft (429 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 38.01 ft (11.59 m) below land-surface datum, Aug. 15, 1975; lowest, 43.64 ft (13.30 m) below land-surface datum, July 19, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	39.12	DEC 21	39.30	FEB 16	39.66	APR 15	40.00	JUN 16	40.40	JUL 15	40.54
NOV 14	39.27	JAN 14	39.16	MAR 15	39.85	MAY 18	40.22				

## GROUND-WATER LEVELS

## HUBBARD COUNTY-Continued

465420094453901. Local number, 140N32W32BBA01.

LOCATION.--Lat 46°54'20", long 94°45'39", in NE¼NW¼ sec.32, T.140 N., R.32 W., Hydrologic Unit 07010106, 1.8 mi (2.9 km) west of Chamberlin.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 25.5 ft (7.8 m), screened 23.5 to 25.5 ft (7.2 to 7.8 m).

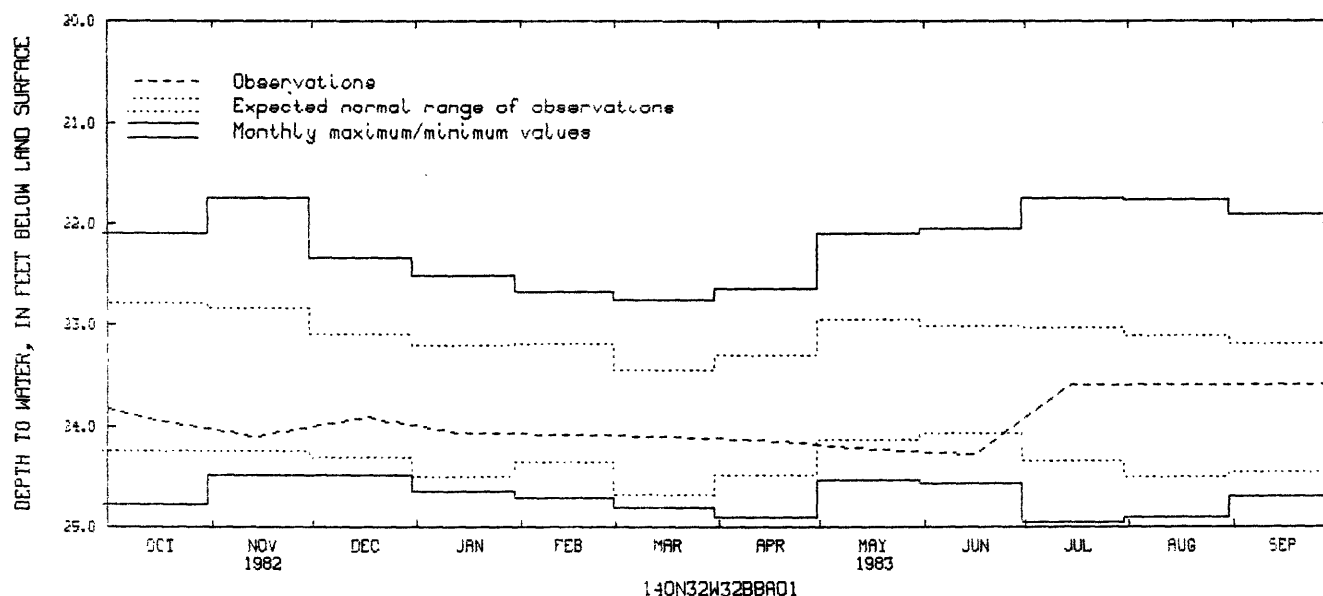
DATUM.--Altitude of land-surface datum is 1,423 ft (434 m). Measuring point: Top of casing, 2.50 ft (0.76 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 21.74 ft (6.63 m) below land-surface datum, July 16, 1975; lowest, 24.95 ft (7.60 m) below land-surface datum, July 12, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	23.95	DEC 17	23.91	FEB 16	24.08	APR 15	24.14	JUN 16	24.28	JUL 15	23.58
NOV 14	24.10	JAN 14	24.07	MAR 15	24.10	MAY 18	24.23				



465640095072101. Local number, 140N35W16BCC01.

LOCATION.--Lat 46°56'40", long 95°07'21", in SW¼SW¼NW¼ sec.16, T.140 N., R.35 W., Hydrologic Unit 07010106, northwest of Park Rapids.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 26 ft (7.9 m), screened 24 to 26 ft (7.3 to 7.9 m).

DATUM.--Altitude of land-surface datum is 1,458 ft (444 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 14.86 ft (4.53 m) below land-surface datum, Aug. 15, 1975; lowest, 18.12 ft (5.52 m) below land-surface datum, June 14, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	16.12	DEC 17	16.39	FEB 16	16.57	APR 15	16.68	JUN 16	16.80	JUL 15	16.11
NOV 14	16.20	JAN 15	16.47	MAR 15	16.64	MAY 18	16.60				

## GROUND-WATER LEVELS

## ISANTI COUNTY

453125093181101. Local number, 035N24W14BCD01.

LOCATION.--Lat 45°31'25", long 93°18'11", in SE¼SW¼NW¼ sec.14, T.35 N., R.24 W., Hydrologic Unit 07010207, northwest of Isanti.

Owner: Allen Kluck.

AQUIFER.--Eau Claire - Mount Simon Formations of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 300 ft (91.4 m), cased to 105 ft (32.0 m).

DATUM.--Altitude of land-surface datum is 940 ft (287 m). Measuring point: Hole in pump base, 0.10 ft (0.03 m) above land-surface datum.

PERIOD OF RECORD.--February 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 11.96 ft (3.65 m) below land-surface datum, July 17, 1975; lowest, 15.72 ft (4.79 m) below land-surface datum, Apr. 4, 1968.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	14.23	DEC 21	13.51	APR 22	13.08	JUL 8	12.57

453058093175901. Local number, 035N24W14CDC01.

LOCATION.--Lat 45°30'58", long 93°17'59", in SW¼SE¼SW¼ sec.14, T.35 N., R.24 W., Hydrologic Unit 07010207, northwest of Isanti.

Owner: Ernest Kluck.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Driven unused water-table well, diameter 1½ in (0.03 m), depth 17 ft (5.18 m), screen information not available.

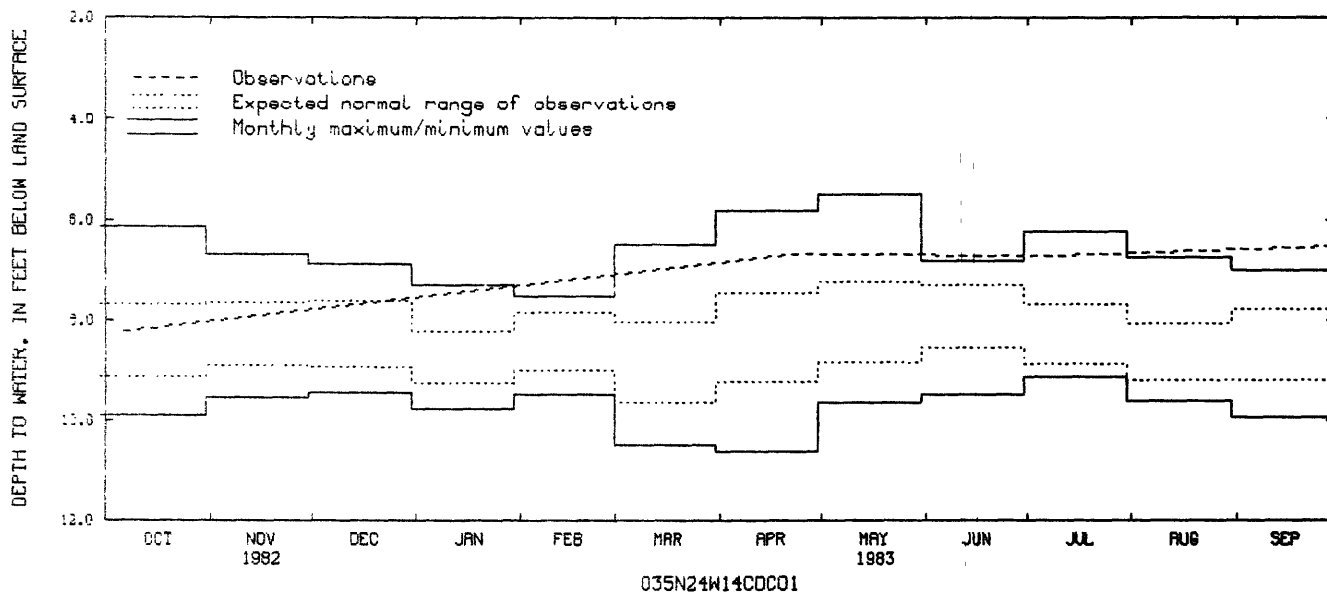
DATUM.--Altitude of land-surface datum is 930 ft (283 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--March 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.49 ft (1.67 m) below land-surface datum, May 21, 1979; lowest, 10.60 ft (3.23 m) below land-surface datum, Apr. 4, 1968.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	8.23	APR 22	6.68	JUL 8	6.72



## GROUND-WATER LEVELS

## ISANTI COUNTY--Continued

453410093140001. Local number, 036N23W32ACB01.

LOCATION.--Lat 45°34'10", long 93°14'00", in NW¼SW¼NE¼ sec.32, T.36 N., R.23 W., Hydrologic Unit 07010207, in Cambridge.

Owner: City of Cambridge, well 4.

AQUIFER.--Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 20 in (0.51 m), depth 630 ft (192 m), cased to 352 ft (107 m).

DATUM.--Altitude of land-surface datum is 960 ft (293 m). Measuring point: Edge of vent pipe, 3.00 ft (0.91 m) above land-surface datum.

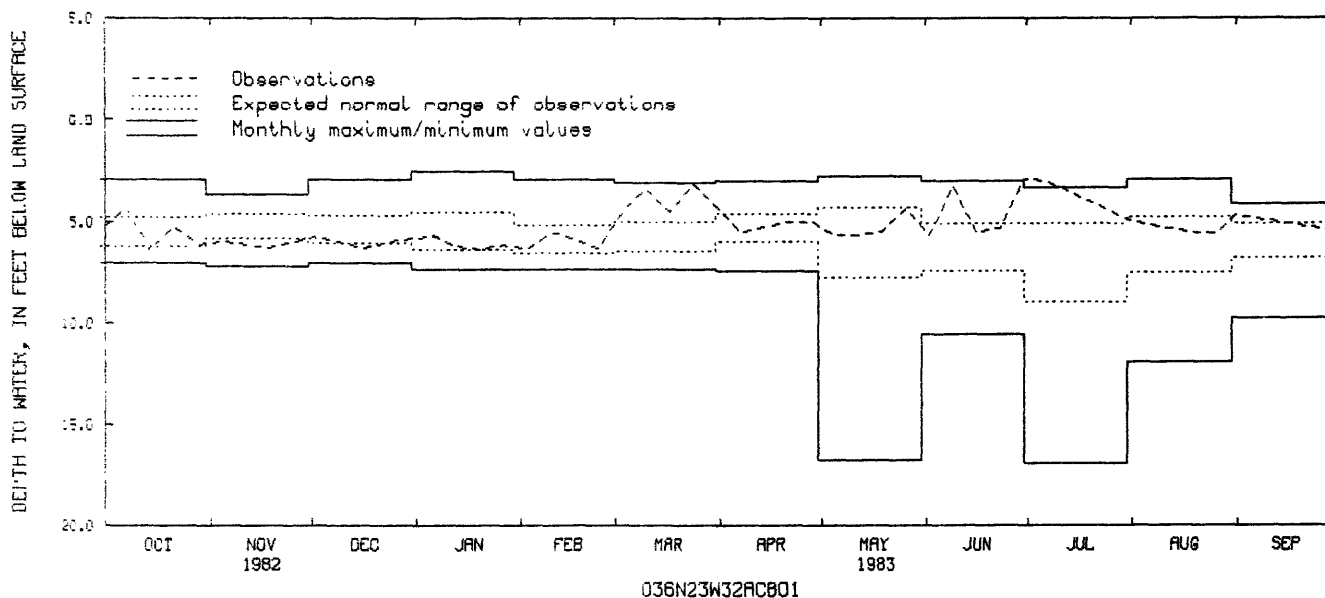
REMARKS.--Measured weekly by Thomas Minar. Water level affected by pumping.

PERIOD OF RECORD.--July 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.50 ft (0.76 m) below land-surface datum, Jan. 17, 1974; lowest, 16.95 ft (5.17 m) below land-surface datum, July 11, 1974.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	4.30	DEC 9	6.02	FEB 3	6.32	MAR 31	4.27	MAY 26	4.39	AUG 1	5.00
14	6.37	16	6.33	11	5.55	APR 7	5.51	JUN 2	5.68	18	5.55
21	5.25	23	6.02	24	6.33	21	5.00	9	3.28	26	5.56
29	6.15	JAN 6	5.71	MAR 3	4.56	28	5.00	16	5.60	SEP 1	4.70
NOV 4	5.97	13	6.23	10	3.37	MAY 5	5.70	23	5.32	22	5.25
18	6.29	20	6.37	17	4.56	13	5.65	30	2.90	29	5.48
DEC 2	5.78	27	6.19	24	3.18	19	5.52	JUL 7	3.05		



## GROUND-WATER LEVELS

## ITASCA COUNTY

471450093322001. Local number, 055N25W17ACD01.

LOCATION.--Lat 47°14'50", long 93°32'20", in SE¼SW¼NE¼ sec.17, T.55 N., R.25 W., Hydrologic Unit 07010103, at west end of 13th Street NW, Grand Rapids.

Owner: U.S. Geological Survey.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 4 in (0.10 m), depth 147 ft (44.8 m), screened 143 to 147 ft (43.6 to 44.8 m).

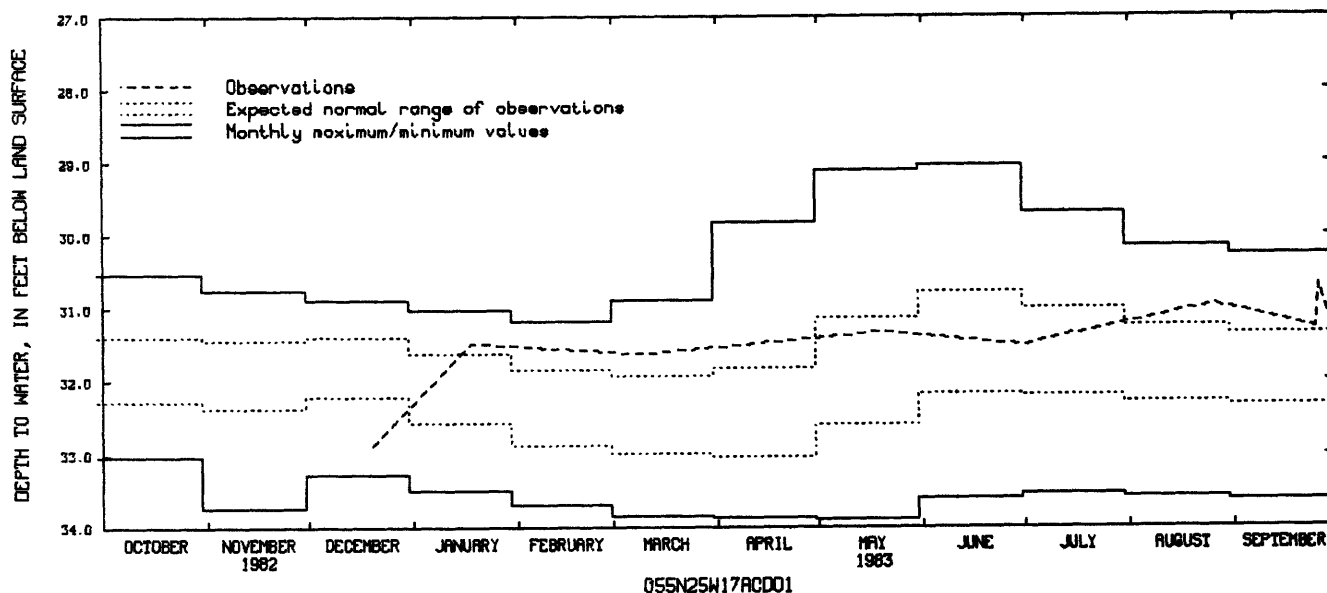
DATUM.--Altitude of land-surface datum is 1,318 ft (402 m). Measuring point: Top of platform, 1.60 ft (0.49 m) above land-surface datum.

PERIOD OF RECORD.--April 1962 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 29.04 ft (8.85 m) below land-surface datum, June 1, 1966; lowest, 33.92 ft (10.34 m) below land-surface datum, May 17, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 20	32.88	MAR 10	31.62	JUN 30	31.50	SEP 25	31.28	SEP 26	30.68	SEP 30	31.31
JAN 18	31.47	MAY 20	31.32	AUG 26	30.95						



## JACKSON COUNTY

434742095191501. Local number, 104N37W19DBD01.

LOCATION.--Lat 43°47'42", long 95°19'15", in SE¼NW¼SE¼ sec.19, T.104 N., R.37 W., Hydrologic Unit 07100001, at Heron Lake.

Owner: City of Heron Lake, old railroad well.

AQUIFER.--Sioux Quartzite of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 16 in (0.41 m), depth 323 ft (98.4 m), screened 205 to 225 ft (62.5 to 68.6 m).

DATUM.--Altitude of land-surface datum is 1,420 ft (433 m). Measuring point: Edge of breather pipe, 2.60 ft (0.79 m) above land-surface datum.

PERIOD OF RECORD.--August 1972, July 1973, September 1976, July 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 59.16 ft (18.03 m) below land-surface datum, Aug. 11, 1972; lowest, 66.10 ft (20.15 m) below land-surface datum, July 14, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	65.16	JAN 25	63.67	MAR 4	62.82	APR 21	62.76	JUN 8	63.63	AUG 29	65.38

## GROUND-WATER LEVELS

## KANABEC COUNTY

454744093151601. Local number, 038N23W07DBB01.

LOCATION.--Lat 45°47'44", long 93°15'16", in NW¼NW¼SE¼ sec.7, T.38 N., R.23 W., Hydrologic Unit 07030004, on Chester Belkholm farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ (0.04 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

DATUM.--Altitude of land-surface datum is 963 ft (294 m). Measuring point: Top of casing, 1.60 ft (0.49 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 9.91 ft (3.02 m) below land-surface datum, Mar. 29, 1982; lowest, 15.11 ft (4.61 m) below land-surface datum, Feb. 25, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	13.87	DEC 22	13.38	APR 19	12.72	JUN 18	12.83	AUG 13	13.09	SEP 18	13.14
NOV 30	13.45	JAN 20	13.67	MAY 15	12.70	JUL 16	12.85				

455342093134001. Local number, 039N23W05DAC01.

LOCATION.--Lat 45°53'42", long 93°13'40", in SW¼NE¼SE¼ sec.5, T.39 N., R.23 W., Hydrologic Unit 07030004, on Roman Miller property.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ (0.04 m), depth 47 ft (14.3 m), screened 45 to 47 ft (13.7 to 14.3 m).

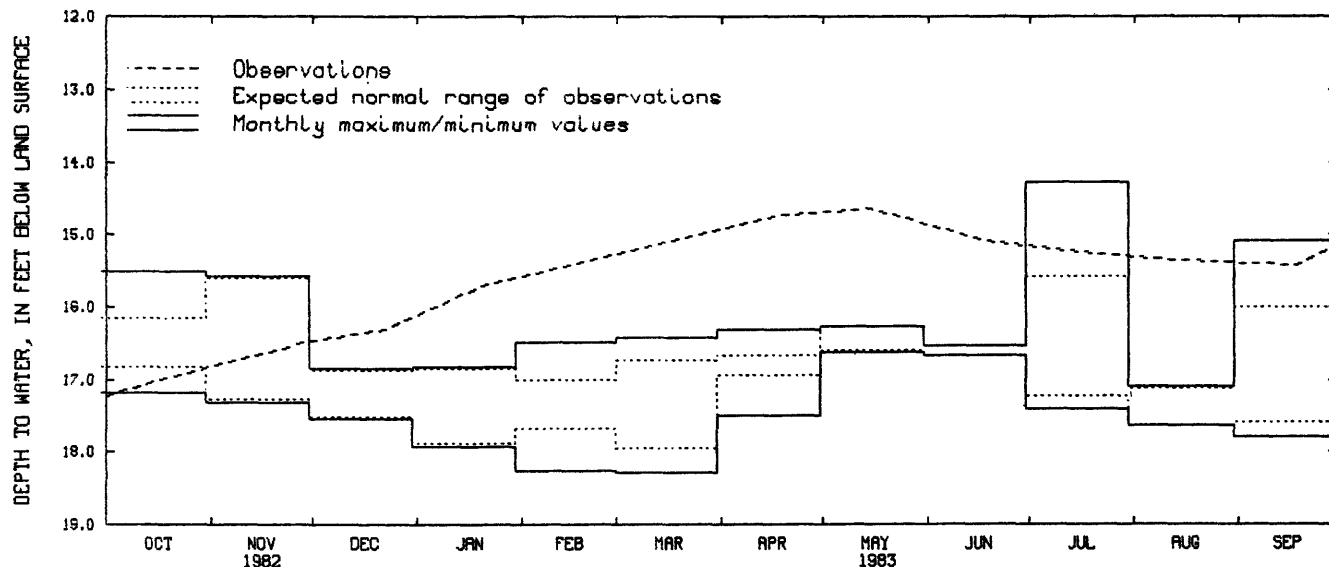
DATUM.--Altitude of land-surface datum is 1,030 ft (314 m). Measuring point: Top of casing, 4.00 ft (1.22 m) above land-surface datum.

PERIOD OF RECORD.--December 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 14.28 ft (4.35 m) below land-surface datum, July 31, 1979; lowest, 18.28 ft (5.57 m) below land-surface datum, Mar. 22, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	16.97	DEC 22	16.32	APR 19	14.73	JUN 18	15.08	AUG 13	15.35	SEP 18	15.42
NOV 30	16.48	JAN 20	15.71	MAY 15	14.64	JUL 16	15.24				



039N23W05DAC01

## GROUND-WATER LEVELS

## KANABEC COUNTY--Continued

455236093172301. Local number, 039N24W11DDC01.

LOCATION.--Lat 45°52'36", long 93°17'23", in SW¼SE¼SE¼ sec.11, T.39 N., R.24 W., Hydrologic Unit 07030004, intersection of Forest Avenue and U.S. Highway 65.

Owner: City of Mora, well 3.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 12 in (0.30 m), depth 170 ft (51.8 m), screened 150 to 170 ft (45.7 to 51.8 m).

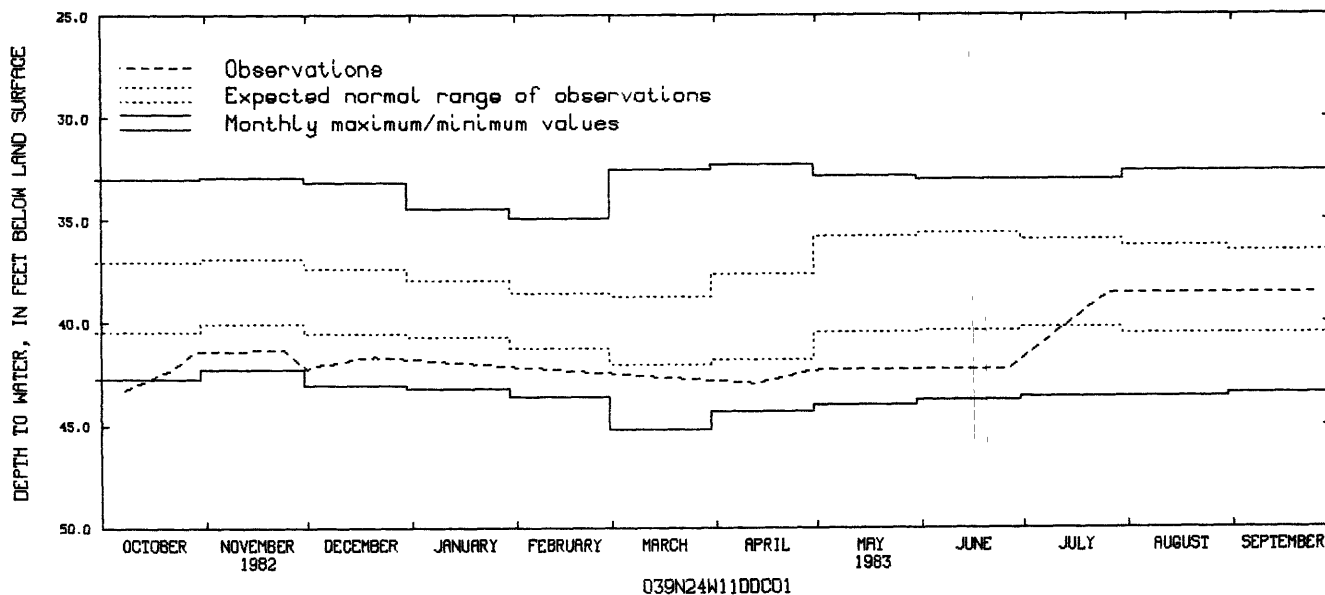
DATUM.--Altitude of land-surface datum is 1,011 ft (308 m). Measuring point: Edge of vent pipe, 2.40 ft (0.73 m) above land-surface datum.

PERIOD OF RECORD.--March 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 32.28 ft (9.84 m) below land-surface datum, Apr. 6, 1973; lowest, 45.18 ft (13.77 m) below land-surface datum, Mar. 15, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	43.30	OCT 29	41.39	DEC 1	42.24	DEC 21	41.66	APR 18	42.72	JUN 27	42.23
22	42.25	NOV 24	41.33	15	41.74	APR 14	42.97	MAY 2	42.27	JUL 26	38.57



455047093205401. Local number, 039N24W20DDD01.

LOCATION.--Lat 45°50'47", long 93°20'54", in SE¼SE¼SE¼ sec.20, T.39 N., R.24 W., Hydrologic Unit 07030004, 3.1 mi (5.0 km) southwest of Mora.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 26 ft (7.9 m), screened 24 to 26 ft (7.3 to 7.9 m).

DATUM.--Altitude of land-surface datum is 964 ft (294 m). Measuring point: Top of casing, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--November 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.27 ft (1.61 m) below land-surface datum, Apr. 19, 1983; lowest, 6.19 ft (1.89 m) below land-surface datum, Sept. 23, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	5.80	DEC 22	5.80	APR 19	5.27	JUN 18	5.67	AUG 13	5.82	SEP 18	5.54
NOV 30	5.72	JAN 20	5.86	MAY 15	5.49	JUL 16	5.79				



## GROUND-WATER LEVELS

KANDIYOHI COUNTY

450730095014801. Local number, 119N35W14ABB01.

LOCATION.--Lat 45°07'30", long 95°01'48", in NW¼NW¼NE¼ sec.14, T.119 N., R.35 W., Hydrologic Unit 07020004, at Willmar.

Owner: Burlington Northern, Inc.

**AQUIFER.**--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 10 in (0.25 m), depth 320 ft (97.5 m), screened 297 to 320 ft (89.9 to 97.5 m).

DATUM.--Altitude of land-surface datum is 1,140 ft (347 m). Measuring point: Wood floor of recorder shelter, 1.00 ft (0.30 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

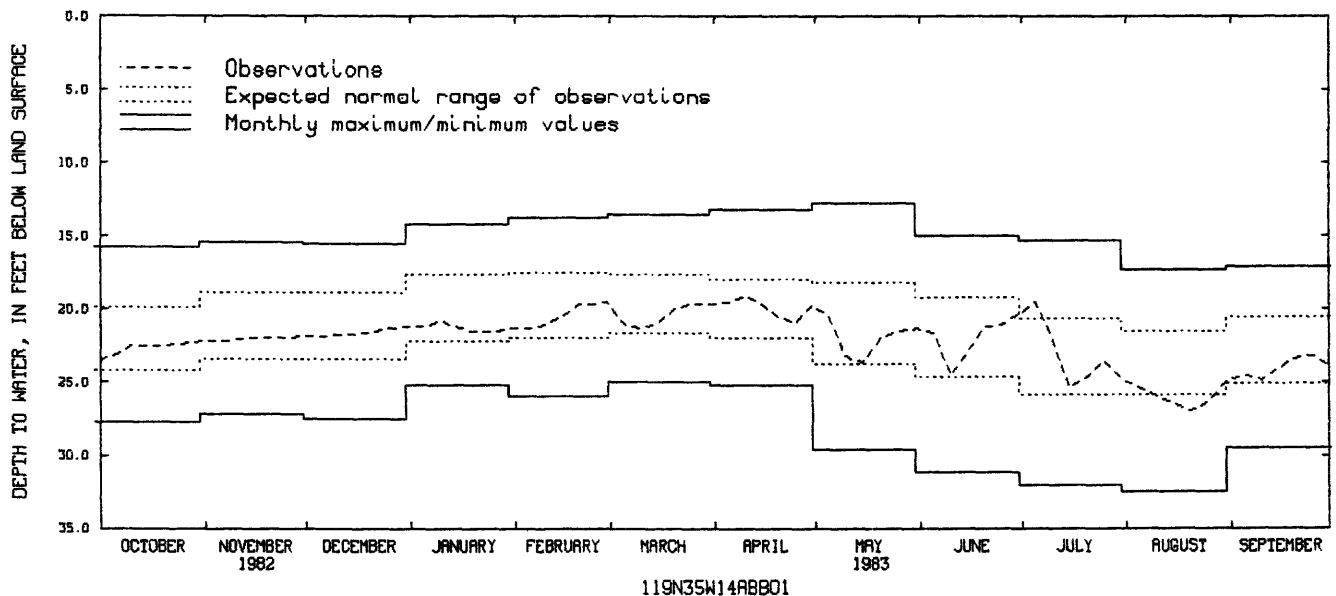
PERIOD OF RECORD.--December 1967 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 12.78 ft (3.90 m) below land-surface datum, May 12, 1969; lowest, 32.50 ft (9.91 m) below land-surface datum, Aug. 27, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.19	22.13	21.84	21.18	21.25	20.99	19.50	20.47	21.65	19.51	.....	24.45
10	22.53	22.11	.....	20.76	21.11	21.31	19.07	23.21	24.50	22.00	.....	24.84
15	22.52	21.97	.....	21.26	20.41	20.97	19.65	23.63	22.90	25.37	.....	24.05
20	22.49	.....	21.62	21.55	19.66	19.99	20.55	21.98	21.20	24.72	27.00	23.37
25	22.40	.....	21.29	21.50	19.56	19.54	20.90	21.53	21.10	23.50	26.34	23.12
EOM	22.15	.....	21.15	21.31	19.48	19.67	19.72	21.30	20.35	24.82	24.85	23.91

WTR YEAR 1983      HIGHEST 18.47 APR 11, 1983      LOWEST 28.53 AUG 16, 1983



452415094503001. Local number, 122N33W04BCD01.

LOCATION.--Lat 45°24'15", long 94°50'30", in SE~~4~~SW~~4~~NW~~4~~ sec.4, T.122 N., R.33 W., Hydrologic Unit 07010204, at Regal.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

**WELL CHARACTERISTICS.**--Bored observation water-table well, diameter 2 in (0.05 m), depth 17 ft (5.2 m), screened 14 to 17 ft (4.3 to 5.2 m).

DATUM.--Altitude of land-surface datum is 1,220 ft (372 m). Measuring point: Top of casing, 4.40 ft (1.34 m) above land-surface datum.

PERIOD OF RECORD.--December 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.86 ft (1.48 m) below land-surface datum, June 26, 1979;  
lowest, 11.40 ft (3.47 m) below land-surface datum, Feb. 26, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

[illegible]

## GROUND-WATER LEVELS

## KANDIYOHI COUNTY--Continued

452400095004001. Local number, 122N34W06CBC01.

LOCATION.--Lat 45°24'00", long 95°00'40", in SW¼NW¼SW¼ sec.6, T.122 N., R.34 W., Hydrologic Unit 07010204, 3.4 mi (5.5 km) south of Belgrade.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 23 ft (7.0 m), screened 20 to 23 ft (6.1 to 7.0 m).

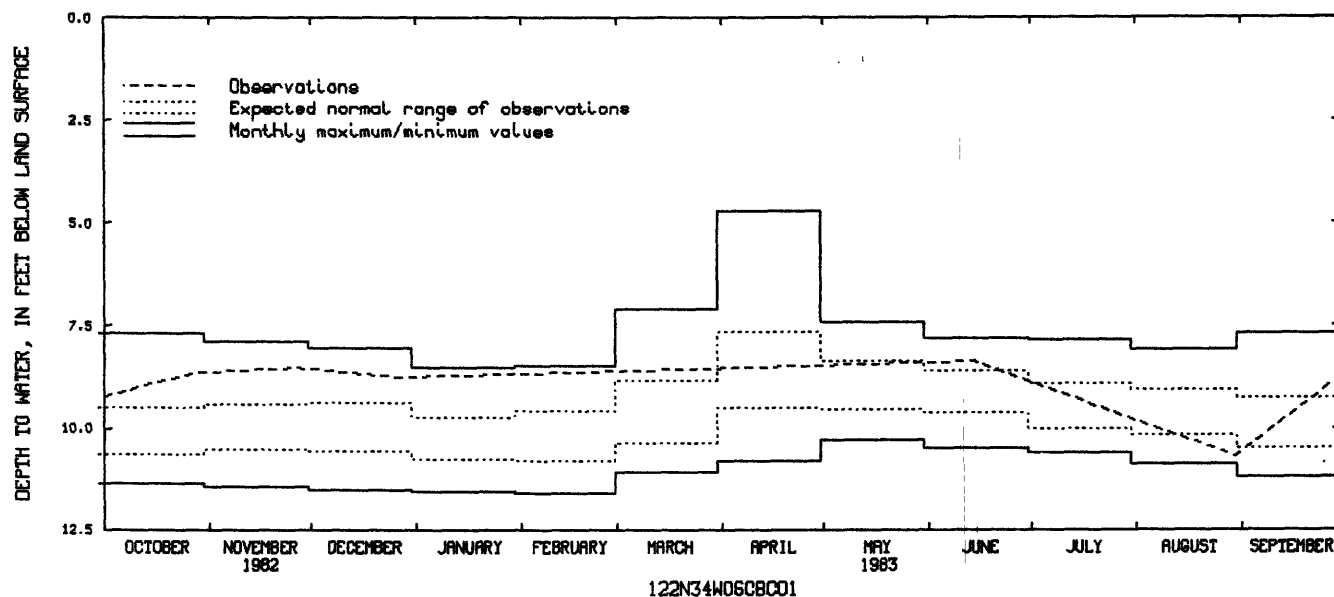
DATUM.--Altitude of land-surface datum is 1,237 ft (377 m). Measuring point: Top of platform, 0.80 ft (0.24 m) above land-surface datum.

PERIOD OF RECORD.--October 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.71 ft (1.44 m) below land-surface datum, Apr. 28, 1979; lowest, 11.61 ft (3.54 m) below land-surface datum, Feb. 26, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	8.65	NOV 26	8.52	DEC 27	8.75	JUN 14	8.36	AUG 30	10.70	SEP 27	8.95



## LAC QUI PARLE COUNTY

445258096224001. Local number, 116N46W02CBC01.

LOCATION.--Lat 44°52'58", long 96°22'24", in SW¼NW¼SW¼ sec.2, T.116 N., R.46 W., Hydrologic Unit 07020003, 8.6 mi (13.8 km) south of Marietta.

Owner: State of Minnesota.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 210 ft (64.0 m), screened 207 to 210 ft (63.1 to 64.0 m).

DATUM.--Land-surface datum is 1,161.1 ft (353.9 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.65 ft (0.81 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 19.45 ft (5.93 m) below land-surface datum, Apr. 26, 1983; lowest, 36.90 ft (11.25 m) below land-surface datum, Aug. 14, 1981.

WATER LEVEL IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 28	20.75	MAR 28	20.05	MAY 28	21.65	JUN 24	20.75	JUL 27	34.80	SEP 27	23.05
FEB 28	20.65	APR 26	19.45	31	21.57	JUL 26	33.05	AUG 26	36.85		

## GROUND-WATER LEVELS

## LAC QUI PARLE COUNTY--Continued

445122096224501. Local number, 116N46W15ADD01.

LOCATION.--Lat 44°51'22", long 96°22'45", in SE½SE½NE¼ sec.15, T.116 N., R.46 W., Hydrologic Unit 07020003, northeast of Gary.

Owner: State of Minnesota.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 70 ft (21.3 m), screened 67 to 70 ft (20.4 to 21.3 m).

DATUM.--Land-surface datum is 1,179.0 ft (359.4 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.76 ft (0.84 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--May 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.48 ft (3.19 m) below land-surface datum, June 16, 1980; lowest, 15.04 ft (4.58 m) below land-surface datum, Sept. 27, 1983.

## WATER LEVEL IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 28	13.84	MAR 28	11.94	MAY 28	12.34	JUN 24	12.54	JUL 27	13.32	SEP 27	15.04
FEB 28	13.44	APR 26	11.74	31	12.25	JUL 26	13.24	AUG 26	14.44		

## LE SUEUR COUNTY

442522093543901. Local number, 111N26W14ADA01.

LOCATION.--Lat 44°25'22", long 93°54'39", in NE½SE½NE¼ sec.14, T.111 N., R.26 W., Hydrologic Unit 07020012, 0.85 mi (1.37 km) south of Le Sueur.

Owner: Merle Moser.

AQUIFER.--Buried gravel of Pleistocene Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 16 in (0.41 m), depth 242 ft (73.8 m), screened 212 to 242 ft (64.6 to 73.8 m).

DATUM.--Altitude of land-surface datum is 855 ft (261 m). Measuring point: Edge of vent pipe, 1.20 ft (0.37 m) above land-surface datum.

PERIOD OF RECORD.--January 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 80.03 ft (24.39 m) below land-surface datum, Sept. 14, 1983; lowest, 84.55 ft (25.77 m) below land-surface datum, Mar. 9, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	84.14	JAN 10	83.27	MAR 7	82.94	MAY 9	82.57	JUL 20	81.82	SEP 14	80.03

443234093333501. Local number, 112N23W02BAB01.

LOCATION.--Lat 44°32'34", long 93°33'35", in NW¼NE¼NW¼ sec.2, T.112 N., R.23 W., Hydrologic Unit 07020012, just east of New Prague.

Owner: Holy Trinity Lutheran Church.

AQUIFER.--St. Lawrence Formation of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 180 ft (54.9 m), cased to 155 ft (47.2 m).

DATUM.--Altitude of land-surface datum is 1,005 ft (306 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--April 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 95.53 ft (29.12 m) below land-surface datum, May 3, 1983; lowest, 99.42 ft (30.30 m) below land-surface datum, July 26, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	97.10	JAN 5	96.29	MAR 2	95.98	MAY 3	95.53	JUL 12	95.70	SEP 8	96.32

## GROUND-WATER LEVELS

## LE SUEUR COUNTY--Continued

443147093374501. Local number, 112N23W06DDD01.

LOCATION.--Lat 44°31'47", long 93°37'45", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.6, T.112 N., R.23 W., Hydrologic Unit 07020012, 3 mi (4.8 km) southwest of New Prague.

Owner: Friedens Lutheran Church.

AQUIFER.--St. Lawrence Formation of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 5 in (0.13 m), depth 265 ft (80.8 m), cased to 209 ft (63.7 m).

DATUM.--Altitude of land-surface datum is 1,019 ft (311 m). Measuring point: Top of casing, 1.70 ft (0.52 m) above land-surface datum.

PERIOD OF RECORD.--April 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 150.8 ft (45.96 m) below land-surface datum, Mar. 18, 1981; lowest, 152.0 ft (46.33 m) below land-surface datum, Sept. 13, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	151.2	JAN 5	151.0	MAR 2	151.7	JUL 12	151.4	SEP 8	151.8

## LINCOLN COUNTY

441705096084501. Local number, 110N44W33DCD01.

LOCATION.--Lat 44°17'05", long 96°08'45", in SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.33, T.110 N., R.44 W., Hydrologic Unit 07020006, at Tyler.

Owner: U.S. Geological Survey.

AQUIFER.--Dakota Sandstone of Early Cretaceous Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 8 in (0.20 m), depth 967 ft (295 m), screened 890 to 900 ft (271 to 274 m).

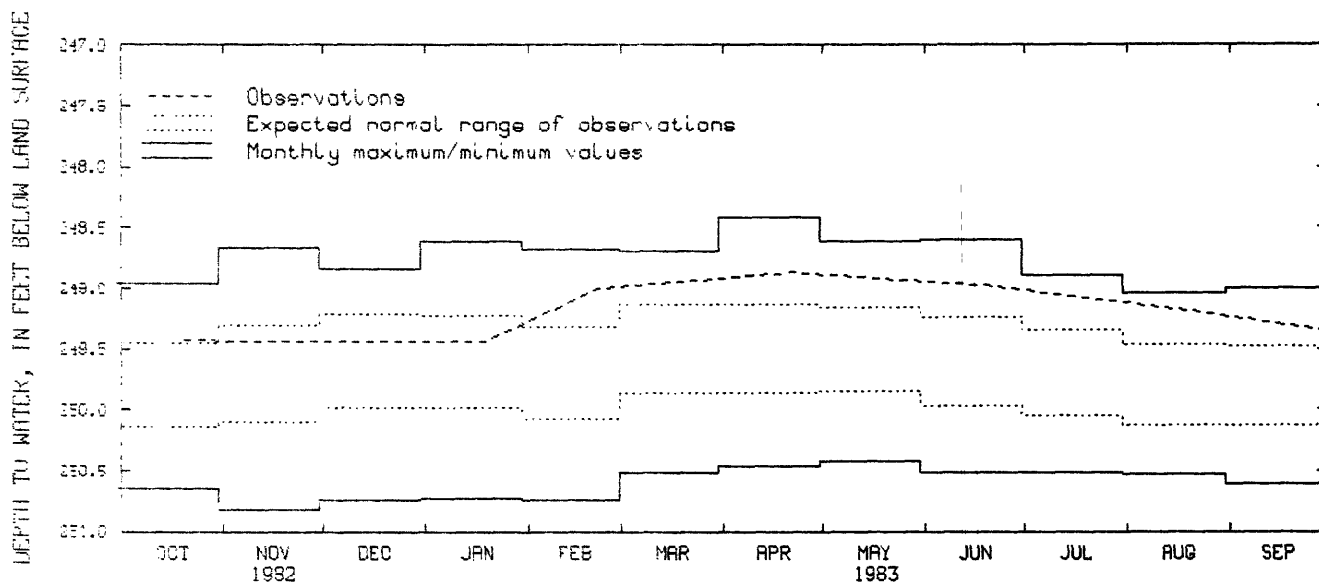
DATUM.--Altitude of land-surface datum is 1,738 ft (530 m). Measuring point: Top of recorder platform, 3.50 ft (1.07 m) above land-surface datum.

PERIOD OF RECORD.--November 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 248.4 ft (75.71 m) below land-surface datum, Apr. 20, 1970; lowest, 250.8 ft (76.44 m) below land-surface datum, Nov. 12, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	249.4	JAN 19	249.4	FEB 22	249.0	APR 21	248.9	JUN 20	249.0	AUG 18	249.2



110N44W33DCD01

## GROUND-WATER LEVELS

## MARTIN COUNTY

434359094422201. Local number, 103N32W08CCD01.

LOCATION.--Lat 43°43'59", long 94°42'22", in SE¼SW¼SW¼ sec.8, T.103 N., R.32 W., Hydrologic Unit 07020009, 1.5 mi (2.4 km) south of Trimont.

Owner: Robert Olson.

AQUIFER.--Sandstone of Cretaceous Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 16 in (0.41 m), depth 412 ft (126 m), screened 372 to 412 ft (113 to 126 m).

DATUM.--Altitude of land-surface datum is 1,242 ft (379 m). Measuring point: Vent pipe, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 90.93 ft (27.72 m) below land-surface datum, Mar. 7, 1983; lowest, 92.85 ft (28.30 m) below land-surface datum, Sept. 14, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	91.69	JAN 10	91.22	MAR 7	90.93	MAY 9	90.98	JUL 20	91.02	SEP 14	92.85

434725094483001. Local number, 104N33W28BAB01.

LOCATION.--Lat 43°47'25", long 94°48'30", in NW¼NE¼NW¼ sec.28, T.104 N., R.33 W., Hydrologic Unit 07020009, 6.6 mi (10.6 km) northwest of Trimont.

Owner: Kenneth Schafer.

AQUIFER.--Sioux Quartzite of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 5 in (0.13 m), depth 178 ft (54.2 m), cased to 121 ft (36.9 m).

DATUM.--Altitude of land-surface datum is 1,290 ft (393 m). Measuring point: Top of casing, 1.30 ft (0.40 m) above land-surface datum.

PERIOD OF RECORD.--September 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 83.42 ft (25.43 m) below land-surface datum, Mar. 7, 1983; lowest, 85.17 ft (25.96 m) below land-surface datum, Nov. 9, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	83.90	JAN 10	83.60	MAR 7	83.42	MAY 9	83.65	JUL 20	83.67	SEP 14	85.17

## MC LEOD COUNTY

444630094021601. Local number, 115N27W14ABA01.

LOCATION.--Lat 44°46'30", long 94°02'16", in NE¼NW¼NE¼ sec.14, T.115 N., R. 27 W., Hydrologic Unit 07010205, in city of Plato.

Owner: Kenny's Garage. Formerly Plato Creamery.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 67 ft (20.4 m).

DATUM.--Altitude of land-surface datum is 990 ft (302 m). Measuring point: Edge of pump base, 0.70 ft (0.21 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--September 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.62 ft (7.50 m) below land-surface datum, May 14, 1982; lowest, 34.58 ft (10.54 m) below land-surface datum, July 12, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	25.65	JAN 18	28.87	SEP 21	24.98

## GROUND-WATER LEVELS

## MC LEOD COUNTY--Continued

444758094132101. Local number, 115N28W05ACC01.

LOCATION.--Lat 44°47'58", long 94°13'21", in SW¼SW¼NE¼ sec.5, T.115 N., R.28 W., Hydrologic Unit 07010205, northwest of Glencoe.

Owner: Graupmann Farms, Inc.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 472 ft (144 m), screened 432 to 472 ft (132 to 144 m).

DATUM.--Altitude of land-surface datum is 1,036 ft (316 m). Measuring point: Edge of vent pipe, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--September 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 80.50 ft (24.54 m) below land-surface datum, Aug. 20, 1979; lowest, 109.6 ft (33.41 m) below land-surface datum, Oct. 1, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	91.45	JAN 18	85.19	APR 5	83.20	JUN 8	85.46	SEP 1	94.05

444704094090801. Local number, 115N28W11ADD01.

LOCATION.--Lat 44°47'04", long 94°09'08", in SE¼SE¼NE¼ sec.11, T.115 N., R.28 W., Hydrologic Unit 07010205, 0.4 mi (0.6 km) north of Glencoe.

Owner: McLeod County Highway Department.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 5 in (0.13 m), depth 500 ft (152 m), cased to 446 ft (136 m).

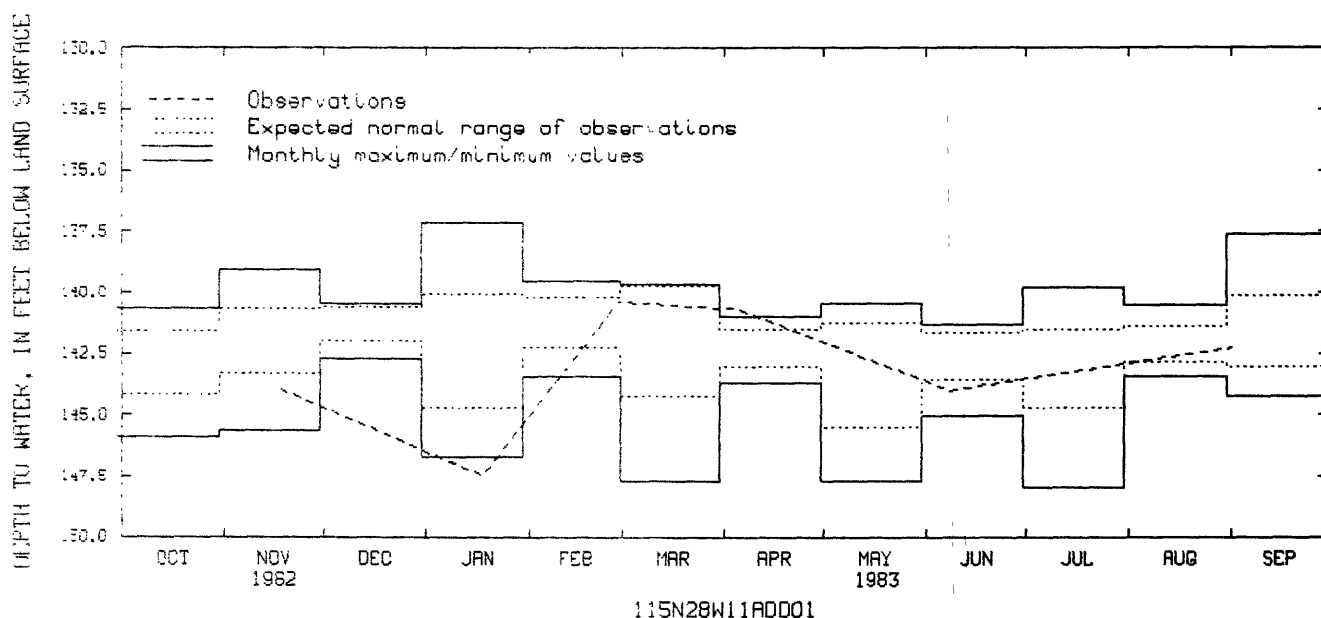
DATUM.--Altitude of land-surface datum is 1,020 ft (311 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--November 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 137.2 ft (41.82 m) below land-surface datum, Jan. 7, 1982; lowest, 148.0 ft (45.10 m) below land-surface datum, July 18, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	144.0	JAN 18	147.5	FEB 28	140.4	APR 5	140.7	JUN 8	144.0	SEP 1	142.3



115N28W11ADD01

## GROUND-WATER LEVELS

365

## MC LEOD COUNTY--Continued

444819094164701. Local number, 116N29W35DDC01.

LOCATION.--Lat 44°48'19", long 94°16'47", in SW¼SE¼SE¼ sec.35, T.116 N., R.29 W., Hydrologic Unit 07010205, 1.3 mi (2.1 km) south of Biscay.

Owner: Charles Johnson.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 269 ft (82.0 m), screened 229 to 269 ft (69.8 to 82.0 m).

DATUM.--Altitude of land-surface datum is 1,050 ft (320 m). Measuring point: Edge of vent pipe, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--September 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.40 ft (7.44 m) below land-surface datum, June 8, 1983; lowest, 29.93 ft (9.12 m) below land-surface datum, Sept. 9, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	27.94	JAN 18	25.80	FEB 28	25.26	JUN 8	24.40	SEP 1	27.30

445721094031201. Local number 117N27W10DAA01.

LOCATION.--Lat 44°57'21", long 94°03'12", in NE¼NE¼SE¼ sec.10, T.117 N., R.27 W., Hydrologic Unit 07010205, 0.1 mi (0.2 km) south of Winsted.

Owner: Winsted Farmers Coop.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled industrial artesian well, diameter 4 in (0.10 m), depth 129 ft (39.3 m), screened 125 to 129 ft (38.1 to 39.3 m).

DATUM.--Altitude of land-surface datum is 1,015 ft (309 m). Measuring point: Top of casing, 1.40 ft (0.43 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.49 ft (9.60 m) below land-surface datum, June 8, 1983; lowest, 41.52 (12.66 m) below land-surface datum, Nov. 3, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	32.63	JAN 18	32.38	FEB 28	32.30	APR 5	31.57	JUN 8	31.49	SEP 1	33.15

## GROUND-WATER LEVELS

## MEEKER COUNTY

450632094290801. Local number, 119N30W19AAB01.

LOCATION.--Lat 45°06'32", long 94°29'08", in NW¼NE¼NE¼ sec.19, T.119 N., R.30 W., Hydrologic Unit 07010204, on Ted Carlson farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 26 ft (7.9 m), screened 24 to 26 ft (7.3 to 7.9 m).

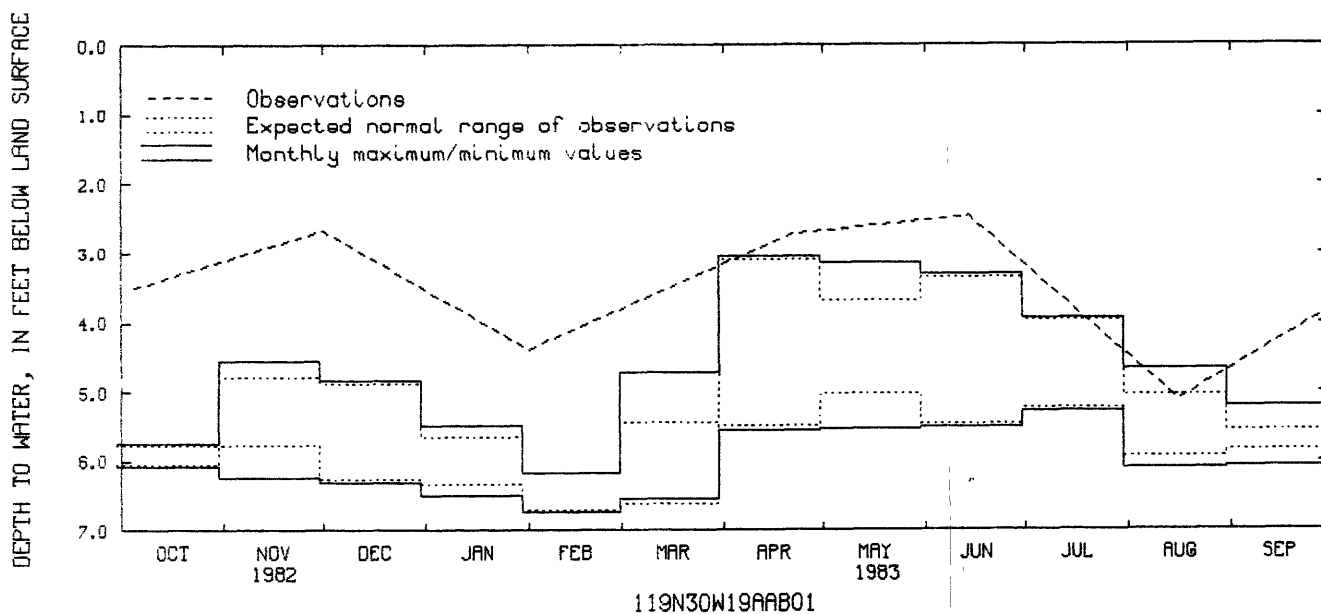
DATUM.--Altitude of land-surface datum is 1,130 ft (344 m). Measuring point: Top of casing, 3.30 ft (1.01 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.47 ft (1.75 m) below land-surface datum, June 14, 1983; lowest 6.74 ft (2.05 m) below land-surface datum, Feb. 3, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	3.50	DEC 1	2.67	FEB 1	4.38	APR 22	2.72	JUN 14	2.47	AUG 16	5.11



451542094322301. Local number, 121N31W26BDC01.

LOCATION.--Lat 45°15'42", long 94°32'23", in SW¼SE¼NW¼ sec.26, T.121 N., R.31 W., Hydrologic Unit 07010204, on Keith Langmo farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 16 ft (4.9 m), screened 14 to 16 ft (4.3 to 4.9 m).

DATUM.--Altitude of land-surface datum is 1,112 ft (339 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.57 ft (1.09 m) below land-surface datum, June 21, 1982; lowest, 6.59 ft (2.01 m) below land-surface datum, Mar. 12, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	4.39	DEC 1	3.86	FEB 1	5.14	APR 22	3.63	JUN 14	4.53	AUG 16	4.83



## GROUND-WATER LEVELS

## MILLE LACS COUNTY

454450093395701. Local number, 038N27W35ABC01.

LOCATION.--Lat 45°44'50", long 93°39'57", in SW¼NW¼NE¼ sec.35, T.38 N., R.27 W., Hydrologic Unit 07010207, in Milaca.

Owner: City of Milaca, creamery well.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 82 ft (25.0 m), screened 67 to 82 ft (20.4 to 25.0 m).

DATUM.--Land-surface datum is 1,082.2 ft (329.8 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of platform, 3.00 ft (0.91 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--September 1967 to current year.

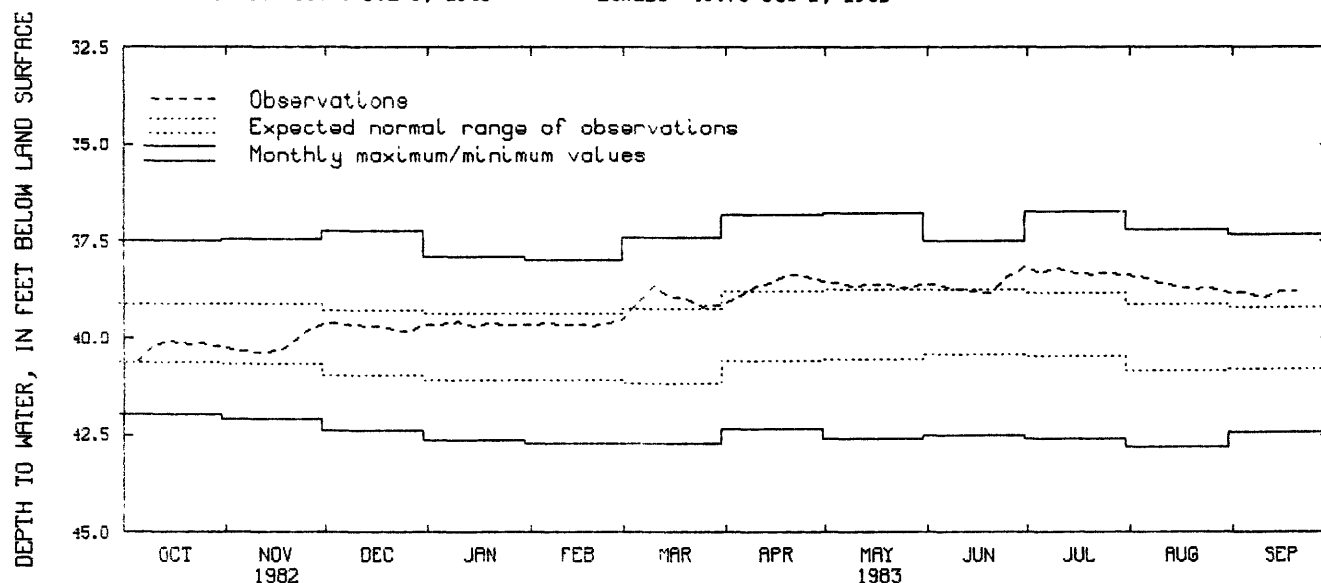
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 36.74 ft (11.20 m) below land-surface datum, July 26, 1972; lowest, 42.81 ft (13.05 m) below land-surface datum, Aug. 27, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	40.63	40.32	39.63	39.64	39.63	.....	38.92	38.59	38.66	38.30	38.43	38.80
10	40.16	40.36	39.67	39.59	39.65	38.66	38.65	38.66	38.74	38.18	38.55	38.95
15	40.09	40.35	39.70	39.70	39.64	38.92	38.55	38.60	38.79	38.31	38.66	38.79
20	40.15	40.20	39.75	39.59	39.70	39.00	38.36	38.61	38.81	38.35	38.72	38.76
25	40.13	39.81	39.84	39.67	39.60	39.18	38.39	38.70	38.42	38.33	38.70	.....
EOM	40.25	39.64	39.66	39.68	39.57	39.13	38.53	38.58	38.17	38.36	38.83	.....

WTR YEAR 1983 HIGHEST 38.08 JUL 3, 1983

LOWEST 40.78 OCT 1, 1982



038N27W35ABC01

MORRISON COUNTY

455135094092801. Local number, 039N31W23DAA01.

LOCATION.--Lat 45°51'35", long 94°09'28", in NE¼NE¼SE¼ sec.23, T.39 N., R. 31 W., Hydrologic Unit 07010201, on Kelzenberg farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Driven observation water-table well, diameter 1½ in (0.03 m), depth 12 ft (3.7 m), screened 10 to 12 ft (3.0 to 3.7 m).

DATUM.--Altitude of land-surface datum is 1,104 ft (336 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--October 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.72 ft (1.13 m) below land-surface datum, July 14, 1978; lowest, dry below land-surface datum, July and Aug. 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	4.18	DEC 23	4.58	FEB 15	5.75	APR 13	4.50	JUN 14	5.52	AUG 16	6.00
NOV 18	4.70	JAN 17	5.35	MAR 18	4.00	MAY 26	5.12	JUL 18	5.35	SEP 16	6.30

## GROUND-WATER LEVELS

## MORRISON COUNTY--Continued

455253094195801. Local number, 039N32W09DCC01.

LOCATION.--Lat 45°52'53", long 94°19'58", in SW¼SW¼SE¼ sec.9, T.39 N., R. 32 W., Hydrologic Unit 07010201, north of Royalton.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

DATUM.--Altitude of land-surface datum is 1,092 ft (333 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--October 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.00 ft (0.91 m) above land-surface datum, Apr. 17, 1979; lowest, 3.91 ft (1.19 m) below land-surface datum, Feb. 22, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	0.40	DEC 23	1.18	FEB 15	1.65	MAY 26	1.22	JUL 18	1.38	SEP 16	0.75
NOV 18	0.80	JAN 17	1.30	MAR 18	0.20	JUN 14	1.22	AUG 16	1.45		

460148094190701. Local number, 041N32W13DCA02.

LOCATION.--Lat 46°01'48", long 94°19'07", in NE¼SW¼SE¼ sec.13, T.41 N., R.32 W., Hydrologic Unit 07010104, east of Belle Prairie.

Owner: O'Day Farm.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation water-table well, depth 36 ft (11.0 m), depth of screen unknown.

DATUM.--Altitude of land-surface datum is 1,131 ft (345 m). Measuring point: Top of casing, 1.70 ft (0.52 m) above land-surface datum.

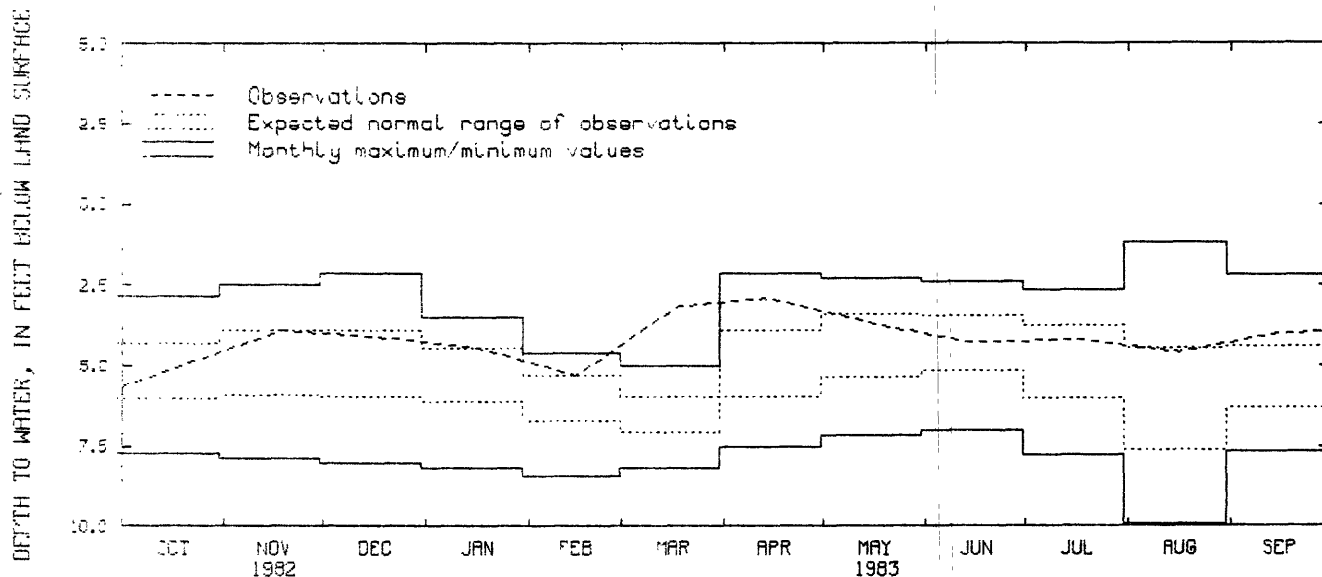
REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--October 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.19 ft (0.36 m) below land-surface datum, Aug. 2, 1972; lowest, 8.60 ft (2.62 m) below land-surface datum, Aug. 13, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	3.90	JAN 17	4.45	MAR 18	3.15	MAY 26	3.90	JUL 18	4.20	SEP 16	3.98
DEC 23	4.15	FEB 15	5.30	APR 13	2.90	JUN 14	4.25	AUG 16	4.58		



## GROUND-WATER LEVELS

## MORRISON COUNTY--Continued

460444094212501. Local number, 130N29W08DCC01.

LOCATION.--Lat 46°04'44", long 94°21'25", in SW¼SW¼SE¼ sec.8, T.130 N., R.29 W., Hydrologic Unit 07010104, at Camp Ripley.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in (0.05 m), depth 59 ft (18.0 m), screened 56 to 59 ft (17.1 to 18.0 m).

DATUM.--Land-surface datum is 1,149.0 ft (350.2 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.10 ft (0.64 m) above land-surface datum.

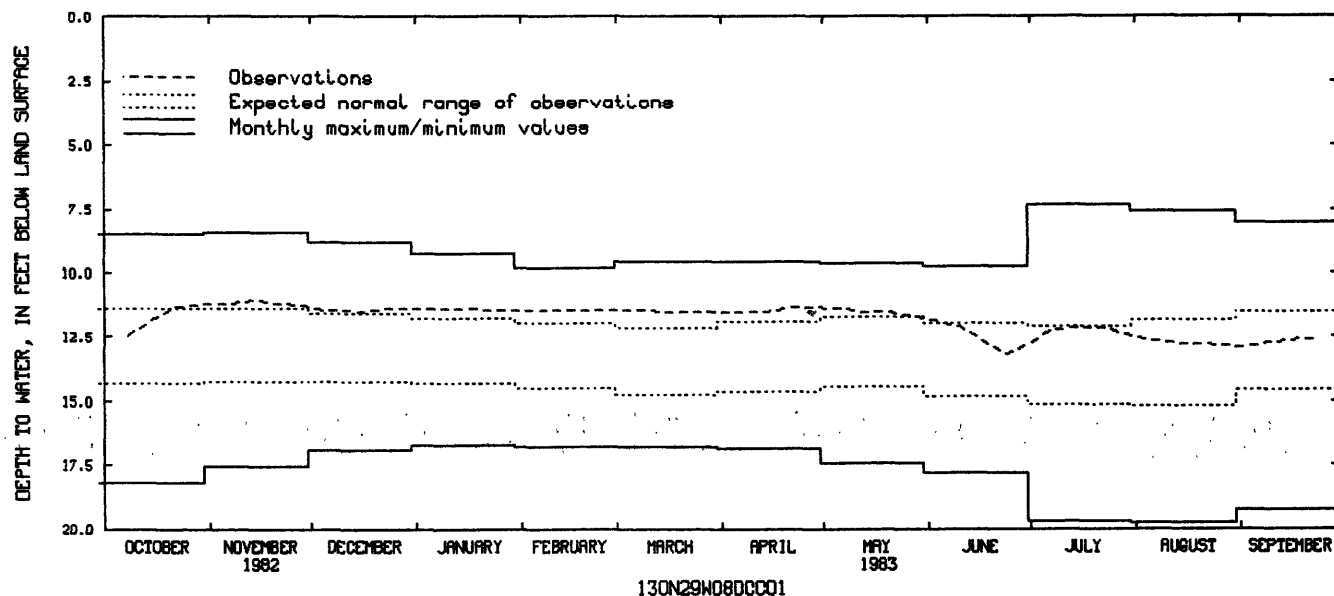
REMARKS.--Water levels used in monthly Water Resources Review.

PERIOD OF RECORD.--April 1949 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.35 ft (2.24 m) below land-surface datum, July 28, 1972; lowest, 19.75 ft (6.02 m) below land-surface datum, Aug. 4, 1961.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	12.45	DEC 10	11.49	FEB 4	11.80	APR 8	11.50	JUN 3	11.86	JUL 29	12.42
15	11.86	17	11.50	11	11.90	15	11.50	10	12.12	AUG 5	12.63
22	11.34	23	11.40	18	12.05	22	11.33	17	12.86	12	12.76
29	11.24	30	11.22	25	12.10	29	11.36	24	13.20	26	12.84
NOV 5	11.22	JAN 7	11.63	MAR 4	12.13	MAY 6	11.39	JUL 1	12.72	SEP 2	12.92
15	11.08	14	11.64	11	11.74	13	11.53	8	12.22	9	12.76
19	11.17	21	11.76	26	11.63	20	11.54	15	12.18	16	12.64
29	11.29	28	11.80	APR 1	11.52	27	11.67	22	12.13	23	12.58
DEC 3	11.42										



## GROUND-WATER LEVELS

## MOWER COUNTY

434010093010801. Local number, 102N18W05ACB01.

LOCATION.--Lat 43°40'10", long 93°01'08", in NW¼SW¼NE¼ sec.5, T.102 N., R.18 W., Hydrologic Unit 07080201, in Austin.

Owner: Church of Latter Day Saints.

AQUIFER.--Cedar Valley Formation of Middle Devonian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 5 in (0.13 m), depth 100 ft (30.5 m), cased to 77 ft (23.5 m).

DATUM.--Altitude of land-surface datum is 1,230 ft (375 m). Measuring point: Top of casing, 0.80 ft (0.24 m) above land-surface datum.

PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 33.85 ft (10.32 m) below land-surface datum, Mar. 8, 1983; lowest, 37.72 ft (11.50 m) below land-surface datum, July 10, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	35.09	JAN 12	35.10	MAR 8	33.85	MAY 10	33.89	SEP 15	36.40

434417093521001. Local number, 103N17W09DAA01.

LOCATION.--Lat 43°44'17", long 93°52'10", in NE¼NE¼SE¼ sec.9, T.103 N., R.17 W., Hydrologic Unit 07080201, in Brownsdale.

Owner: Lord O'Lakes, creamery well.

AQUIFER.--Cedar Valley Formation of Middle Devonian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), depth 130 ft (39.6 m), casing information not available.

DATUM.--Altitude of land-surface datum is 1,280 ft (390 m). Measuring point: Top of well cap, 0.40 ft (0.12 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--February 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 36.93 ft (11.26 m) below land-surface datum, Apr. 15, 1983; lowest, 45.20 ft (13.78 m) below land-surface datum, Mar. 30, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	39.39	JAN 12	37.69	APR 15	36.93	MAY 24	36.97	JUL 11	37.13	AUG 29	37.72
NOV 29	37.43	FEB 22	37.89								

## MURRAY COUNTY

435357096034701. Local number, 105N43W18BCC01.

LOCATION.--Lat 43°53'57", long 96°03'47", in SW¼SW¼NW¼ sec.18, T.105 N., R.43 W., Hydrologic Unit 10170204, 6 mi (9.6 km) southwest of Chandler.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 12 ft (3.7 m), screened 10 to 12 ft (3.0 to 3.7 m).

DATUM.--Altitude of land-surface datum is 1,600 ft (488 m). Measuring point: Top of casing, 4.25 ft (1.30 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.08 ft (1.24 m) below land-surface datum, Sept. 27, 1983; lowest, 8.61 ft (2.62 m) below land-surface datum, Oct. 31, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 25	7.15	DEC 11	7.86	FEB 12	8.05	APR 23	5.65	JUN 13	7.85	AUG 20	7.96
NOV 11	7.60	JAN 15	8.00	MAR 10	5.89	MAY 21	7.27	JUL 26	7.56	SEP 27	4.08

## GROUND-WATER LEVELS

## MURRAY COUNTY--Continued

440028095352401. Local number, 106N40W12ABB01.

LOCATION.--Lat 44°00'28", long 95°35'24", in NW¼NW¼NE¼ sec.12, T.106 N., R.40 W., Hydrologic Unit 07100012, 5.5 mi (8.8 km) southwest of Dovray.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 12.5 ft (3.8 m), screened 10.5 to 12.5 ft (3.2 to 3.8 m).

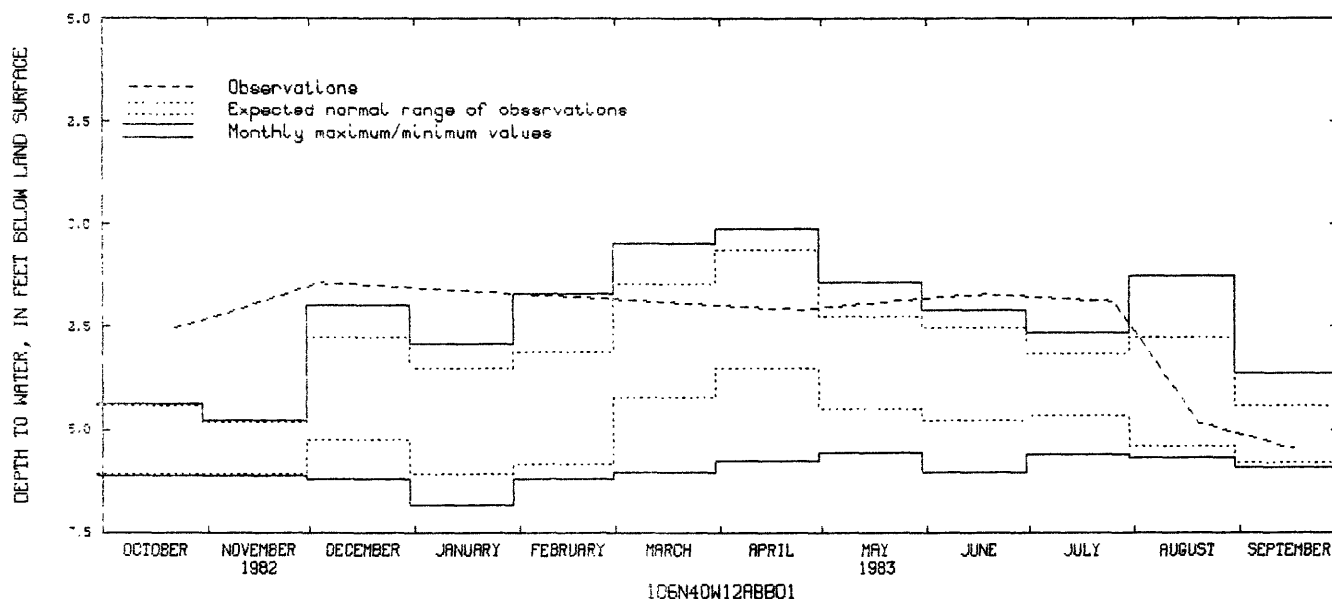
DATUM.--Altitude of land-surface datum is 1,450 ft (442 m). Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

PERIOD OF RECORD.--December 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.09 ft (0.03 m) below land-surface datum, Apr. 21, 1979; lowest, 6.85 ft (2.09 m) below land-surface datum, Jan. 28, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	2.53	DEC 4	1.42	MAY 24	1.85	JUL 26	1.87	AUG 20	4.85	SEP 17	5.47
NOV 2	2.28	APR 25	2.08	JUN 18	1.70						



444254095071201. Local number, 108N41W36BBC01.

LOCATION.--Lat 44°42'54", long 95°07'12", in SW¼NW¼NW¼ sec.36, T.108 N., R.41 W., Hydrologic Unit 07100001, near Lake Shetek.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 7 ft (2.1 m), screened 5 to 7 ft (1.5 to 2.1 m).

DATUM.--Altitude of land-surface datum is 1,490 ft (454 m). Measuring point: Top of casing, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.51 ft (0.46 m) above land-surface datum, Mar. 24, 1979; lowest, 6.09 ft (1.86 m) below land-surface datum, Sept. 30, 1981.

## WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	+0.19	NOV 2	0.03	JUL 26	+0.86	AUG 20	2.59	SEP 17	2.20

## GROUND-WATER LEVELS

## OLMSTED COUNTY

435920092273801. Local number, 106N14W14ADB01.

LOCATION.--Lat 43°59'20", long 92°27'38", in NW¼SE¼NE¼ sec.14, T.106 N., R.14 W., Hydrologic Unit 07040004, in Rochester.

Owner: Golden Hill School Dist. #1371.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 478 ft (146 m), cased to 397 ft (121 m).

DATUM.--Altitude of land-surface datum is 1,065 ft (325 m). Measuring point: Edge of well cap, 1.80 ft (0.55 m) above land-surface datum.

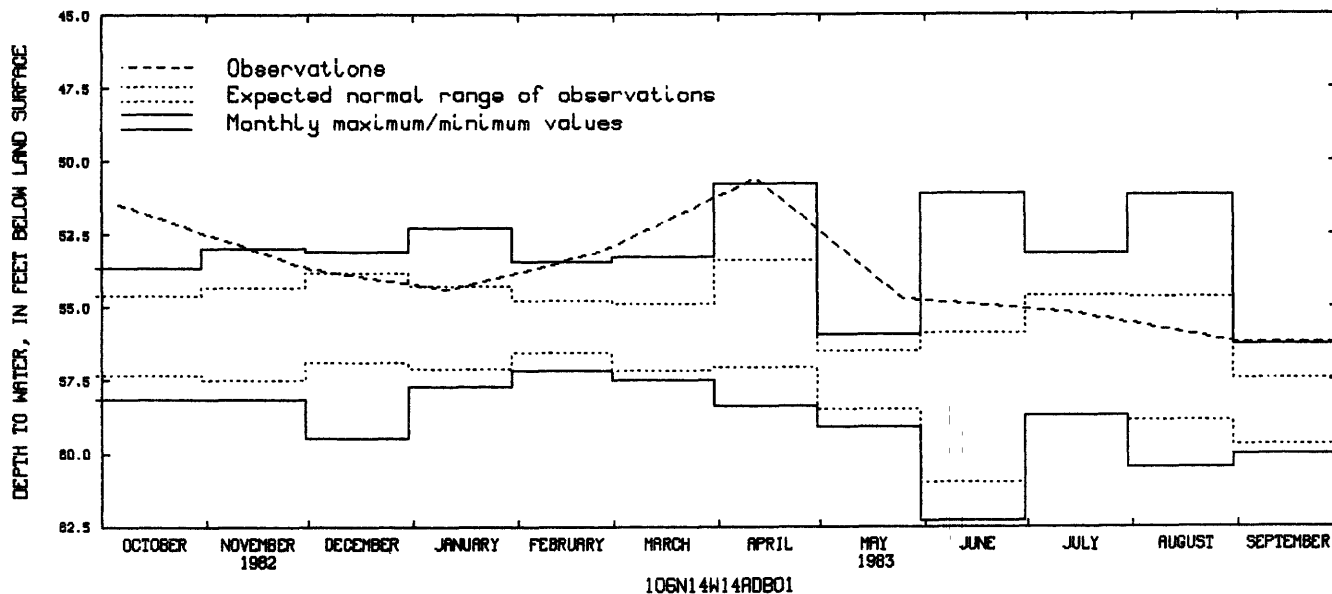
REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--August 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 50.58 ft (15.42 m) below land-surface datum, Apr. 12, 1983; lowest, 62.30 ft (18.99 m) below land-surface datum, June 8, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	51.46	JAN 12	54.38	APR 12	50.58	MAY 25	54.68	JUL 13	55.15	AUG 31	56.18
DEC 2	53.69	FEB 25	53.09								



## GROUND-WATER LEVELS

## OTTER TAIL COUNTY

460838095150000. Local number, 131N36W20BCC01.

LOCATION.--Lat 46°08'38", long 95°15'00", in SW¼SW¼NW¼ sec.20, T.131 N., R.36 W., Hydrologic Unit 07010107, 4.4 mi (7.1 km) east of Parkers Prairie.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 27 ft (8.2 m), screened 25 to 27 ft (7.6 to 8.2 m).

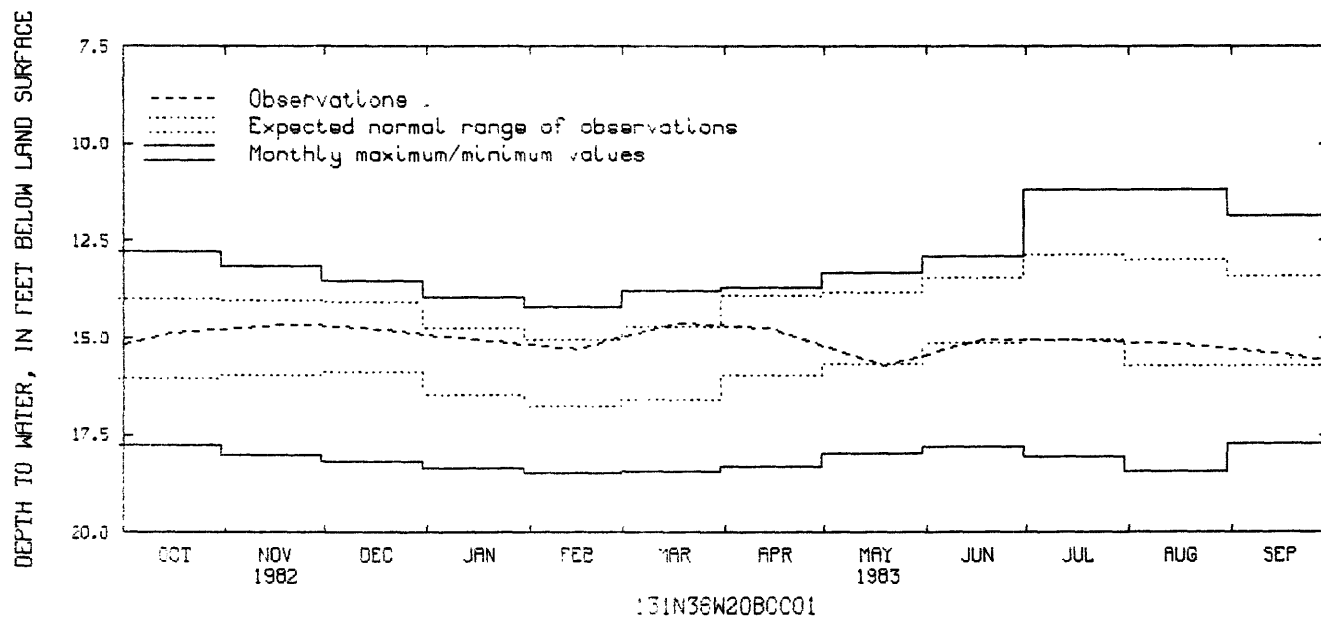
DATUM.--Altitude of land-surface datum is 1,442 ft (440 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--June 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 11.17 ft (3.40 m) below land-surface datum, July 30, 1972; lowest, 18.49 ft (5.64 m) below land-surface datum, Feb. 16, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	14.87	DEC 14	14.75	FEB 15	15.28	APR 15	14.76	JUN 16	15.06	AUG 17	15.16
NOV 23	14.64	JAN 14	15.03	MAR 17	14.61	MAY 19	15.72	JUL 19	15.05	SEP 16	15.40



## GROUND-WATER LEVELS

## OTTER TAIL COUNTY--Continued

461850095191401. Local number, 133N37W23CCB01.

LOCATION.--Lat 46°18'50", long 95°19'14", in NW¼SW¼SW¼ sec.23, T.133 N., R.37 W., Hydrologic Unit 07010107, 5.3 mi (8.5 km) south of Deer Creek.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 20 ft (6.1 m), screened 18 to 20 ft (5.5 to 6.1 m).

DATUM.--Altitude of land-surface datum is 1,445 ft (440 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--August 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.68 ft (2.04 m) below land-surface datum, Sept. 4, 1972; lowest, 13.27 ft (4.04 m) below land-surface datum, Feb. 16, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	9.62	DEC 14	9.43	FEB 15	9.95	APR 15	9.49	JUN 16	9.54	AUG 17	9.82
NOV 23	9.46	JAN 14	8.76	MAR 17	9.44	MAY 19	9.40	JUL 19	9.84	SEP 16	10.10

462024095352301. Local number, 133N39W10CCD01.

LOCATION.--Lat 46°20'24", long 95°35'23", in SE¼SW¼SW¼ sec.10, T.133 N., R.39 W., Hydrologic Unit 07010107, northwest of Vining.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 42 ft (12.8 m), screened 39 to 42 ft (11.9 to 12.8 m).

DATUM.--Land-surface datum is 1,330.5 ft (405.5 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--March 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.60 ft (2.01 m) below land-surface datum, Nov. 30, 1972; lowest, 10.25 ft (3.12 m) below land-surface datum, Feb. 14, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	7.88	DEC 13	7.30	FEB 14	7.20	APR 14	7.23	JUN 15	7.53	AUG 16	8.12
NOV 19	7.51	JAN 13	7.08	MAR 14	7.30	MAY 17	7.38	JUL 14	7.83	SEP 19	9.25

## PINE COUNTY

455737092390001. Local number, 040N18W18DBC01.

LOCATION.--Lat 45°57'37", long 92°39'00", in SW¼NW¼SE¼ sec.18, T.40 N., R.18 W., Hydrologic Unit 07030001, 4.2 mi (6.8 km) southwest of Cloverdale.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 34.5 ft (10.5 m), screened 31 to 34.5 ft (9.4 to 10.5 m).

DATUM.--Altitude of land-surface datum is 890 ft (271 m). Measuring point: Top of casing, 3.45 ft (1.05 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 28.20 ft (8.60 m) below land-surface datum, Sept. 18, 1983; lowest, 31.98 ft (9.75 m) below land-surface datum, Apr. 28, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	30.19	DEC 22	29.35	APR 19	28.72	JUN 18	28.39	AUG 13	28.25	SEP 18	28.20
NOV 30	29.64	JAN 20	28.95	MAY 15	28.60	JUL 16	28.42				



## GROUND-WATER LEVELS

## PINE COUNTY--Continued

455939092365801. Local number, 041N18W33AAD01.

LOCATION.--Lat 45°59'39", long 92°36'58", in SE¼NE¼NE¼ sec.33, T.41 N., R.18 W., Hydrologic Unit 07030001, in St. Croix State Park.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 24 ft (7.3 m), screened 22 to 24 ft (6.7 to 7.3 m).

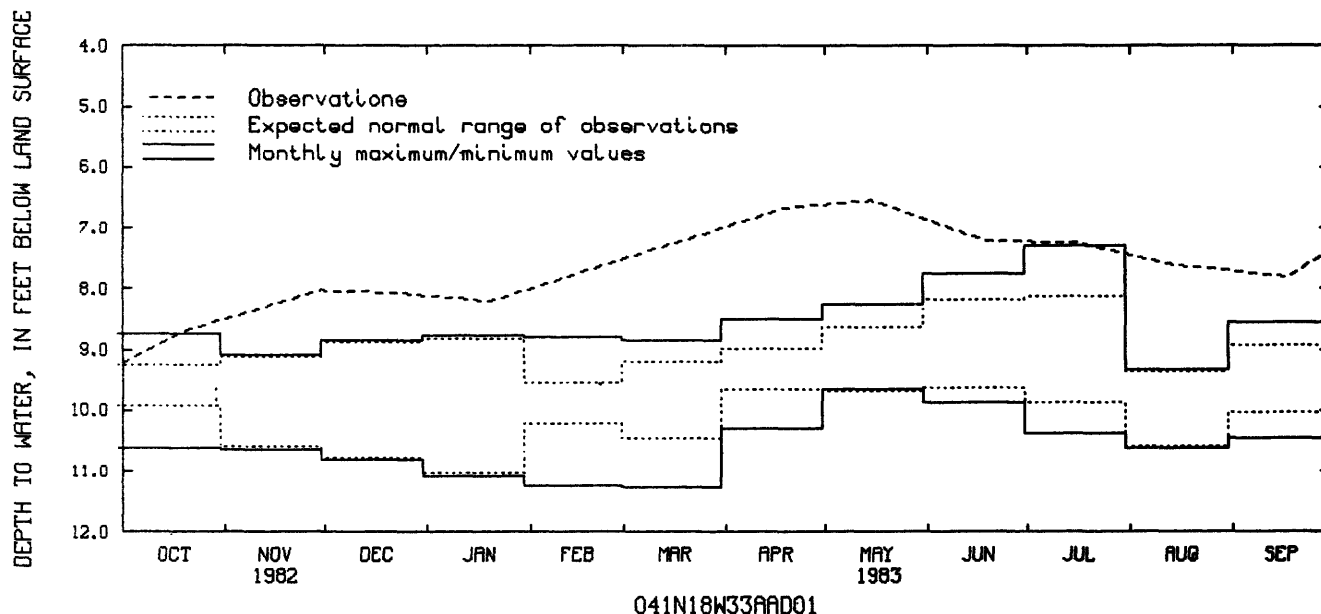
DATUM.--Altitude of land-surface datum is 975 ft (297 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.55 ft (2.00 m) below land-surface datum, May 15, 1983; lowest, 11.27 ft (3.44 m) below land-surface datum, Mar. 20, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	8.70	DEC 22	8.07	APR 19	6.67	JUN 18	7.20	AUG 13	7.60	SEP 18	7.81
NOV 30	8.03	JAN 20	8.21	MAY 15	6.55	JUL 16	7.25				



455947092542301. Local number, 041N20W32BBB01.

LOCATION.--Lat 45°59'47", long 92°54'23", in NW¼NW¼NW¼ sec.32, T.41 N., R.20 W., Hydrologic Unit 07030004, on Howard Sikkink farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 44 ft (13.4 m), screened 42 to 44 ft (12.8 to 13.4 m).

DATUM.--Altitude of land-surface datum is 1,014 ft (309 m). Measuring point: Top of casing, 2.30 ft (0.70 m) above land-surface datum.

PERIOD OF RECORD.--December 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 17.49 ft (5.33 m) below land-surface datum, July 31, 1979; lowest, 20.82 ft (6.35 m) below land-surface datum, Mar. 29, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	19.94	DEC 22	19.21	APR 19	18.36	JUN 18	17.98	AUG 13	17.70	SEP 18	17.73
NOV 30	19.68	JAN 20	19.45	MAY 15	18.05	JUL 16	17.75				

## GROUND-WATER LEVELS

## PINE COUNTY--Continued

461809092481301. Local number, 044N20W13AAA01.

LOCATION.--Lat 46°18'09", long 92°48'13", in NE¼NE¼NE¼ sec. 13, T.44 N., R. 20 W., Hydrologic Unit 07030003, 1.0 mi (1.6 km) southeast of Willow River.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 29 ft (8.8 m), screened 27 to 29 ft (8.2 to 8.8 m).

DATUM.--Altitude of land-surface datum is 1,070 ft (326 m). Measuring point: Top of casing, 4.60 ft (1.40 m) above land-surface datum.

PERIOD OF RECORD.--August 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 8.77 ft (2.67 m) below land-surface datum, Aug. 13, Sept. 18, 1983; lowest, 11.98 ft (3.65 m) below land-surface datum, Mar. 18, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	11.01	DEC 22	9.17	APR 19	10.08	JUN 18	9.23	AUG 13	8.77	SEP 18	8.77
NOV 30	9.01	JAN 20	9.44	MAY 15	8.98	JUL 16	8.90				

462112092495801. Local number, 045N20W26DBB01.

LOCATION.--Lat 46°21'12", long 92°49'58", in NW¼NW¼SE¼ sec. 26, T.45 N., R. 20 W., Hydrologic Unit 07030003, at General Andrews Nursery.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Driven observation water-table well, diameter 1½ in (0.03 m), depth 28 ft (8.5 m), screened 26 to 28 ft (7.9 to 8.5 m).

DATUM.--Altitude of land-surface datum is 1,060 ft (323 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

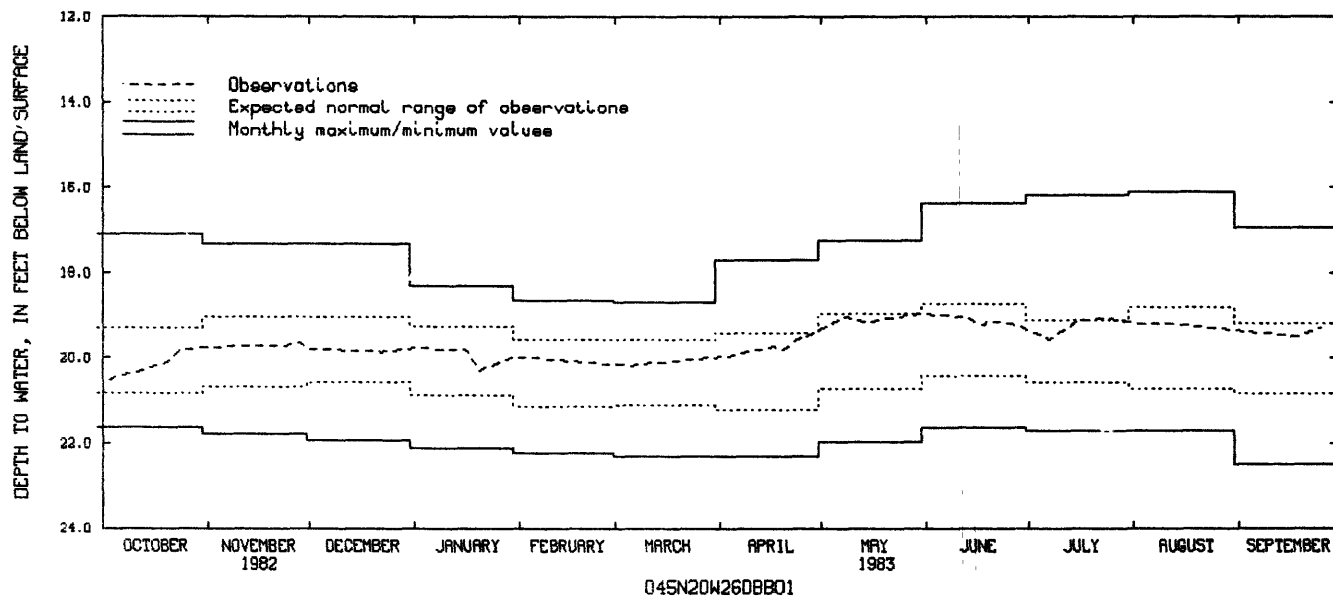
REMARKS.--Measured weekly by Ralph Nelson.

PERIOD OF RECORD.--August 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 16.10 ft (4.91 m) below land-surface datum, Aug. 12, 1974; lowest, 22.49 ft (6.85 m) below land-surface datum, Sept. 26, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	20.50	DEC 22	19.85	FEB 6	19.99	APR 17	19.72	JUN 4	18.98	JUL 16	19.10
20	20.11	JAN 2	19.76	13	20.03	19	19.80	12	19.04	24	19.07
24	19.80	9	19.78	20	20.10	24	19.57	18	19.23	31	19.16
NOV 14	19.70	16	19.78	MAR 6	20.16	MAY 8	19.04	19	19.12	AUG 13	19.20
21	19.73	20	20.29	APR 3	19.94	15	19.15	26	19.18	SEP 18	19.49
28	19.64	30	19.96	10	19.83	30	18.95	JUL 7	19.56	25	19.30
30	19.77										



## GROUND-WATER LEVELS

## PIPESTONE COUNTY

435610096082601. Local number, 106N44W33CCD01.

LOCATION.--Lat 43°56'10", long 96°08'26", in SE¼SW¼SW¼ sec.33, T.106 N., R.44 W., Hydrologic Unit 10170204, 4 mi (6.4 km) north of Edgerton.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 16 ft (4.9 m), screened 14 to 16 ft (4.3 to 4.9 m).

DATUM.--Altitude of land-surface datum is 1,610 ft (491 m). Measuring point: Top of casing 2.40 ft (0.73 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.78 ft (0.54 m) below land-surface datum, Apr. 19, 1979; lowest, 9.83 ft (3.00 m) below land-surface datum, Sept. 27, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 25	4.62	DEC 11	4.65	FEB 12	5.30	APR 22	1.92	JUN 13	4.62	AUG 11	5.59
NOV 11	4.67	JAN 8	4.55	MAR 10	2.59	MAY 20	3.45	JUL 21	4.78	SEP 27	9.83

440456096263201. Local number, 107N47W12CDC01.

LOCATION.--Lat 44°04'56", long 96°26'32", in SW¼SE¼SW¼ sec.12, T.107 N., R.47 W., Hydrologic Unit 10170203, 4.2 mi (6.8 km) northwest of Cazenovia.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 16 ft (4.9 m), screened 14 to 16 ft (4.3 to 4.9 m).

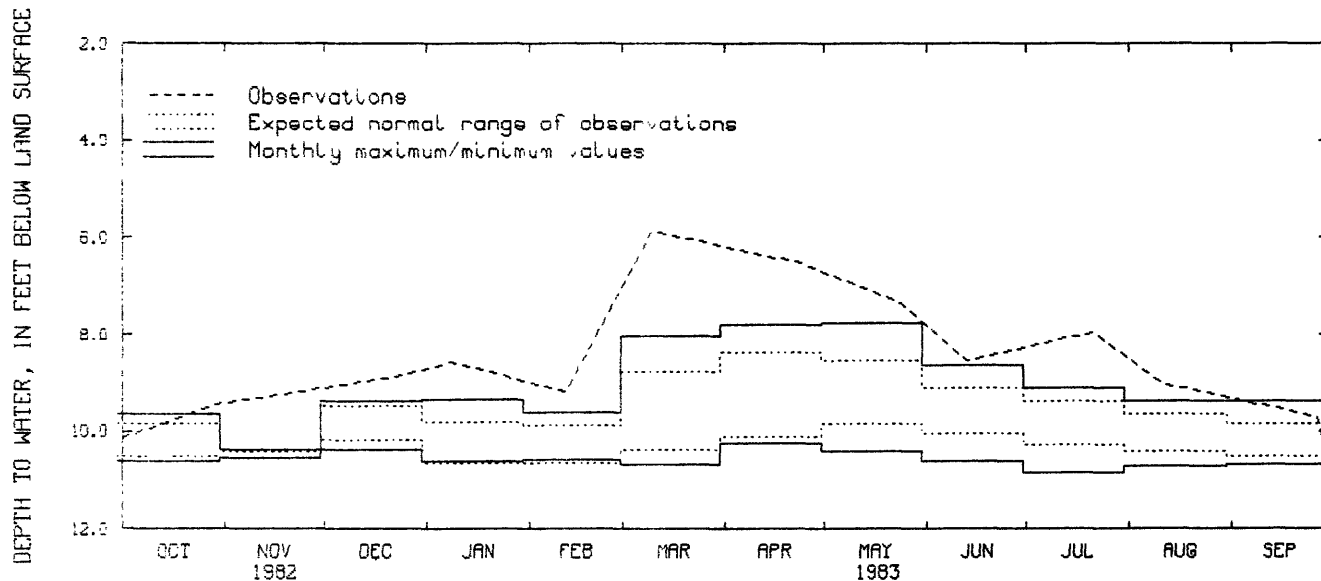
DATUM.--Altitude of land-surface datum is 1,600 ft (488 m). Measuring point: Top of casing, 3.90 ft (1.19 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.85 ft (1.78 m) below land-surface datum, Mar. 10, 1983; lowest, 10.85 ft (3.31 m) below land-surface datum, July 18, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	9.43	JAN 8	8.58	MAR 10	5.85	MAY 24	7.35	JUL 21	7.95	SEP 27	9.70
DEC 20	8.90	FEB 12	9.17	APR 25	6.54	JUN 13	8.54	AUG 11	9.01		



107N47W12CDC01

## GROUND-WATER LEVELS

## POPE COUNTY

452940095414501. Local number, 123N40W04BDA01.

LOCATION.--Lat 45°29'40", long 95°41'45", in NE¼SE¼NW¼ sec.4, T.123 N., R.40 W., Hydrologic Unit 07020005, east of Hancock.

Owner: U.S. Geological Survey.

AQUIFER.--Shallow buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation artesian well, diameter 1½ in (0.03 m), depth 20 ft (6.1 m), screened 17 to 20 ft (5.2 to 6.1 m).

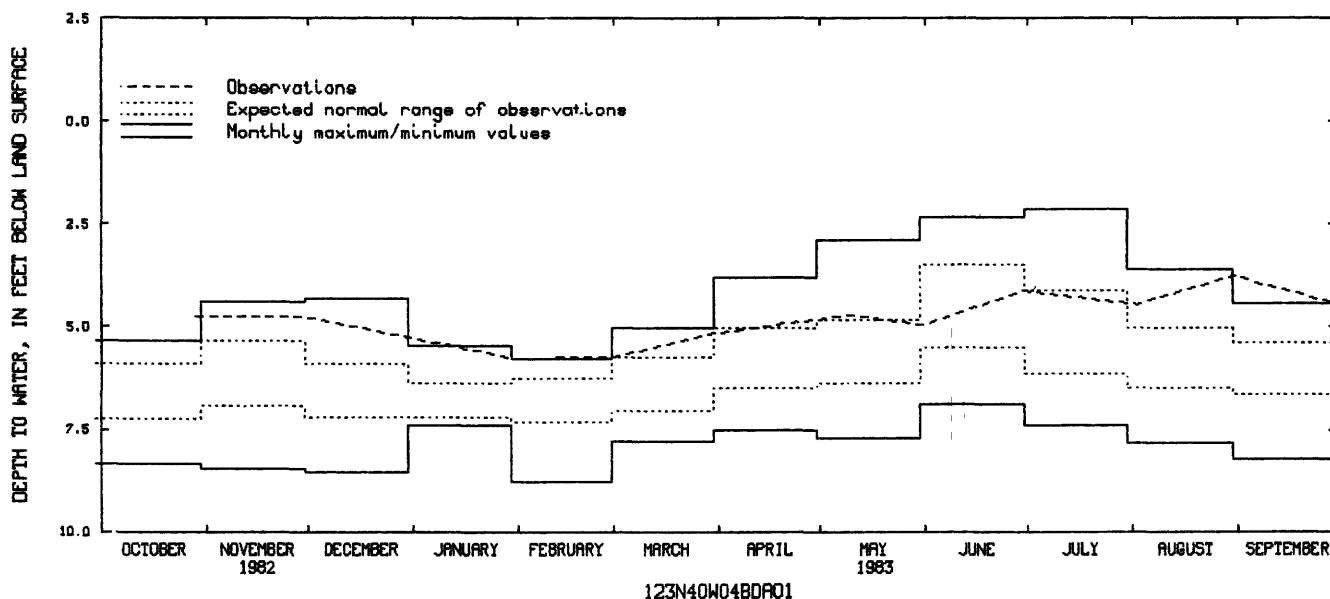
DATUM.--Altitude of land-surface datum is 1,080 ft (329 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--December 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.13 ft (0.65 m) below land-surface datum, July 27, 1972; lowest, 8.77 ft (2.67 m) below land-surface datum, Feb. 2, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	4.74	DEC 30	5.24	FEB 28	5.75	MAY 10	4.70	JUN 30	4.12	AUG 31	3.75
NOV 30	4.75	JAN 31	5.76	MAR 31	5.15	31	4.95	AUG 2	4.45	SEP 30	4.43



453150095130001. Local number, 124N36W20DDD01.

LOCATION.--Lat 45°31'50", long 95°13'00", in SE¼SE¼SE¼ sec.20, T.124 N., R.36 W., Hydrologic Unit 07010204, southeast of Sedan.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 18 ft (5.5 m), screened 15 to 18 ft (4.6 to 5.5 m).

DATUM.--Altitude of land-surface datum is 1,332 ft (406 m). Measuring point: Top of casing, 3.75 ft (1.14 m) above land-surface datum.

PERIOD OF RECORD.--November 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.42 ft (1.65 m) below land-surface datum, June 27, 1972; lowest, 10.33 ft (3.15 m) below land-surface datum, Feb. 22, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	7.99	DEC 30	8.25	FEB 28	8.42	MAY 10	7.80	JUN 30	7.45	AUG 31	7.92
NOV 30	7.99	JAN 31	8.51	MAR 31	8.01	31	7.97	AUG 2	7.44	SEP 30	8.03

## GROUND-WATER LEVELS

## POPE COUNTY--Continued

453250095434501. Local number, 124N40W18DAD01.

LOCATION.--Lat 45°32'50", long 95°43'45", in SE¼NE¼SE¼ sec.18, T.124 N., R.40 W., Hydrologic Unit 07020005, south of Cyrus.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 23 ft (7.0 m), screened 20 to 23 ft (6.1 to 7.0 m).

DATUM.--Altitude of land-surface datum is 1,097 ft (334 m). Measuring point: Top of casing, 5.60 ft (1.71 m) above land-surface datum.

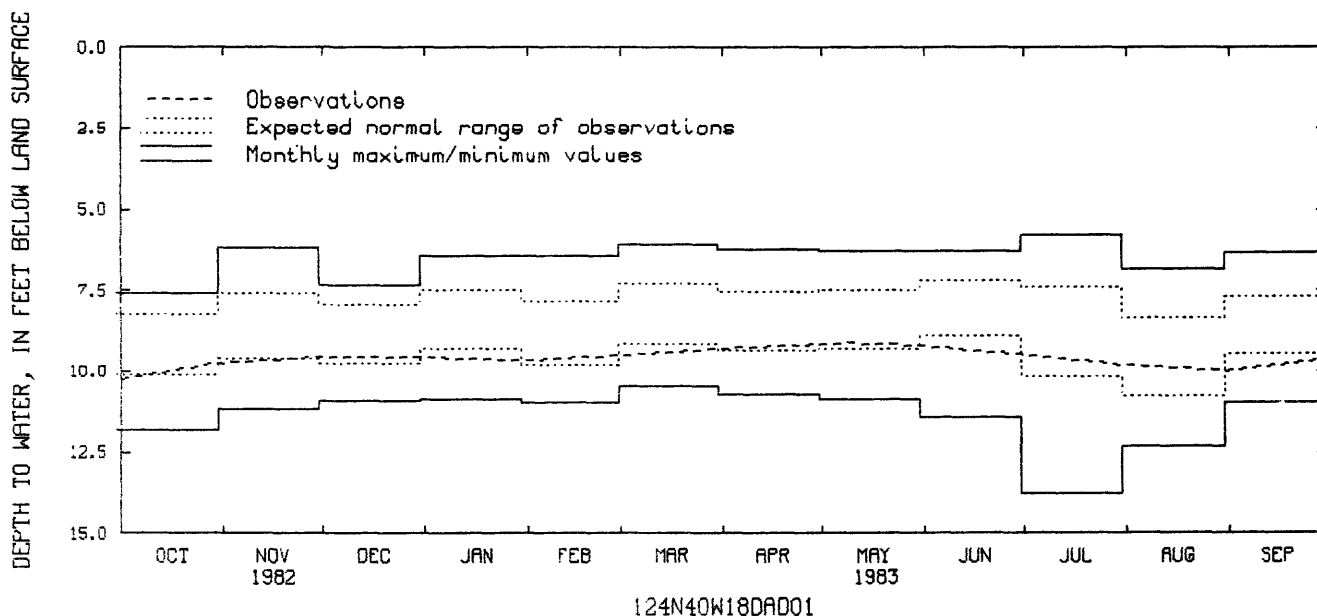
REMARKS.--Water level affected by pumping from nearby irrigation well.

PERIOD OF RECORD.--December 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.78 ft (1.76 m) below land-surface datum, July 27, 1972; lowest, 13.80 ft (4.21 m) below land-surface datum, July 27, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	9.76	DEC 30	9.55	FEB 28	9.51	MAY 10	9.11	JUN 30	9.47	AUG 31	9.98
NOV 30	9.55	JAN 31	9.65	MAR 31	9.29	31	9.20	AUG 2	9.81	SEP 30	9.63



453810095174501. Local number, 125N37W14DBB01.

LOCATION.--Lat 45°38'10", long 95°17'45", in NW¼NW¼SE¼ sec.14, T.125 N., R.37 W., Hydrologic Unit 07020005, 4 mi (6.4 km) east of Glenwood.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 64 ft (19.5 m), screened 62 to 64 ft (18.9 to 19.5 m).

DATUM.--Altitude of land-surface datum is 1,368 ft (417 m). Measuring point: Top of platform, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--August 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 35.10 ft (10.70 m) below land-surface datum, Feb. 9, 1973; lowest, 37.89 ft (11.55 m) below land-surface datum, Feb. 14, 1968.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	36.60	DEC 30	36.52	MAR 31	36.52	MAY 31	36.76	AUG 2	36.85	SEP 30	36.80
NOV 30	36.45	JAN 31	36.64	MAY 10	36.64	JUN 30	36.84	31	36.87		

## GROUND-WATER LEVELS

## POPE COUNTY--Continued

454230095143001. Local number, 126N36W20BCC01.

LOCATION.--Lat 45°42'30", long 95°14'30", in SW¼SW¼NW¼ sec.20, T.126 N., R.36 W., Hydrologic Unit 07010202, east of Villard.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 17 ft (5.2 m), screened 14 to 17 ft (4.3 to 5.2 m).

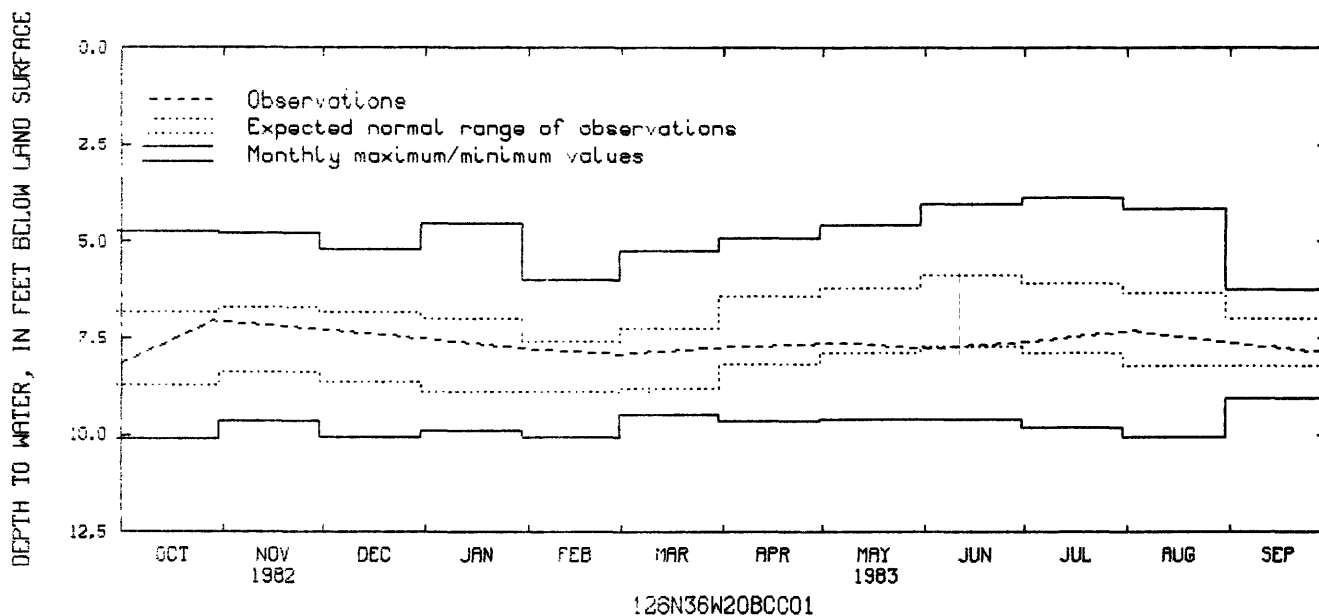
DATUM.--Altitude of land-surface datum is 1,354 ft (413 m). Measuring point: Top of platform, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--November 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.84 ft (1.17 m) below land-surface datum, July 27, 1972; lowest, 10.10 ft (3.08 m) below land-surface datum, Oct 4, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	7.05	DEC 30	7.49	FEB 28	7.91	MAY 10	7.61	JUN 30	7.60	AUG 31	7.61
NOV 30	7.27	JAN 31	7.76	MAR 31	7.73	MAY 31	7.77	AUG 2	7.30	SEP 30	7.86



## GROUND-WATER LEVELS

## RAMSEY COUNTY

445648093053402. Local number, 028N22W06ABD02.

LOCATION.--Lat 44°56'48", long 93°05'34", in SE¼NW¼NE¼ sec.6, T.28 N., R.22 W., Hydrologic Unit 07010206, at 55 East 5th Street, St. Paul.

Owner: Northwestern National Bank.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled air-conditioning artesian well, diameter 16 in (0.41 m), depth 355 ft (108 m), cased to 212 ft (64.6 m).

DATUM.--Altitude of land-surface datum is 770 ft (235 m). Measuring point: Edge of vent pipe, 7.50 ft (2.29 m) below land-surface datum.

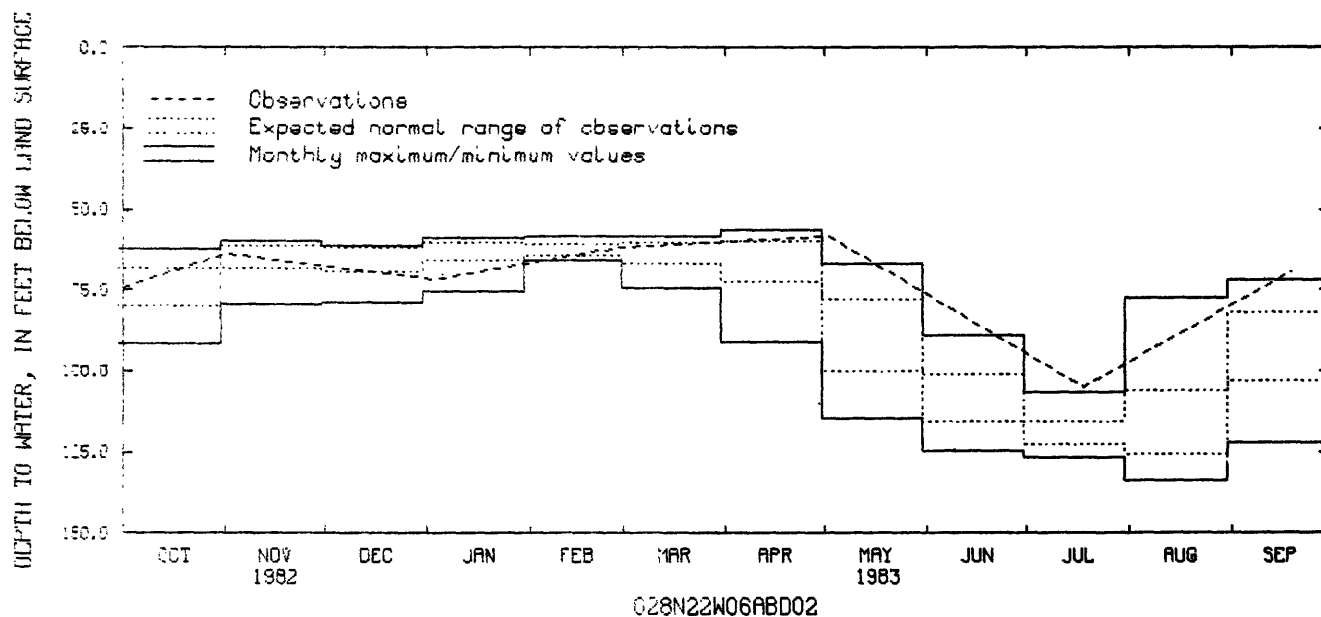
REMARKS.--Water level affected by pumping of nearby wells.

PERIOD OF RECORD.--May 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 56.00 ft (17.07 m) below land-surface datum, Apr. 5, 1979; lowest, 134.0 ft (40.84 m) below land-surface datum, Aug. 16, 1972.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	63.80	JAN 3	71.70	FEB 28	61.80	MAY 2	58.15	JUL 18	105.0	SEP 19	69.30



445632093084901. Local number, 028N23W03ADD01.

LOCATION.--Lat 44°56'32", long 93°08'49", in SE¼SE¼NE¼ sec.3, T.28 N., R.23 W., Hydrologic Unit 07010206, at northwest corner of Lexington and Summit Avenues, St. Paul.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 96 ft (29.3 m), screened 94 to 96 ft (28.6 to 29.3 m).

DATUM.--Altitude of land-surface datum is 920 ft (280 m). Measuring point: Top of casing, 4.00 ft (1.22 m) above land-surface datum.

PERIOD OF RECORD.--August 1975 to current year.

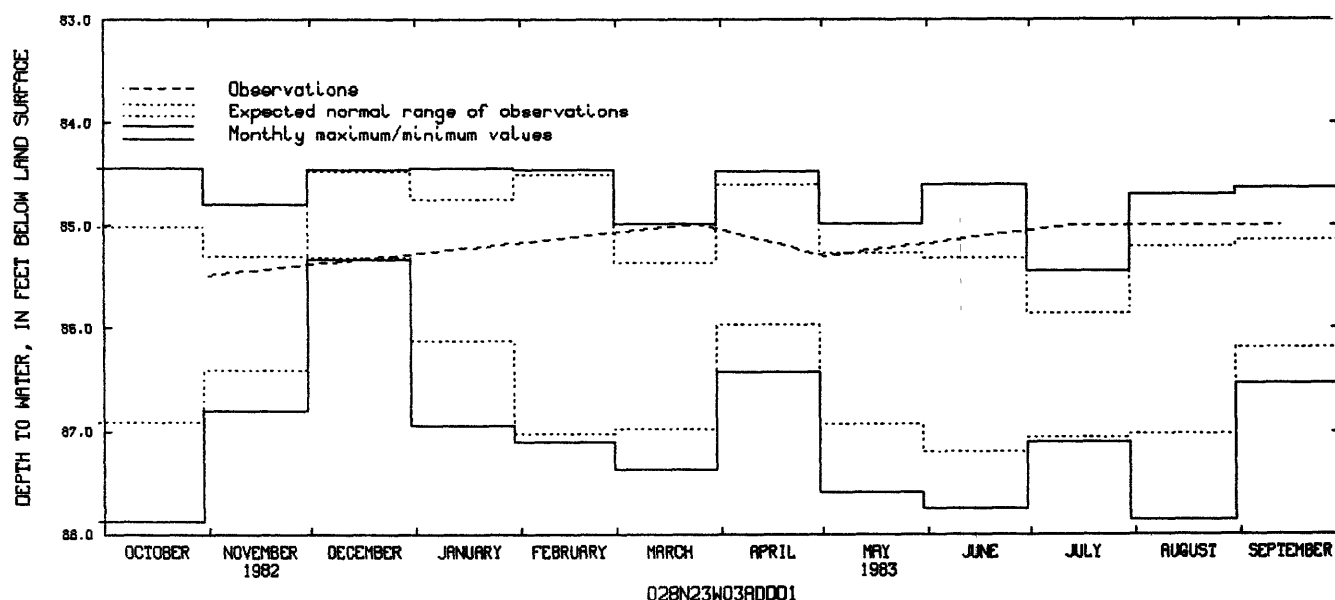
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 84.44 ft (25.74 m) below land-surface datum, Oct. 26, 1979; Jan. 22, 1980; lowest, 87.88 ft (26.79 m) below land-surface datum, Oct. 25, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	85.48	MAR 25	84.98	MAY 2	85.29	JUL 11	85.00	SEP 13	85.00

## GROUND-WATER LEVELS

## RAMSEY COUNTY--Continued



445955093011001. Local number, 029N22W14CAB01.

LOCATION.--Lat 44°59'55", long 93°01'10", in NW¼NE¼SW¼ sec.14, T.29 N., R.22 W., Hydrologic Unit 07010206, at Goodrich Golf Course.

Owner: Ramsey County.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 523 ft (159 m), cased to 303 ft (92.4 m).

DATUM.--Altitude of land-surface datum is 969 ft (295 m). Measuring point: Edge of vent pipe, 2.50 ft (0.76 m) above land-surface datum.

PERIOD OF RECORD.--May 1965, April 1966 to August 1966, August 1971, May 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 127.5 ft (38.86 m) below land-surface datum, Jan. 13, 1982; lowest, 140.6 ft (42.85 m) below land-surface datum, Apr. 6, 1966.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 9	130.4	JUL 18	130.2	SEP 19	134.4

445955093011002. Local number, 029N22W14CAB02.

LOCATION.--Lat 44°59'55", long 93°01'10", in NW¼NE¼SW¼ sec.14, T.29 N., R.22 W., Hydrologic Unit 07010206, at Goodrich Golf Course.

Owner: U.S. Geological Survey.

AQUIFER.--Buried gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation artesian well, diameter 2 in (0.05 m), depth 81 ft (24.7 m), screened 78 to 81 ft (23.8 to 24.7 m).

DATUM.--Altitude of land-surface datum is 970 ft (296 m). Measuring point: Top of casing, 1.30 ft (0.40 m) above land-surface datum.

PERIOD OF RECORD.--October 1966 to August 1971, August 1977, June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 33.58 ft (10.24 m) below land-surface datum, July 18, 1983; lowest, 45.36 ft (13.83 m) below land-surface datum, June 3, 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 9	37.02	MAR 10	36.90	MAY 13	34.40	JUL 18	33.58	SEP 13	33.64



## RAMSEY COUNTY--Continued

445955093011003. Local number, 029N22W14CAB03.

LOCATION.--Lat 44°59'55", long 93°01'10", in NW¼NE¼SW¼ sec.14, T.29 N., R.22 W., Hydrologic Unit 07010206, at Goodrich Golf Course.

Owner: U.S. Geological Survey.

AQUIFER.--Buried gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 52 ft (15.8 m), screened 49 to 52 ft (14.9 to 15.8 m).

DATUM.--Altitude of land-surface datum is 970 ft (296 m). Measuring point: Top of casing, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--October 1966 to August 1971, June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 13.17 ft (4.01 m) below land-surface datum, July 18, 1983; lowest, 25.43 ft (7.75 m) below land-surface datum, June 3, 1968.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 9	18.62	MAR 10	17.84	MAY 13	14.90	JUL 18	13.17	SEP 13	13.30

450001093024701. Local number, 029N22W16ADD01.

LOCATION.--Lat 45°00'01", long 93°02'47", in SE¼SE¼NE¼ sec.16, T.29 N., R.22 W., Hydrologic Unit 07010206, at 1955 English St.

Owner: Maplewood Bowl.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), depth 163 ft (49.7 m), screened 158 to 163 ft (48.2 to 49.7 m).

DATUM.--Altitude of land-surface datum is 900 ft (274 m). Measuring point: Top of well cap, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--January 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 70.70 ft (21.55 m) below land-surface datum, Jan. 12, 1981; lowest, 73.18 ft (22.31 m) below land-surface datum, Jan. 14, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 9	73.02	JAN 14	73.18	MAR 1	72.18	MAY 13	71.59	JUL 18	71.20	SEP 9	71.23

445918092590901. Local number, 029N22W24ADA01.

LOCATION.--Lat 44°59'18", long 92°59'09", in NE¼SE¼NE¼ sec.24, T.29 N., R.22 W., Hydrologic Unit 07010206, at 1555 Century Avenue.

Owner: Northern States Power Co., Maplewood Gas Plant.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled fire protection artesian well, diameter 12 in (0.30 m), depth 523 ft (159 m), cased to 420 ft (128 m).

DATUM.--Land-surface datum is 996.5 ft (303.7 m) National Geodetic Vertical Datum of 1929. Measuring point: Edge of 2 in (0.05 m) breather pipe, 2.40 ft (0.73 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--August 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 134.7 ft (41.10 m) below land-surface datum, Nov. 15, 1976; lowest, 151.0 ft (46.02 m) below land-surface datum, May 14, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 9	137.2	JAN 14	138.1	MAR 9	136.6	MAY 4	137.4	JUL 19	137.8	SEP 19	136.4

## GROUND-WATER LEVELS

## RAMSEY COUNTY--Continued

445700093051001. Local number, 029N22W31DDD01.

LOCATION.--Lat 44°05'00", long 93°05'10", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec.31, T.29 N., R.22 W., Hydrologic Unit 07010206, at 261 East 5th Street, St. Paul.

Owner: Control Data Corp.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 298 ft (91 m), cased to 151 ft (46.0 m).

DATUM.--Altitude of land-surface datum is 750 ft (229 m). Measuring point: Top of recorder platform, 9.00 ft (2.74 m) below land-surface datum.

REMARKS.--Water level affected by pumping of nearby wells.

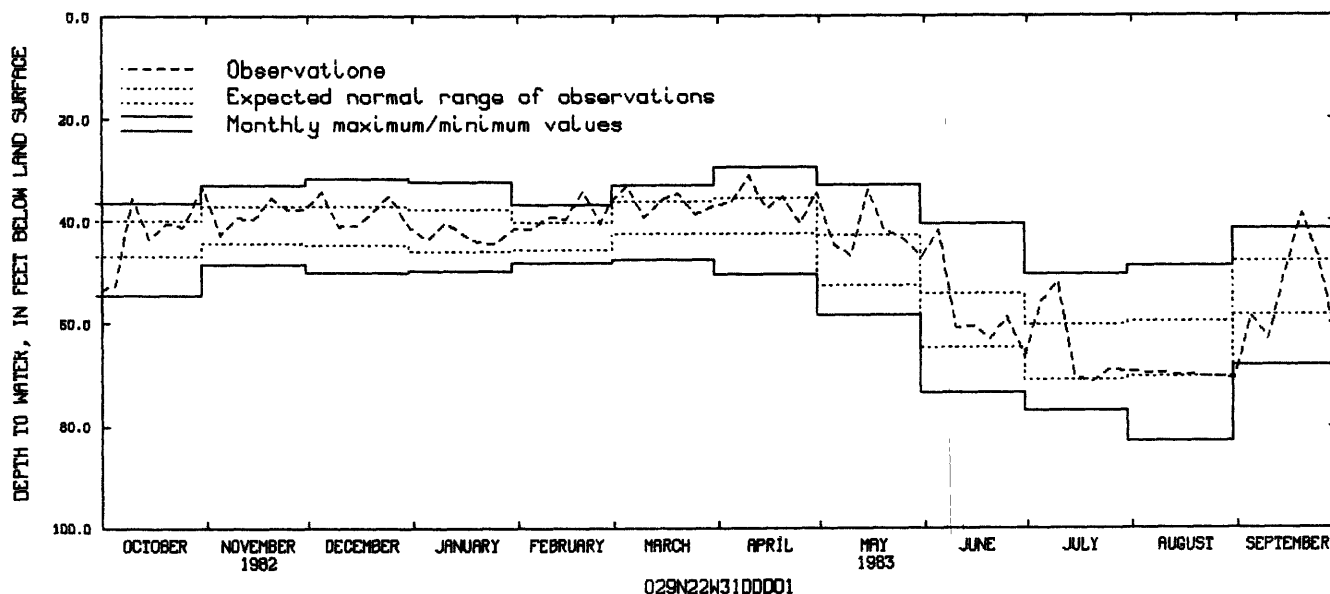
PERIOD OF RECORD.--December 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 28.79 ft (8.78 m) below land-surface datum, Apr. 24, 1983; lowest, 83.06 ft (25.32 m) below land-surface datum, Aug. 16, 1972.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	52.49	42.79	34.23	43.69	41.47	32.98	36.18	44.71	41.82	55.77	.....	58.49
10	35.48	39.38	41.02	40.31	39.09	39.21	31.07	46.87	60.83	51.94	.....	63.00
15	43.47	39.51	40.89	42.18	39.49	35.77	37.52	33.76	60.37	70.34	.....	49.58
20	40.45	35.56	38.22	43.99	34.09	34.47	35.18	41.74	63.08	71.46	.....	38.58
25	41.05	37.58	35.03	44.36	40.39	38.59	40.52	43.28	58.61	69.12	.....	47.58
EOM	33.30	37.63	41.36	41.33	36.13	36.94	34.35	46.91	66.12	.....	70.56	64.16

WTR YEAR 1983      HIGHEST 28.79 APR 24, 1983      LOWEST 73.88 SEP 2, 1983



450026093084201. Local number, 029N23W11CCC01.

LOCATION.--Lat 45°00'26", long 93°08'42", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec.11, T.29 N., R.23 W., Hydrologic Unit 07010206, at 2204 North Lexington Avenue, Roseville.

Owner: Lexington Court Apartments.

AQUIFER.--St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 325 ft (99.1 m), cased to 192 ft (58.5 m).

DATUM.--Altitude of land-surface datum is 945 ft (288 m). Measuring point: Top of well cap, 1.40 ft (0.43 m) above land-surface datum.

PERIOD OF RECORD.--January 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 107.5 ft (32.77 m) below land-surface datum, Mar. 4, 1974; lowest, 111.2 ft (33.89 m) below land-surface datum, Aug. 18, 1975.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	110.4	JAN 13	110.2	MAR 1	110.2	MAY 13	110.0	JUL 13	110.7	SEP 9	110.7

## RAMSEY COUNTY--Continued

445751093072301. Local number, 029N23W25CCD01.

LOCATION.--Lat 44°57'51", long 93°07'23", SE¼SW¼SW¼ sec.25, T.29 N., R.23 W., Hydrologic Unit 07010206, at 760 North Dale Street, St. Paul.

Owner: Burlington Northern, Inc., Dale Street Shops.

AQUIFER.--Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in (0.20 m), depth 999 ft (304 m), cased to 955 ft (291 m).

DATUM.--Land-surface datum is 859.5 ft (262.0 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder floor, 4.60 ft (1.40 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--December 1970, November 1976 to current year.

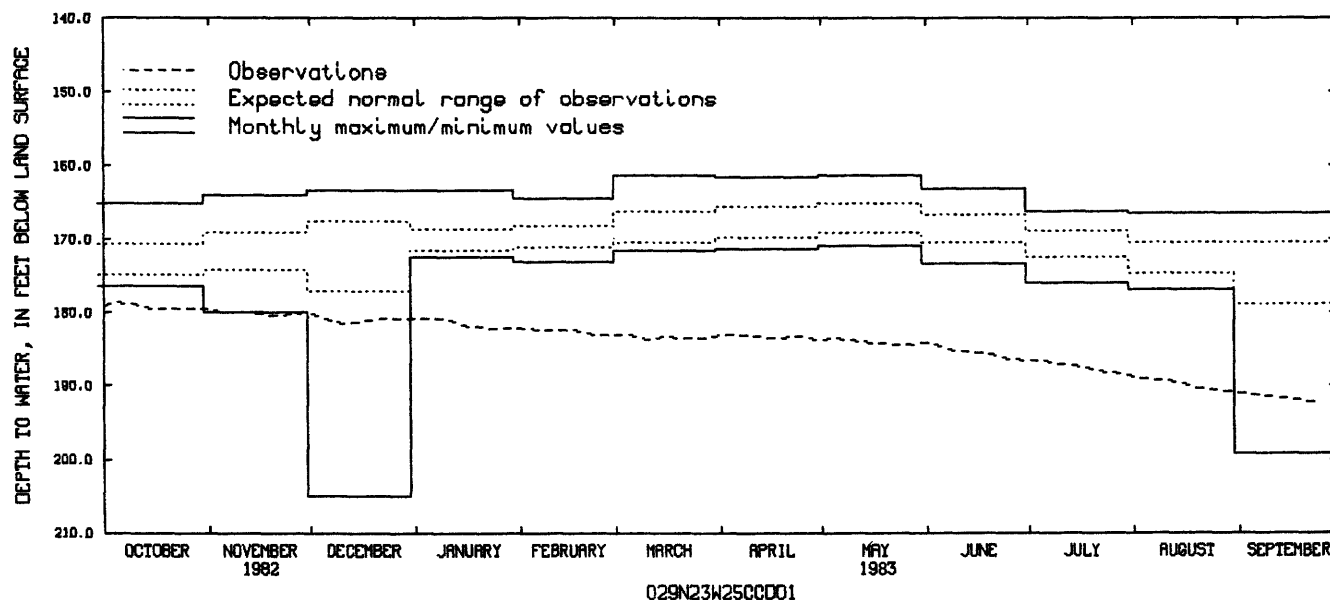
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 161.0 ft (49.07 m) below land-surface datum, May 10, 1980; lowest, 205.0 ft (62.48 m) below land-surface datum, Dec. 15, 1970.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	178.7	180.0	180.6	180.7	182.2	183.1	183.0	183.4	184.7	186.6	189.1	.....
10	178.8	179.8	181.5	180.7	182.3	183.6	183.1	183.7	185.3	187.0	189.2	.....
15	179.5	180.1	181.2	181.8	182.2	183.4	183.4	184.1	185.3	187.3	189.7	192.1
20	179.6	180.4	180.9	181.9	182.7	183.4	183.4	184.2	185.7	187.6	190.4	192.0
25	179.4	180.2	180.8	182.1	183.1	183.6	183.2	184.4	186.3	188.2	191.0	192.2
DOM	179.4	179.8	180.8	182.1	182.9	183.1	183.6	184.0	186.5	188.6	.....	192.4

WTR YEAR 1983 HIGHEST 178.5 OCT 4, 1982

LOWEST 192.5 SEP 23, 1983



445739093081201. Local number, 029N23W35BAD01.

LOCATION.--Lat 44°57'39", long 93°08'12", in SE¼NE¼NW¼ sec.35, T.29 N., R.23 W., Hydrologic Unit 07010206, Victoria Street, 0.35 mi (0.56 km) north of University Avenue.

Owner: City of St. Paul.

AQUIFER.--St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 16 in (0.41 m), depth 234 ft (71.3 m), screened 174 to 234 ft (53.0 to 71.3 m).

DATUM.--Altitude of land-surface datum is 888 ft (261 m). Measuring point: Top of coupling, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 121.7 ft (37.09 m) below land-surface datum, May 2, 1983; lowest, 133.0 ft (40.54 m) below land-surface datum, May 5, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	123.0	JAN 4	122.2	FEB 28	122.2	MAY 2	121.7	JUL 11	122.1	SEP 13	124.8

## GROUND-WATER LEVELS

## RAMSEY COUNTY--Continued

450414093012701. Local number, 030N22W23CBB01.

LOCATION.--Lat 45°04'14", long 93°01'27", in NW¼NW¼SW¼ sec.23, T.30 N., R.22 W., Hydrologic Unit 07010206, Hoffman Road, 0.85 mi (1.4 km) southwest of Highway 61.

Owner: White Bear Town Hall.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 96 ft (29.3 m), screened 91 to 96 ft (27.7 to 29.3 m).

DATUM.--Altitude of land-surface datum is 928 ft (283 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 20.58 ft (6.27 m) below land-surface datum, May 13, 1983; lowest, 22.80 ft (6.95 m) below land-surface datum, Sept. 8, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	22.43	JAN 13	22.14	MAR 1	21.92	MAY 13	20.58	JUL 19	20.60	SEP 9	21.00

450723093071801. Local number, 030N23W01BAB01.

LOCATION.--Lat 45°07'23", long 93°07'18", in NW¼NE¼NW¼ sec.1, T.30 N., R.23 W., Hydrologic Unit 07010206, at Bucher Playground.

Owner: City of Shoreview.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled recreation artesian well, diameter 8 in (0.20 m), depth 155 ft (47.2 m), cased to 101 ft (30.8 m).

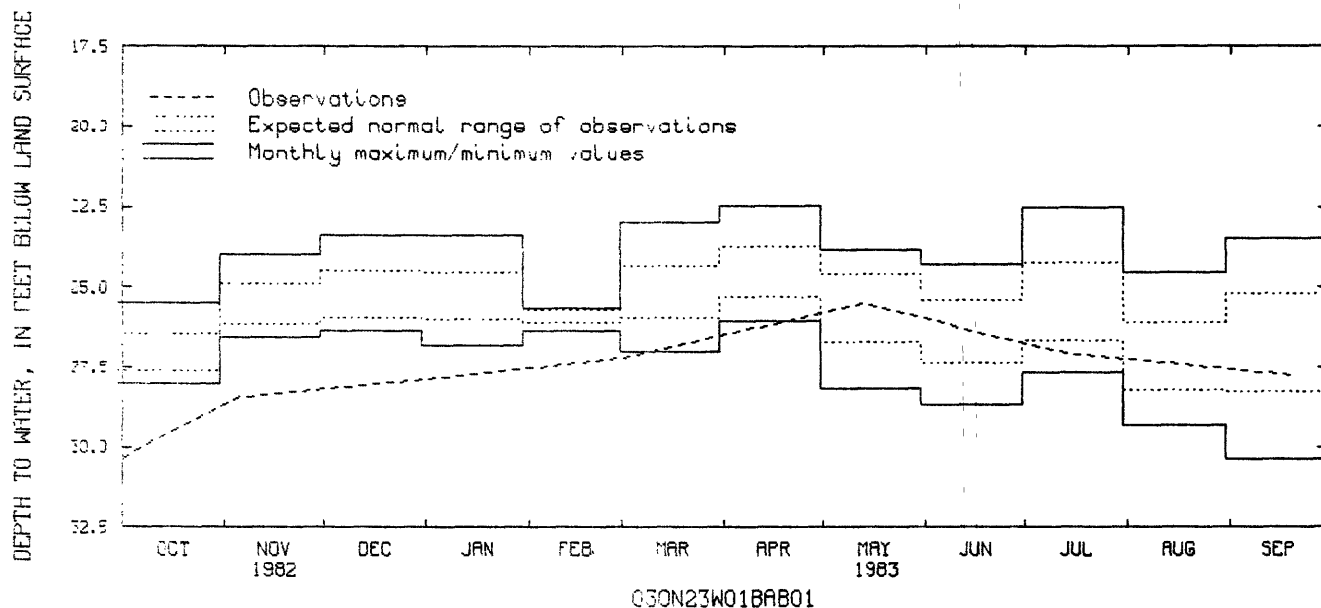
DATUM.--Altitude of land-surface datum is 900 ft (274 m). Measuring point: Top of breather pipe, 2.40 ft (0.73 m) above land-surface datum.

PERIOD OF RECORD.--August 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.47 ft (6.85 m) below land-surface datum, Apr. 19, 1976; lowest, 30.35 ft (9.25 m) below land-surface datum, Sept. 8, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	28.44	JAN 13	27.73	MAR 1	27.20	MAY 13	25.49	JUL 13	27.05	SEP 9	27.74



## GROUND-WATER LEVELS

## RAMSEY COUNTY--Continued

450238093082501. Local number, 030N23W35BDC01.

LOCATION.--Lat 45°02'38", long 93°08'25", in SW¼SE¼NW¼ sec.35, T.30 N., R.23 W., Hydrologic Unit 07010206, southeast corner of Arbogast Street and Richmond Avenue.

Owner: City of Shoreview.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 510 ft (155 m), cased to 465 ft (142 m).

DATUM.--Altitude of land-surface datum is 960 ft (293 m). Measuring point: Hole in shelter floor, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--April 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 134.1 ft (40.87 m) below land-surface datum, May 31, 1983; lowest, 145.9 ft (44.47 m) below land-surface datum, Aug. 21, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	139.7	138.9	139.0	138.3	136.9	135.5	134.6	134.8	134.8	137.2	140.3	139.8
10	139.4	138.6	139.1	138.1	136.9	135.9	134.4	134.6	135.8	138.3	140.8	140.0
15	139.5	138.7	139.1	137.4	137.3	135.2	134.8	134.9	135.6	140.5	140.8	139.2
20	139.5	138.7	138.6	137.3	137.7	135.1	134.5	134.7	135.6	138.8	140.5	138.7
25	138.7	138.9	138.8	137.2	137.9	135.1	134.4	135.0	137.9	139.4	140.4	138.4
EOM	138.9	138.6	138.3	137.1	137.3	134.8	135.0	134.2	137.4	139.7	140.1	139.3

WTR YEAR 1983      HIGHEST 134.1 MAY 31, 1983      LOWEST 141.0 AUG 13, 1983

## REDWOOD COUNTY

441513095183001. Local number, 109N37W09CCC01.

LOCATION.--Lat 44°15'13", long 95°18'30", in SW¼SW¼SW¼ sec.9, T.109 N., R.37 W., Hydrologic Unit 07020008, 3 mi (4.8 km) northwest of Lamberton.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 19 ft (5.8 m), screened 17 to 19 ft (5.2 to 5.8 m).

DATUM.--Altitude of land-surface datum is 1,065 ft (325 m). Measuring point: Top of casing, 3.70 ft (1.13 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.52 ft (2.29 m) below land-surface datum, June 21, 1982; lowest, 17.03 ft (5.19 m) below land-surface datum, Oct. 20, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	13.84	DEC 4	11.42	FEB 28	8.35	APR 23	8.42	JUN 20	11.29	AUG 23	15.28
NOV 2	13.96	JAN 5	14.28	MAR 14	8.35	MAY 21	10.91	JUL 23	13.55	SEP 26	15.70

## GROUND-WATER LEVELS

## REDWOOD COUNTY--Continued

441323095280701. Local number, 109N38W30BBD01.

LOCATION.--Lat 44°13'23", long 95°28'07", in SE¼NW¼NW¼ sec.30, T.109 N., R.38 W., Hydrologic Unit 07020008, at city of Walnut Grove.

Owner: Plum Creek Cheese Co.

AQUIFER.--Sandstone of Cretaceous Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 5 in (0.13 m), depth 240 ft (73.2 m), casing depth not available.

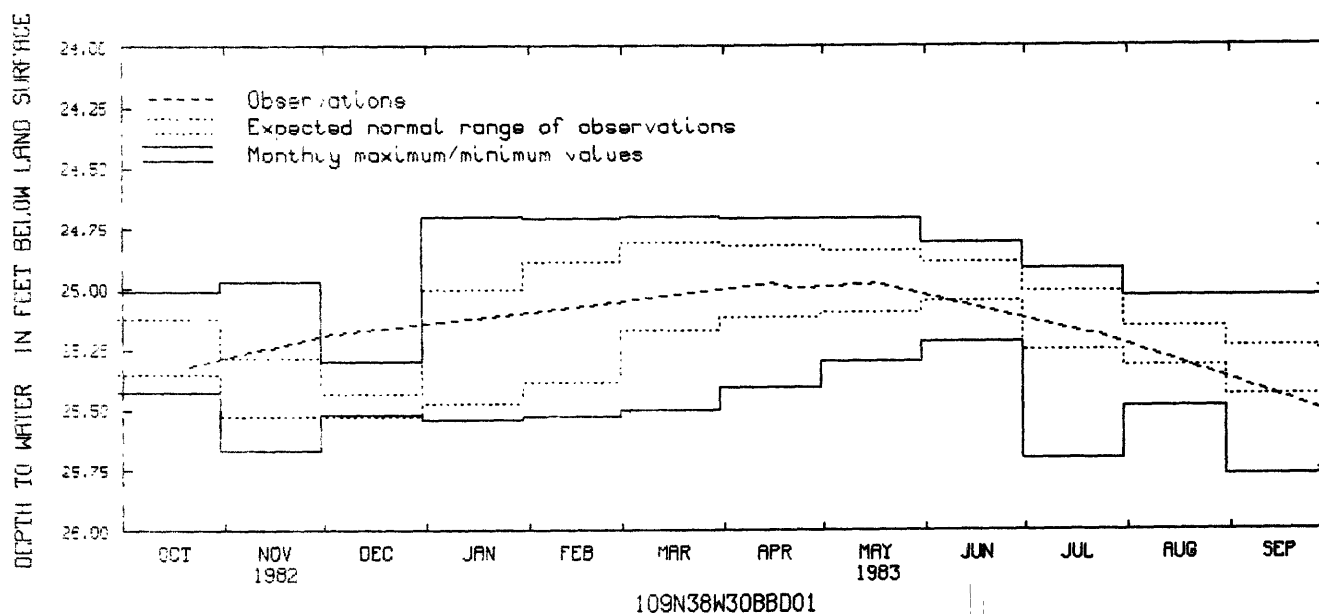
DATUM.--Altitude of land-surface datum is 1,218 ft (371 m). Measuring point: Top of recorder floor, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--August 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.65 ft (7.51 m) below land-surface datum, Mar. 13, 14, Apr. 23, May 8, 9, 1978; lowest, 25.77 ft (7.85 m) below land-surface datum, Sept. 29, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	25.32	JAN 25	25.11	APR 15	24.98	APR 21	25.00	MAY 17	24.98	JUL 25	25.20
DEC 2	25.19										



109N38W30BBD01

442027095341401. Local number, 110N39W17AAA01.

LOCATION.--Lat 44°20'27", long 95°34'14", in NE¼NE¼NE¼ sec.17, T.110 N., R.39 W., Hydrologic Unit 07020008, 5 mi (8.1 km) south of Milroy.

Owner: U.S. Geological Survey.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 15 ft (4.6 m), screened 13 to 15 ft (4.0 to 4.6 m).

DATUM.--Altitude of land-surface datum is 1,110 ft (338 m). Measuring point: Top of casing, 0.10 ft (0.03 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.51 ft (0.77 m) below land-surface datum, Mar. 24, 1979; lowest, 8.96 ft (2.73 m) below land-surface datum, Sept. 30, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	6.93	DEC 4	4.42	FEB 15	5.57	MAY 21	4.06	JUL 23	5.84	SEP 26	8.23
NOV 2	6.66	JAN 5	5.75	APR 23	3.11	JUN 20	4.87	AUG 15	7.37		

## GROUND-WATER LEVELS

## REDWOOD COUNTY--Continued

443051095074201. Local number, 112N36W14AAA01.

LOCATION.--Lat 44°30'51", long 95°07'42", in NE¼NE¼NE¼ sec.14, T.112 N., R.36 W., Hydrologic Unit 07020007, 2 mi (3.2 km) south of Redwood Falls.

Owner: Frank Boots.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), measured depth 214 ft (65.2 m), reported screened 213 to 218 ft (64.9 to 66.4 m).

DATUM.--Land-surface datum is 1,038.9 ft (316.7 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

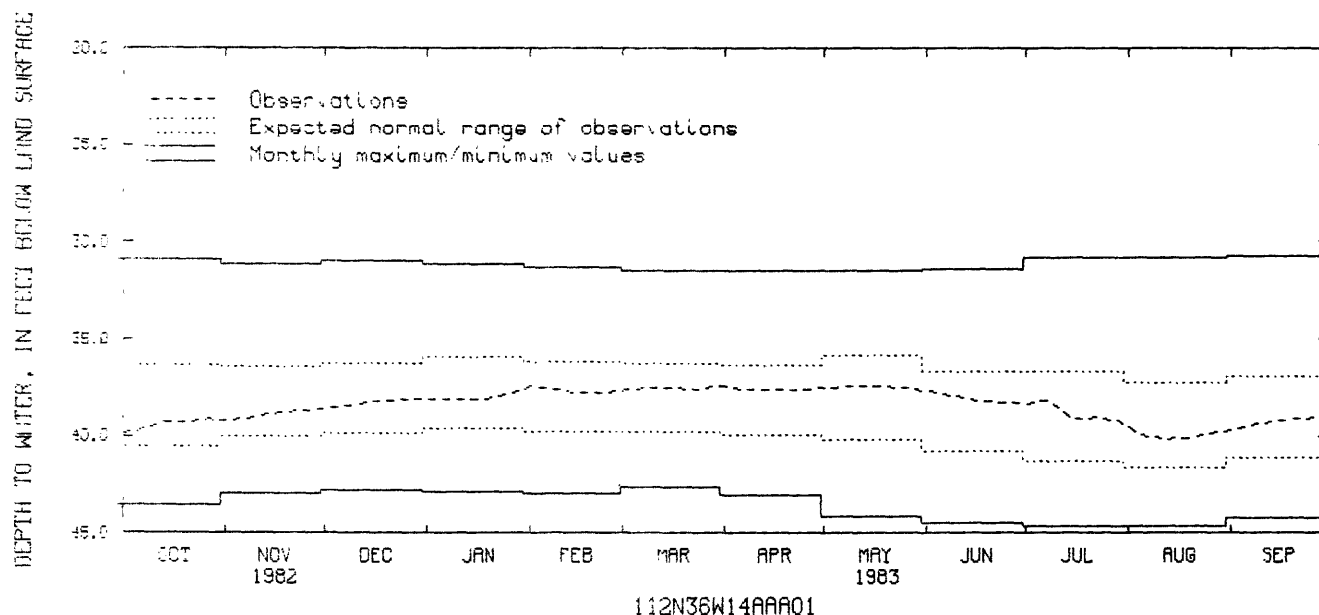
REMARKS.--Measured weekly by Kenneth Daby. Water level affected by regional pumping.

PERIOD OF RECORD.--July 1952 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 30.72 ft (9.36 m) below land-surface datum, Sept. 10, 1953; lowest, 44.68 ft (13.62 m) below land-surface datum, July 16, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	39.72	DEC 9	38.41	FEB 9	37.58	APR 6	37.60	JUN 17	38.17	AUG 12	40.16
13	39.31	16	38.16	16	37.80	13	37.59	24	38.27	19	40.13
20	39.27	22	38.15	23	37.75	20	37.62	JUL 1	38.32	26	39.83
27	39.14	29	38.10	MAR 2	37.63	27	37.55	8	38.16	SEP 2	39.68
NOV 3	39.19	JAN 6	38.08	9	37.52	MAY 5	37.47	15	39.13	9	39.39
10	39.01	12	38.07	16	37.50	12	37.41	22	39.05	16	39.19
17	38.79	19	38.08	23	37.61	19	37.45	29	39.20	23	39.09
24	38.69	26	37.83	30	37.39	25	37.49	AUG 5	39.95	30	38.95
DEC 2	38.54	FEB 1	37.46								



442906095064101. Local number, 112N36W24DDC01.

LOCATION.--Lat 44°29'06", long 95°06'41", in SW¼SE¼SE¼ sec.24, T.112 N., R.36 W., Hydrologic Unit 07020007, 3.6 mi (5.8 km) south of Redwood Falls.

Owner: City of Redwood Falls.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 144 ft (43.9 m), screened 141 to 144 ft (43.0 to 43.9 m).

DATUM.--Altitude of land-surface datum is 1,041 ft (317 m). Measuring point: Top of casing, 2.50 ft (0.76 m) above land-surface datum.

REMARKS.--Water level affected by pumping from nearby well field.

PERIOD OF RECORD.--December 1967 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 39.52 ft (12.05 m) below land-surface datum, Mar. 13, 1971; lowest, 51.21 ft (15.61 m) below land-surface datum, July 16, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	44.83	DEC 9	43.13	FEB 9	42.61	APR 6	42.77	JUN 17	43.87	AUG 12	46.58
13	44.77	16	42.99	16	43.28	13	42.79	24	43.97	19	45.96
20	44.46	22	43.00	23	43.09	20	42.84	JUL 1	44.08	26	45.60
27	43.98	29	43.19	MAR 2	42.87	27	43.11	8	43.85	SEP 2	44.36
NOV 3	44.63	JAN 6	43.44	9	42.71	MAY 5	43.14	15	45.65	9	44.78
10	43.87	12	43.38	16	43.26	12	43.19	22	45.47	16	44.59
17	43.70	19	43.59	23	43.64	19	43.03	29	45.17	23	44.50
24	43.54	26	42.81	30	42.48	25	42.74	AUG 5	46.59	30	44.33
DEC 2	43.32	FEB 1	42.30								

## GROUND-WATER LEVELS

## REDWOOD COUNTY--Continued

442917095183701. Local number, 112N37W21CCC01.

LOCATION.--Lat 44°29'17", long 95°18'37", in SW¼SW¼SW¼ sec.21, T.112 N., R.37 W., Hydrologic Unit 07020006, 1 mi (1.6 km) northeast of Seaforth.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 17 ft (5.2 m), screened 15 to 17 ft (4.6 to 5.2 m).

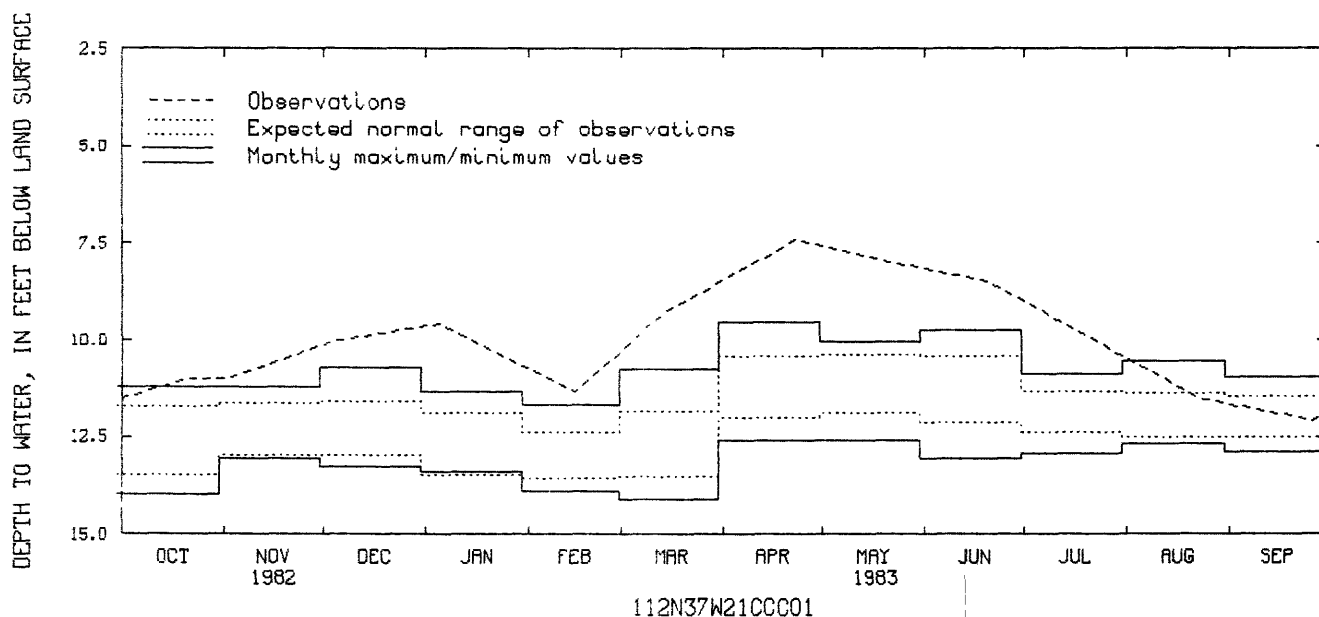
DATUM.--Altitude of land-surface datum is 1,020 ft (311 m). Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.40 ft (2.26 m) below land-surface datum, Apr. 23, 1983; lowest, 14.11 ft (4.30 m) below land-surface datum, Mar. 11, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	11.01	DEC 4	10.03	FEB 15	11.34	APR 23	7.40	JUN 20	8.48	AUG 23	11.52
NOV 2	11.00	JAN 5	9.58	MAR 14	9.29	MAY 21	7.97	JUL 23	10.05	SEP 26	12.08



442950095255301. Local number, 112N38W21BBC01.

LOCATION.--Lat 44°29'50", long 95°25'53", in SW¼NW¼NW¼ sec.21, T.112 N., R.37 W., Hydrologic Unit 07020006, 0.2 mi (0.3 km) southwest of Vesta.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

DATUM.--Altitude of land-surface datum is 1,040 ft (317 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.46 ft (0.45 m) below land-surface datum, May 21, 1983; lowest, 7.12 ft (2.17 m) below land-surface datum, Sept. 26, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	5.19	DEC 4	3.85	FEB 15	4.75	APR 23	1.66	JUN 20	3.32	AUG 23	6.20
NOV 2	5.31	JAN 5	3.85	MAR 14	3.27	MAY 21	1.46	JUL 23	4.06	SEP 26	7.12



## GROUND-WATER LEVELS

## REDWOOD COUNTY--Continued

442959095315901. Local number, 112N39W22BBB01.

LOCATION.--Lat 44°29'59", long 95°31'59", in NW¼NW¼NW¼ sec.22, T.112 N., R.39 W., Hydrologic Unit 07020006, 5.25 mi (8.45 km) west of Vesta.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 12 ft (3.7 m), screened 10 to 12 ft (3.0 to 3.7 m).

DATUM.--Altitude of land-surface datum is 1,055 ft (322 m). Measuring point: Top of casing, 3.90 ft (1.19 m) above land-surface datum.

PERIOD OF RECORD.--October 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.91 ft (0.28 m) below land-surface datum, Apr. 21, 1979; lowest, 7.75 ft (2.36 m) below land-surface datum, Sept. 30, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	6.20	DEC 4	4.35	FEB 15	4.01	MAY 21	3.78	JUL 23	5.89	SEP 26	7.31
NOV 2	6.35	JAN 5	5.43	APR 23	1.20	JUN 20	5.37	AUG 23	6.69		

## RENNVILLE COUNTY

444437094425001. Local number, 115N32W29AAC01.

LOCATION.--Lat 44°44'37", long 94°42'50", in SW¼NE¼NE¼ sec.29, T.115 N., R.32 W., Hydrologic Unit 07010205, in Hector.

Owner: Hector Creamery.

AQUIFER.--Sandstone of Cretaceous Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in (0.20 m), depth 370 ft (109 m), screened 360 to 370 ft (110 to 113 m).

DATUM.--Altitude of land-surface datum is 1,080 ft (329 m). Measuring point: Top of casing, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--March 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 32.32 ft (9.85 m) below land-surface datum, June 14, 1982; lowest, 38.48 ft (11.73 m) below land-surface datum, Oct. 24, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	32.80	DEC 3	33.04	DEC 21	32.70	JAN 25	33.05	JUN 9	32.37	AUG 25	32.51

## GROUND-WATER LEVELS

## RICE COUNTY

441912093162901. Local number, 110N20W19BDC01.

LOCATION.--Lat 44°19'12", long 93°16'29", in SW¼SE¼NW¼ sec.19, T.110 N., R.20 W., Hydrologic Unit 07040002, just north of Faribault.

Owner: St. Lawrence Cemetery Assn.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 400 ft (122 m), cased to 357 ft (110 m).

DATUM.--Altitude of land-surface datum is 985 ft (300 m). Measuring point: Top of casing, 1.60 ft (0.49 m) above land-surface datum.

PERIOD OF RECORD.--June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.08 ft (1.85 m) below land-surface datum, May 10, 1983; lowest, 10.94 ft (3.33 m) below land-surface datum, July 10, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	8.17	JAN 12	7.82	MAR 2	7.62	MAY 10	6.08	JUL 12	6.72	SEP 7	7.00

442543093113701. Local number, 111N20W11CDC01.

LOCATION.--Lat 44°25'43", long 93°11'37", in SW¼SE¼SW¼ sec.11, T.111 N., R.20 W., Hydrologic Unit 07040002, Highway 218 at Dundas.

Owner: Rollie Green.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled commercial artesian well, diameter 4 in (0.10 m), depth 158 ft (48.2 m), cased to 101 ft (30.8 m).

DATUM.--Altitude of land-surface datum is 950 ft (290 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.68 ft (6.91 m) below land-surface datum, May 3, 1983; lowest, 27.24 ft (8.30 m) below land-surface datum, Jan. 12, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	25.43	JAN 12	24.86	MAR 2	24.13	MAY 3	22.68	JUL 12	23.12	SEP 7	23.64

442751093240701. Local number, 112N21W31CBB01.

LOCATION.--Lat 44°27'51", long 93°24'07", in NW¼NW¼SW¼ sec.31, T.112 N., R.21 W., Hydrologic Unit 07040002, 1.0 mi (1.6 km) south of Highway 19.

Owner: Trondhjem Church.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 276 ft (84.1 m), cased to 232 ft (70.7 m).

DATUM.--Altitude of land-surface datum is 1,130 ft (344 m). Measuring point: Top of casing, 1.10 ft (0.34 m) above land-surface datum.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 139.4 ft (42.49 m) below land-surface datum, Sept. 8, 1983; lowest, 141.8 ft (43.22 m) below land-surface datum, Oct. 30, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	140.9	JAN 5	140.6	MAR 2	140.5	MAY 3	139.7	JUL 12	139.5	SEP 8	139.4

## ROCK COUNTY

433515096114901. Local number, 102N45W35DDC01.

LOCATION.--Lat 43°35'15", long 96°11'49", in SW¼SE¼SE¼ sec.35, T.102 N., R.45 W., Hydrologic Unit 10170204, 4 mi (6.4 km) south of Luverne.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 14 ft (4.3 m), screened 12 to 14 ft (3.7 to 4.3 m).

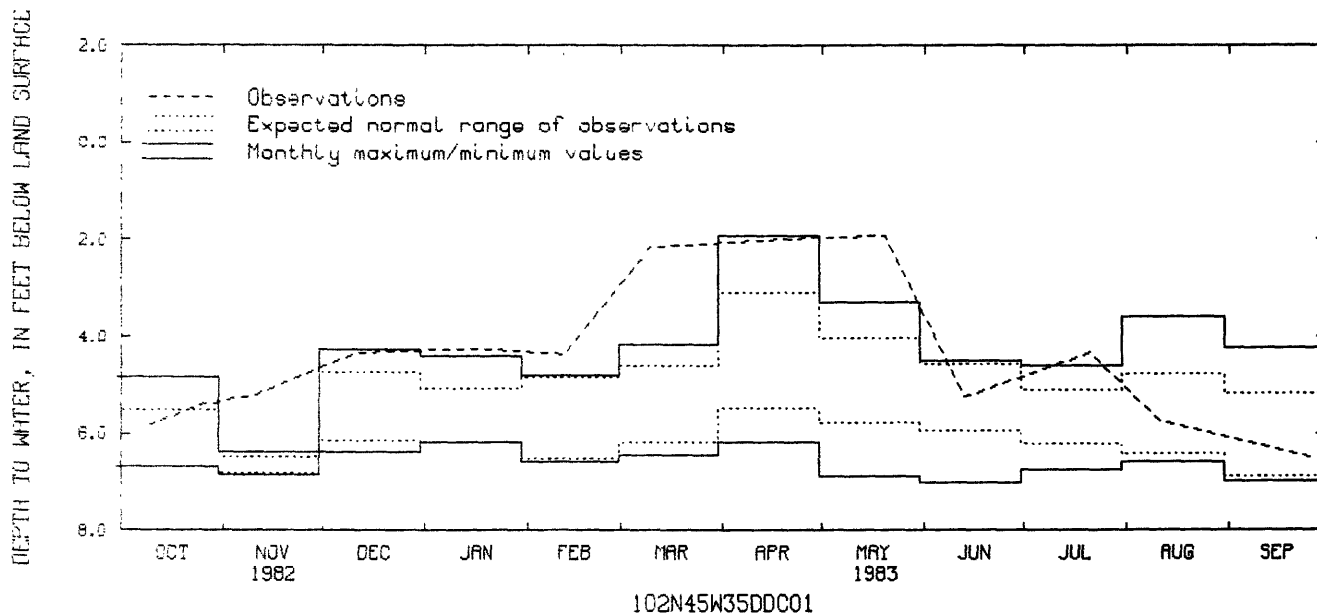
DATUM.--Altitude of land-surface datum is 1,400 ft (427 m). Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 1.90 ft (0.58 m) below land-surface datum, Apr. 19, 1979; lowest, 7.01 ft (2.14 m) below land-surface datum, June 6, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	5.84	DEC 11	4.33	FEB 12	4.36	APR 22	1.97	JUN 13	5.25	AUG 11	5.74
25	5.41	JAN 15	4.25	MAR 10	2.16	MAY 20	1.92	JUL 21	4.34	SEP 27	6.52
NOV 11	5.19										



433843096184701. Local number, 102N46W14AAA01.

LOCATION.--Lat 43°38'43", long 96°18'47", in NE¼NE¼NE¼ sec.14, T.102 N., R.46 W., Hydrologic Unit 10170203, 4.5 mi (7.2 km) west of Luverne.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 14 ft (4.3 m), screened 12 to 14 ft (3.7 to 4.3 m).

DATUM.--Altitude of land-surface datum is 1,450 ft (442 m). Measuring point: Top of casing, 1.65 ft (0.50 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.12 ft (0.95 m) below land-surface datum, Oct. 25, 1982; lowest, 9.01 ft (2.75 m) below land-surface datum, Oct. 12, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	3.28	NOV 11	3.44	JAN 15	6.90	APR 22	3.52	JUN 13	6.48	AUG 11	7.15
25	3.12	DEC 11	4.58	FEB 12	6.55	MAY 20	5.25	JUL 21	6.08	SEP 27	8.33

## GROUND-WATER LEVELS

## ROCK COUNTY--Continued

434726096073201. Local number, 104N44W21CDC01.

LOCATION.--Lat 43°47'26", long 96°07'32", in SW¼SE¼SW¼ sec.21, T.104 N., R.44 W., Hydrologic Unit 10170204, 3.8 mi (6.1 km) northeast of Hardwick.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.04 m), depth 16 ft (4.9 m), screened 14 to 16 ft (4.3 to 4.9 m).

DATUM.--Altitude of land-surface datum is 1,510 ft (460 m). Measuring point: Top of casing, 3.70 ft (1.13 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.70 ft (1.43 m) below land-surface datum, Mar. 10, 1983; lowest, 9.96 ft (3.04 m) below land-surface datum, June 15, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	7.24	DEC 11	6.82	FEB 12	7.27	APR 22	4.71	JUN 13	6.92	AUG 11	7.24
25	6.77	JAN 8	7.38	MAR 10	4.70	MAY 20	6.08	JUL 21	6.42	SEP 27	7.53
NOV 11	6.47										

## SCOTT COUNTY

443732093460301. Local number, 113N24W06BCB01.

LOCATION.--Lat 44°37'32", long 93°46'03", in NW¼SW¼NW¼ sec.6, T.113 N., R.24 W., Hydrologic Unit 07020012, in Belle Plaine.

Owner: Creative Tool and Engineering. Formerly Belle Plaine Coop Creamery.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

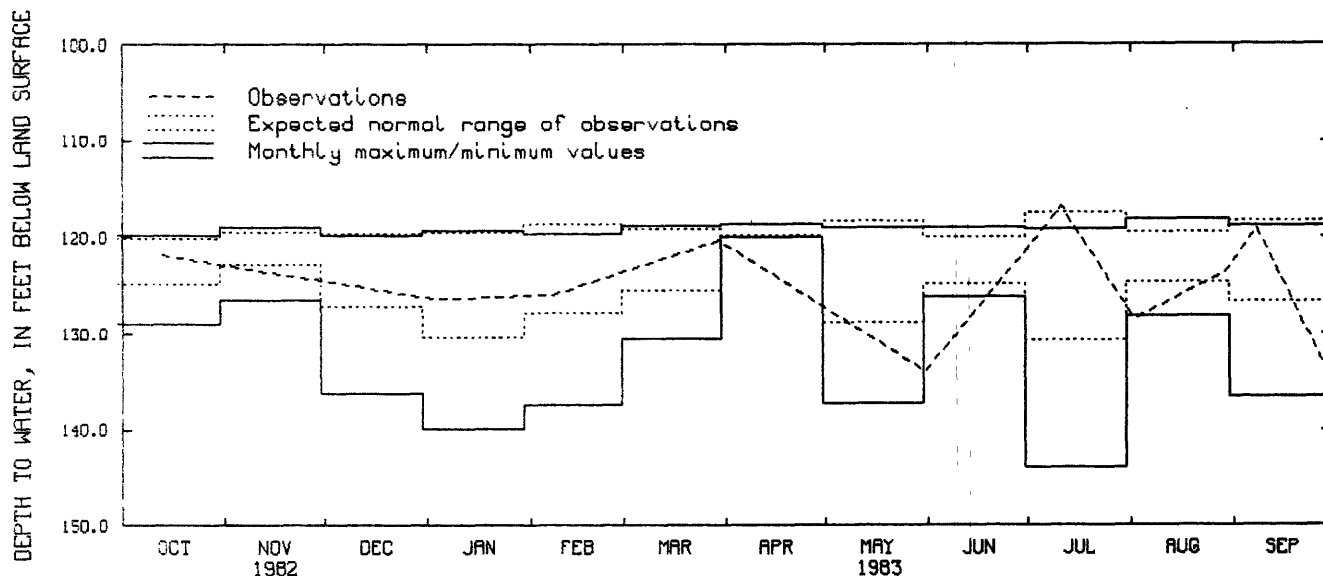
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in (0.30 m), depth 272 ft (82.9 m), screen information not available.

DATUM.--Altitude of land-surface datum is 840 ft (256 m). Measuring point: Top of well cap, 2.30 ft (0.70 m) above land-surface datum.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 116.8 ft (35.60 m) below land-surface datum, July 11, 1983; lowest, 144.0 ft (43.89 m) below land-surface datum, July 9, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	121.8	FEB 8	125.9	MAY 31	134.0	JUL 11	116.8	AUG 29	123.8	SEP 8	119.0
JAN 4	126.4	MAR 30	120.3	JUL 7	118.5	AUG 2	128.4				



113N24W06BCB01

## GROUND-WATER LEVELS

## SCOTT COUNTY--Continued

443352093423001. Local number, 113N24W28DAA01.

LOCATION.--Lat 44°33'52", long 93°42'30", in NE¼NE¼SE¼ sec.28, T.113 N., R.24 W., Hydrologic Unit 07020012, at Michelle Wildlife Area.

Owner: U.S. Geological Survey.

AQUIFER.--Ironton-Galesville Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in (0.15 m), depth 450 ft (137 m), cased to 219 ft (66.8 m).

DATUM.--Altitude of land-surface datum is 990 ft (302 m). Measuring point: Top of well seal, 2.30 ft (0.70 m) above land-surface datum.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 131.9 ft (40.20 m) below land-surface datum, May 3, 1983; lowest, 132.7 ft (40.45 m) below land-surface datum, Aug. 19, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	132.1	JAN 5	132.1	MAR 2	132.0	MAY 3	131.9	JUL 12	132.2	SEP 8	132.0

443352093423002. Local number, 113N24W28DAA02.

LOCATION.--Lat 44°33'52", long 93°42'30", in NE¼NE¼SE¼ sec.28, T.113 N., R.24 W., Hydrologic Unit 07020012, at Michelle Wildlife Area.

Owner: U.S. Geological Survey.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in (0.05 m), depth 655 ft (200 m), screened 650 to 655 ft (198 to 200 m).

DATUM.--Altitude of land-surface datum is 990 ft (302 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 221.0 ft (67.36 m) below land-surface datum, May 3, 1983; lowest, 222.0 ft (67.67 m) below land-surface datum, Sept. 13, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	221.8	JAN 5	221.5	MAR 2	221.3	MAY 3	221.0	JUL 12	221.3	SEP 8	221.7

443715093480801. Local number, 113N25W02CAC01.

LOCATION.--Lat 44°37'15", long 93°48'08", in SW¼NE¼SW¼ sec.2, T.113 N., R.25 W., Hydrologic Unit 07020012, 0.75 mi (1.21 km) west of Belle Plaine at Shep's Gravel Pit.

Owner: U.S. Geological Survey.

AQUIFER.--Ironton-Galesville Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.04 m), depth 323 ft (98.4 m), cased to 193 ft (58.8 m).

DATUM.--Altitude of land-surface datum is 750 ft (229 m). Measuring point: Top of casing, 0.25 ft (0.08 m) above land-surface datum.

PERIOD OF RECORD.--October 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.37 ft (1.94 m) below land-surface datum, May 9, 1983; lowest, 10.35 ft (3.15 m) below land-surface datum, Jan. 8, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	9.17	JAN 10	8.25	MAR 7	6.50	MAY 9	6.37	JUL 20	7.10	SEP 8	8.27

## GROUND-WATER LEVELS

## SCOTT COUNTY--Continued

444025093220801. Local number, 114N21W20BAA01.

LOCATION.--Lat 44°40'25", long 93°22'08", in NE¼NE¼NW¼ sec.20, T.114 N., R.21 W., Hydrologic Unit 07020012, 0.5 mi (0.8 km) east of Credit River.

Owner: Credit River Town Hall.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 98 ft (29.9 m), screened 93 to 98 ft (28.4 to 29.9 m).

DATUM.--Altitude of land-surface datum is 946 ft (288 m). Measuring point: Top of casing, 1.10 ft (0.34 m) above land-surface datum.

PERIOD OF RECORD.--September 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 37.73 ft (11.50 m) below land-surface datum, Sept. 8, 1983; lowest, 40.72 ft (12.41 m) below land-surface datum, July 16, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	39.85	JAN 5	39.38	MAR 2	39.00	MAY 3	38.44	JUL 12	38.08	SEP 8	37.73

443752093254401. Local number, 114N22W35DCC01.

LOCATION.--Lat 44°37'52", long 93°25'44", in SW¼SW¼SE¼ sec.35, T.114 N., R.22 W., Hydrologic Unit 07020012, southwest of Credit River.

Owner: St. Catherine's Church.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 235 ft (71.6 m), cased to 194 ft (59.1 m).

DATUM.--Altitude of land-surface datum is 1,015 ft (309 m). Measuring point: Top of casing, 1.20 ft (0.37 m) above land-surface datum.

PERIOD OF RECORD.--September 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 86.90 ft (26.49 m) below land-surface datum, Sept. 8, 1983; lowest, 90.30 ft (27.52 m) below land-surface datum, Sept. 6, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	89.25	JAN 5	89.02	MAR 2	88.85	MAY 3	88.50	JUL 12	87.80	SEP 8	86.90

444633093212901. Local number, 115N21W09CCC01.

LOCATION.--Lat 44°46'33", long 93°21'29", in SW¼SW¼SW¼ sec.9, T.115 N., R.21 W., Hydrologic Unit 07020012, at Savage waste treatment plant.

Owner: City of Savage, well 2.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age and Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, depth 846 ft (258 m), 16 in (0.41 m) casing 0 ft to 280 ft (85.3 m), 10 in (0.25 m) casing 250 ft to 660 ft (85.3 m to 201 m).

DATUM.--Land-surface datum is 730 ft (222.5 m). Measuring point: Edge of vent pipe 0.75 ft (0.23 m) above land-surface datum.

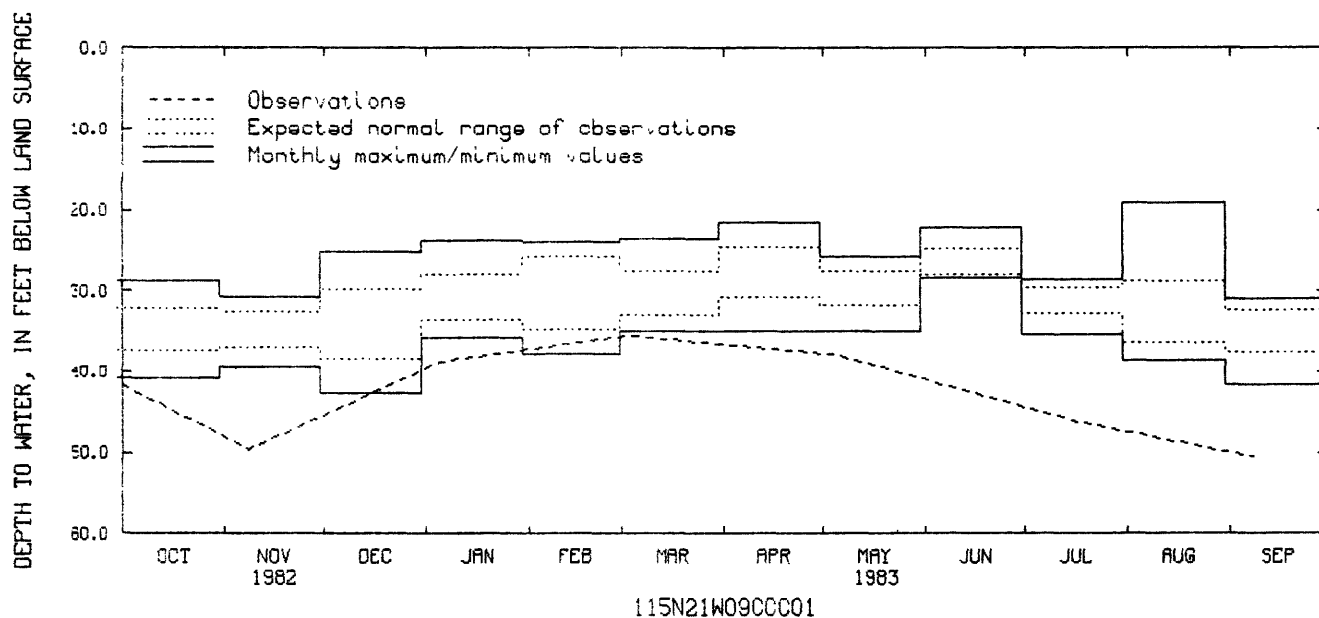
PERIOD OF RECORD.--February 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 18.98 ft (5.79 m) below land-surface datum, Aug. 9, 1979; lowest, 50.58 ft (15.42 m) below land-surface datum, Sept. 8, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	49.65	JAN 5	38.81	MAR 3	35.53	MAY 5	37.92	JUL 15	46.00	SEP 8	50.58

## SCOTT COUNTY--Continued



444720093241801. Local number, 115N22W12ABA01.

LOCATION.--Lat 44°47'20", long 93°24'18", in NE¼NW¼NE¼ sec.12, T.115 N., R.22 W., Hydrologic Unit 07020012, west of Savage at Wilkie State Park.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

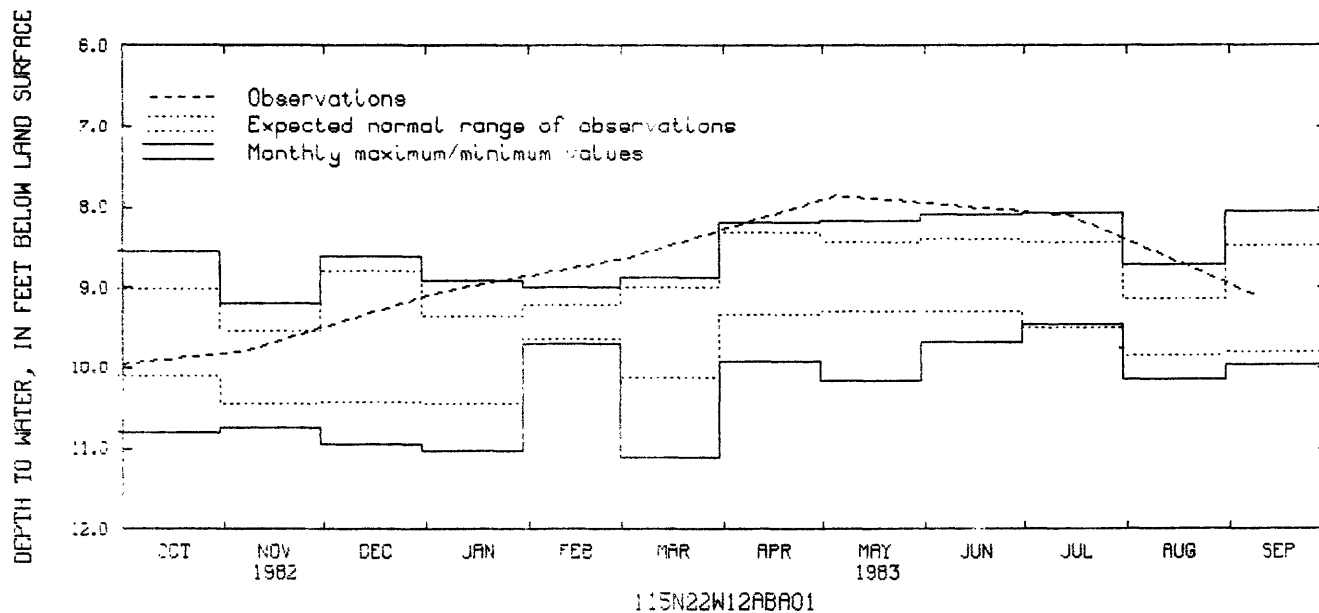
DATUM.--Altitude of land-surface datum is 725 ft (221 m). Measuring point: Top of casing, 2.40 ft (0.73 m) above land-surface datum.

PERIOD OF RECORD.--August 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.85 ft (2.39 m) below land-surface datum, May 5, 1983; lowest, 11.10 ft (3.38 m) below land-surface datum, Mar. 4, 1975.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	9.78	JAN 5	9.05	MAR 3	8.63	MAY 5	7.85	JUL 15	8.10	SEP 8	9.08



## GROUND-WATER LEVELS

## SCOTT COUNTY--Continued

444442093351001. Local number, 115N23W28AAC01.

LOCATION.--Lat 44°44'42", long 93°35'10", in SW¼NE¼NE¼ sec.28, T.115 N., R.23 W., Hydrologic Unit 07020012, 2.75 mi (6.03 km) south of Shakopee.

Owner: Leonard Granzow.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 8 in (0.20 m), depth 150 ft (45.7 m), cased to 116 ft (35.4 m):

DATUM.--Altitude of land-surface datum is 801 ft (244 m). Measuring point: Top of casing, 0.40 ft (0.12 m) above land-surface datum.

PERIOD OF RECORD.--April 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 80.40 ft (24.51 m) below land-surface datum, July 20, 1983; lowest, 87.98 ft (26.82 m) below land-surface datum, Mar. 8, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	86.78	JAN 10	86.27	MAR 7	85.74	MAY 9	83.15	JUL 20	80.40	SEP 8	80.78

## SHERBURNE COUNTY

451954093424801. Local number, 033N27W21CCA01.

LOCATION.--Lat 45°19'54", long 93°42'48", in NE¼SW¼SW¼ sec.21, T.33 N., R.27 W., Hydrologic Unit 07010203, on Bromeling farm, 0.9 mi (1.4 km) east of Big Lake.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 20 ft (6.1 m), screened 18 to 20 ft (5.5 to 6.1 m).

DATUM.--Altitude of land-surface datum is 933.8 ft (284.6 m) National Geodetic Vertical Datum of 1929.

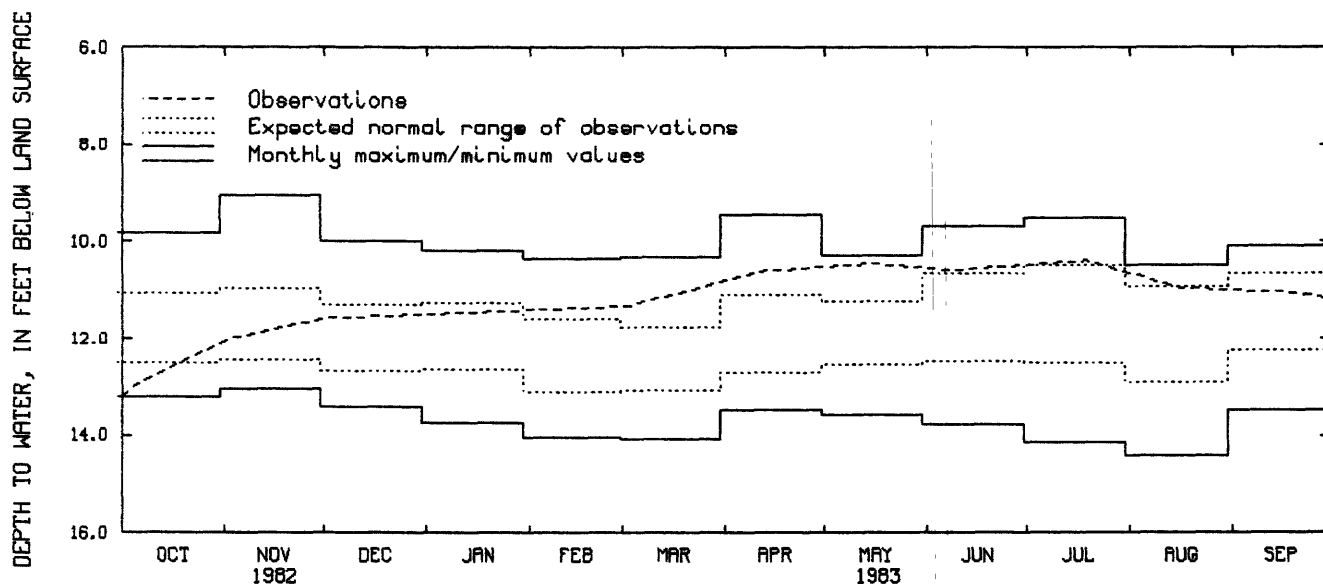
Measuring point: Top of casing, 3.60 ft (1.10 m) above land-surface datum.

PERIOD OF RECORD.--October 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 9.03 ft (2.75 m) below land-surface datum, Nov. 27, 1973; lowest, 14.43 ft (4.40 m) below land-surface datum, Aug. 25, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	12.98	DEC 1	11.58	APR 12	10.61	JUN 8	10.59	AUG 16	10.95	SEP 20	11.05
NOV 2	12.00	MAR 3	11.32	MAY 16	10.45	JUL 19	10.40				



033N27W21CCA01



## SHERBURNE COUNTY--Continued

451852093435301. Local number, 033N27W29CDC01.

LOCATION.--Lat 45°18'52", long 93°43'53", in SW¼SE¼SW¼ sec.29, T.33 N., R.27 W., Hydrologic Unit 07010203, southeast of Big Lake.

Owner: Truman (Pete) Sanford.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age and Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 218 ft (66.4 m), cased to 92 ft (28.0 m).

DATUM.--Altitude of land-surface datum is 931 ft (284 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

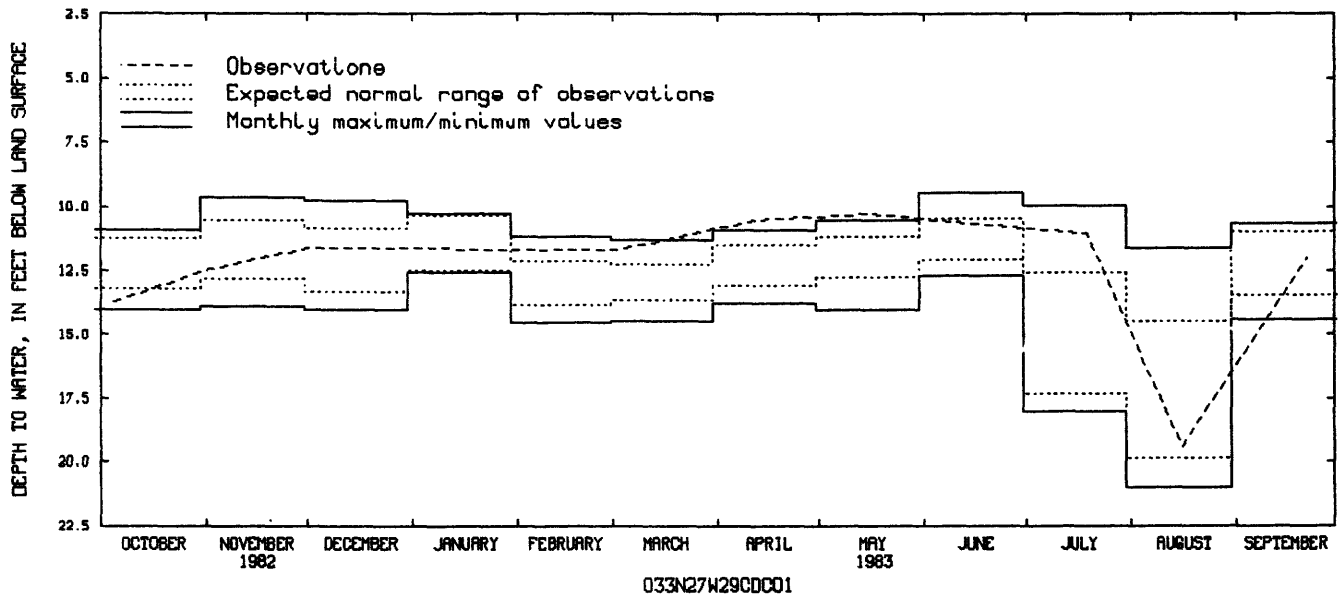
REMARKS.--Water level affected by pumping of nearby wells.

PERIOD OF RECORD.--September, November 1973, October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 9.48 ft (2.89 m) below land-surface datum, June 29, 1979; lowest, 21.00 ft (6.40 m) below land-surface datum, Aug. 4, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	13.72	DEC 1	11.62	APR 12	10.53	JUN 8	10.58	AUG 16	19.40	SEP 22	11.99
NOV 2	12.45	MAR 3	11.68	MAY 16	10.28	JUL 19	11.06				



452638093442001. Local number, 034N27W18AAB01.

LOCATION.--Lat 45°26'38", long 93°44'20", in NW¼NE¼NE¼ sec.18, T.34 N., R.27 W., Hydrologic Unit 07010203, in Orrock, 0.15 mi (0.24 km) west of County Road 5.

Owner: Morton Arneson.

AQUIFER.--Buried gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 115 ft (35.0 m), screened 95 to 115 ft (29.0 to 35.0 m).

DATUM.--Altitude of land-surface datum is 985 ft (300 m). Measuring point: Top of casing, 0.40 ft (0.12 m) above land-surface datum.

PERIOD OF RECORD.--December 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.82 ft (3.30 m) below land-surface datum, July 19, 1983; lowest, 13.71 ft (4.18 m) below land-surface datum, Mar. 9, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	12.39	DEC 1	12.73	APR 12	11.75	JUN 8	11.80	AUG 11	11.43	SEP 20	11.98
NOV 2	11.96	MAR 3	12.83	MAY 16	11.53	JUL 19	10.82				

## GROUND-WATER LEVELS

## SHERBURNE COUNTY--Continued

452339093521402. Local number, 034N28W31BDD02.

LOCATION.--Lat 45°23'39", long 93°52'14", in SE¼SE¼NW¼ sec.31, T.34 N., R.28 W., Hydrologic Unit 07010203, 0.4 mi (0.6 km) north of U.S. Highway 10 in Becker.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 27 ft (8.2 m), screened 25 to 27 ft (7.6 to 8.2 m).

DATUM.--Altitude of land-surface datum is 970 ft (296 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--December 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 17.19 ft (5.24 m) below land-surface datum, July 19, 1983; lowest, 22.51 ft (6.86 m) below land-surface datum, Feb. 8, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	20.26	DEC 1	19.57	APR 12	19.47	JUN 8	19.08	AUG 11	17.51	SEP 22	17.86
NOV 2	19.71	MAR 3	19.71	MAY 16	19.31	JUL 19	17.19				

453121093334401. Local number, 035N26W15DBB01.

LOCATION.--Lat 45°31'21", long 93°33'44", in NW¼NW¼SE¼ sec.15, T.35 N., R.26 W., Hydrologic Unit 07010207, on Sanborn farm, 2.5 mi (4.0 km) south of Princeton.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 56 ft (17.1 m), screened 54 to 56 ft (16.5 to 17.1 m).

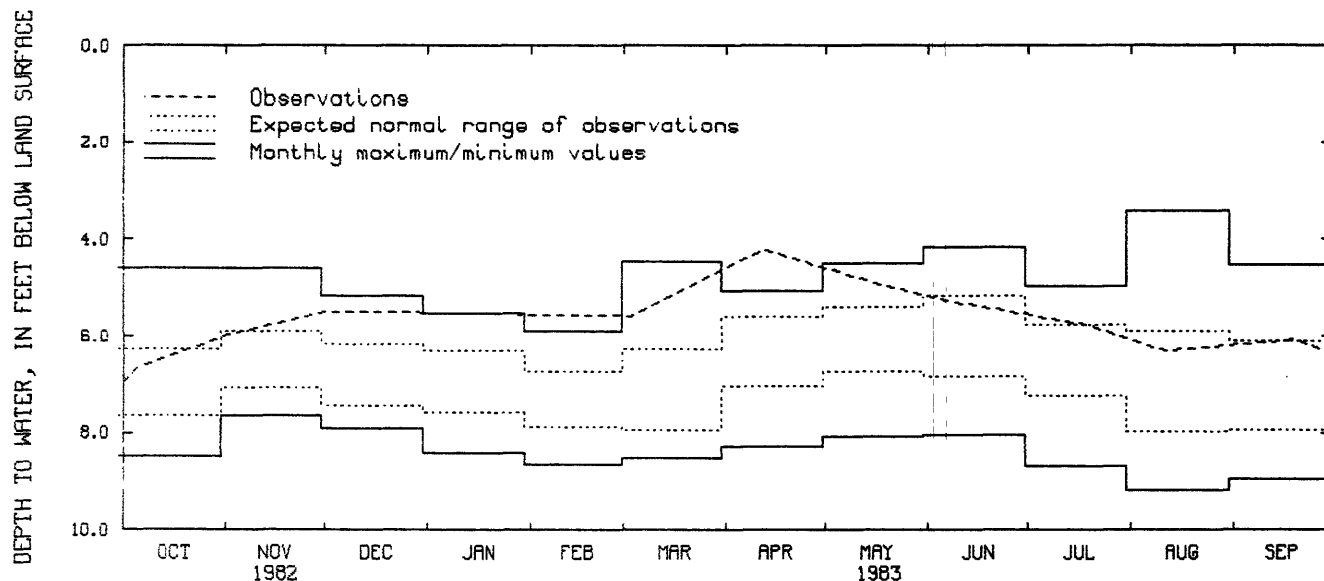
DATUM.--Altitude of land-surface datum is 965 ft (294 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.42 ft (1.04 m) below land-surface datum, Aug. 9, 1972; lowest, 9.19 ft (2.80 m) below land-surface datum, Aug. 17, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	6.67	DEC 1	5.48	APR 12	4.20	JUN 6	5.25	AUG 11	6.31	SEP 20	6.07
NOV 2	5.95	MAR 3	5.58	MAY 16	4.89	JUL 19	5.77				



035N26W15DBB01

## GROUND-WATER LEVELS

## SHERBURNE COUNTY--Continued

452938093432702. Local number, 035N27W29DDB02.

LOCATION.--Lat 45°29'38", long 93°43'27", in NW¼NW¼SE¼ sec.29, T.35 N., R.27 W., Hydrologic Unit 07010203, 3.2 mi (5.2 km) north of Orrock in Sherburne National Wildlife Refuge.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 15 ft (4.6 m), screened 13 to 15 ft (4.0 to 4.6 m).

DATUM.--Altitude of land-surface datum is 985 ft (300 m). Measuring point: Top of casing, 1.70 ft (0.52 m) above land-surface datum.

PERIOD OF RECORD.--October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.00 ft (1.22 m) below land-surface datum, May 14, 1979; lowest, 8.48 ft (2.58 m) below land-surface datum, Nov. 30, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	4.13	DEC 10	4.92	FEB 15	5.23	APR 21	4.53	JUN 16	4.58	AUG 24	4.95
NOV 17	4.51	JAN 17	5.19	MAR 18	4.42	MAY 23	4.47	JUL 27	4.41	SEP 30	4.58

452952093570801. Local number, 035N29W28ABC01.

LOCATION.--Lat 45°29'52", long 93°57'08", in SW¼NW¼NE¼ sec.28, T.35 N., R.29 W., Hydrologic Unit 07010203, on Gilyard farm, north of Clear Lake.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 31 ft (9.4 m), screened 29 to 31 ft (8.8 to 9.4 m).

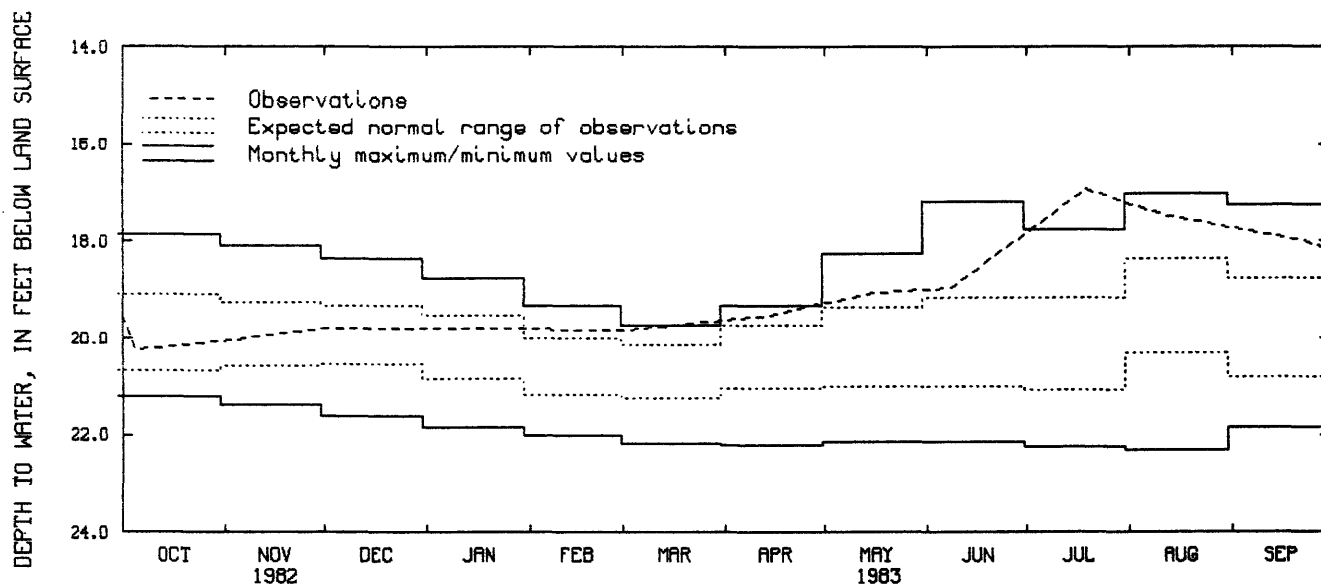
DATUM.--Altitude of land-surface datum is 998 ft (304 m). Measuring point: Top of casing, 2.30 ft (0.70 m) above land-surface datum.

PERIOD OF RECORD.--August 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 16.92 ft (5.16 m) below land-surface datum, July 19, 1983; lowest, 22.32 ft (6.80 m) below land-surface datum, Aug. 18, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	20.24	DEC 1	19.79	APR 12	19.55	JUN 8	18.96	AUG 11	17.45	SEP 22	17.98
NOV 2	20.04	MAR 3	19.82	MAY 16	19.06	JUL 19	16.92				



035N29W28ABC01

## GROUND-WATER LEVELS

## STEARNS COUNTY

452357094145302. Local number, 122N28W07ABA02.

LOCATION.--Lat 45°23'57" in 94°14'53", in NE¼NW¼NE¼ sec.7, T.122 N., R.28 W., Hydrologic Unit 07010203, on Mark John farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 22 ft (6.7 m), screened 20 to 22 ft (6.1 to 6.7 m).

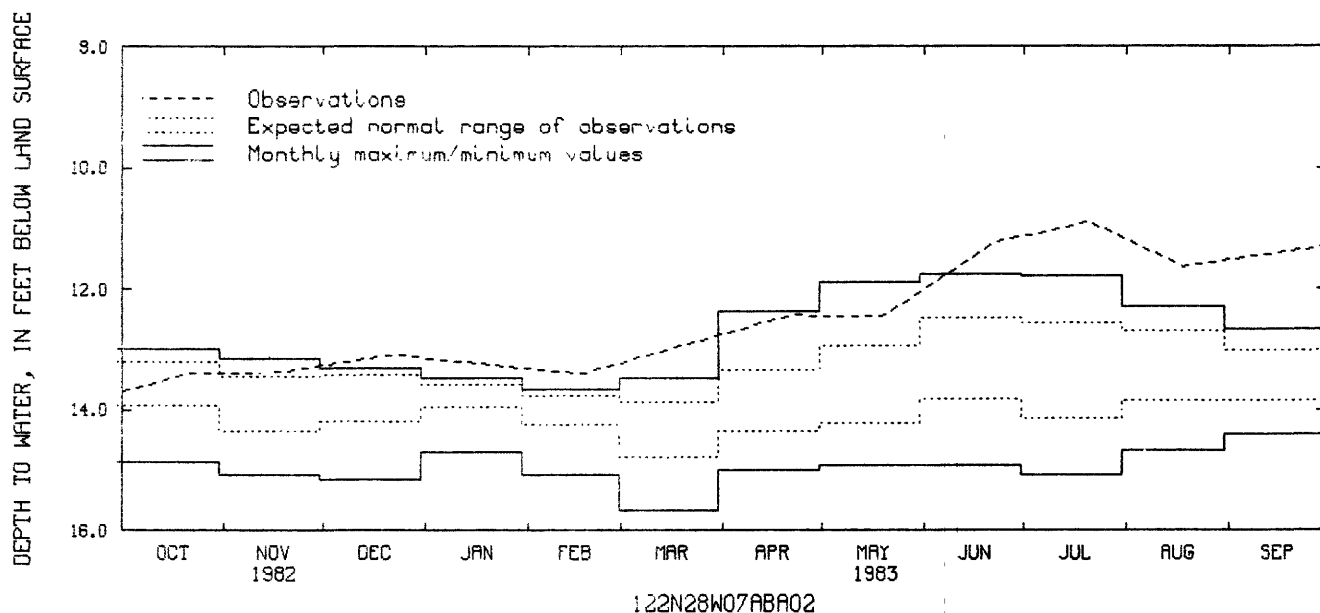
DATUM.--Land-surface datum is 1,132.3 ft (345.1 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 4.70 ft (1.43 m) above land-surface datum.

PERIOD OF RECORD.--October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.89 ft (3.32 m) below land-surface datum, July 21, 1983; lowest, 15.67 ft (4.78 m) below land-surface datum, Mar. 10, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	13.40	DEC 22	13.08	FEB 17	13.40	MAY 19	12.46	JUL 21	10.89	AUG 18	11.63
NOV 18	13.37	JAN 20	13.25	APR 21	12.43	JUN 23	11.21				



452527094420702. Local number, 123N32W33AAD02.

LOCATION.--Lat 45°25'27", long 94°42'07", in SE¼NE¼NE¼ sec.33, T.123 N., R.32 W., Hydrologic Unit 07010202, 2.8 mi (4.5 km) north of Paynesville.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 14 ft (4.3 m), screened 12 to 14 ft (3.7 to 4.3 m).

DATUM.--Altitude of land-surface datum is 1,187 ft (362 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.03 ft (0.92 m) below land-surface datum, June 23, 1983; lowest, 12.03 ft (3.67 m) below land-surface datum, May 21, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	8.10	DEC 22	7.84	FEB 17	8.63	MAY 19	6.51	JUL 21	3.63	AUG 18	4.83
NOV 18	8.29	JAN 20	8.28	APR 21	6.17	JUN 23	3.03				

## STEARNS COUNTY--Continued

453158094123701. Local number, 124N28W21CDA01.

LOCATION.--Lat 45°31'58", long 94°12'37", in NE¼SE¼SW¼ sec.21, T.124 N., R.28 W., Hydrologic Unit 07010203, on Reinert farm, south of St. Cloud.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 11 ft (3.4 m), screened 9 to 11 ft (2.7 to 3.4 m).

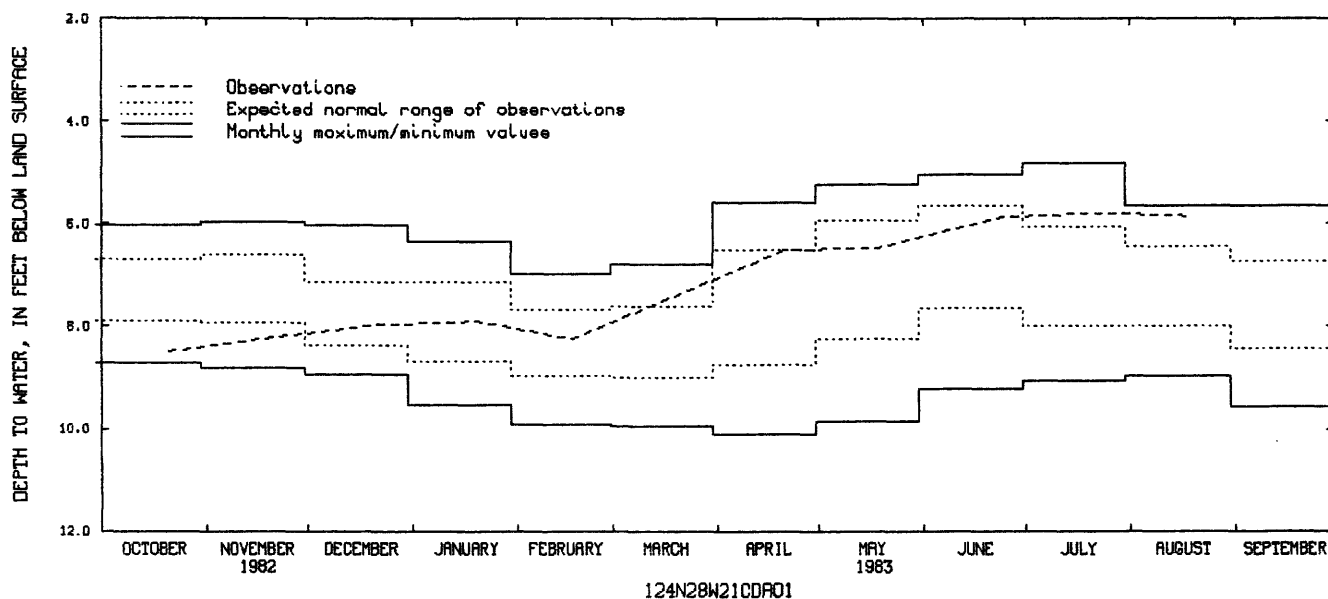
DATUM.--Altitude of land-surface datum is 1,078 ft (329 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

PERIOD OF RECORD.--October 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.82 ft (1.47 m) below land-surface datum, July 13, 1978; lowest, 10.10 ft (3.08 m) below land-surface datum, Apr. 22, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	8.49	DEC 22	7.96	FEB 17	8.25	MAY 19	6.45	JUL 21	5.78	AUG 18	5.85
NOV 18	8.24	JAN 20	7.90	APR 21	6.50	JUN 23	5.88				



453937094491102. Local number, 125N33W03CDA02.

LOCATION.--Lat 45°39'37", long 94°49'11", in NE¼SE¼SW¼ sec.3, T.125 N., R.33 W., Hydrologic Unit 07010202, on Melrose Golf Course.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 13 ft (4.0 m), screened 11 to 13 ft (3.4 to 4.0 m).

DATUM.--Altitude of land-surface datum is 1,209 ft (368 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--December 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.63 ft (1.11 m) below land-surface datum, Apr. 30, 1979; lowest, 7.88 ft (2.40 m) below land-surface datum, Feb. 9, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	4.68	DEC 22	4.86	FEB 17	5.19	MAY 19	4.76	JUL 21	4.36	AUG 18	4.91
NOV 18	4.78	JAN 20	5.02	APR 21	4.23	JUN 23	4.22				

## GROUND-WATER LEVELS

## STEARNS COUNTY--Continued

454346094284602. Local number, 126N30W17ABC02.

LOCATION.--Lat 45°43'46", long 94°28'46", in SW¼NW¼NE¼ sec.17, T.126 N., R.30 W., Hydrologic Unit 07010201, 0.2 mi (0.3 km) west of bridge in Holdingford.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 21 ft (6.4 m), screened 19 to 21 ft (5.8 to 6.4 m).

DATUM.--Altitude of land-surface datum is 1,142 ft (348 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--September 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 8.83 ft (2.69 m) below land-surface datum, July 13, 1978; lowest, 13.26 ft (4.04 m) below land-surface datum, Feb. 9, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	10.30	DEC 22	10.98	FEB 17	11.35	MAY 19	10.53	JUL 21	10.45	AUG 18	10.81
NOV 18	10.89	JAN 20	11.23	APR 21	9.99	JUN 23	10.84				

## STEELE COUNTY

435742093164001. Local number, 106N20W30BAD01.

LOCATION.--Lat 43°57'42", long 93°16'40", in SE¼NE¼NW¼ sec.30, T.106 N., R.20 W., Hydrologic Unit 07040002, at Hope.

Owner: Hope Elevator.

AQUIFER.--Galena Formation of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled commercial artesian well, diameter 5 in (0.13 m), depth 215 ft (65.5 m), cased to 108 ft (32.9 m).

DATUM.--Altitude of land-surface datum is 1,198 ft (365 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--November 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.13 ft (9.49 m) below land-surface datum, May 10, 1983; lowest, 33.78 ft (10.30 m) below land-surface datum, Sept. 15, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	32.30	JAN 12	31.84	MAR 8	31.82	MAY 10	31.13	JUL 21	32.70	SEP 15	33.78

440442093135801. Local number, 107N20W16ABD01.

LOCATION.--Lat 44°04'42", long 93°13'58", in SE¼NW¼NE¼ sec.16, T.107 N., R.20 W., Hydrologic Unit 07040002, at Owatonna.

Owner: City of Owatonna, well 4.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled public supply artesian well, diameter 16 in (0.41 m), depth 710 ft (216 m), cased to 376 ft (115 m).

DATUM.--Altitude of land-surface datum is 1,130 ft (344 m). Measuring point: Vent pipe, 1.00 ft (0.30 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--January 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 144.4 ft (44.01 m) below land-surface datum, Jan 14, 1982; lowest, 147.4 ft (44.93 m) below land-surface datum, May 10, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 12	146.8	MAY 10	147.4

## SWIFT COUNTY

451329096000101. Local number, 120N43W02DDD01.

LOCATION.--Lat 45°13'29", long 96°00'01", in SE¼SE¼SE¼ sec.2, T.120 N., R.43 W., Hydrologic Unit 07020002, at Appleton Airport.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 34 ft (10.4 m), screened 32 to 34 ft (9.8 to 10.4 m).

DATUM.--Altitude of land-surface datum is 1,020 ft (311 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--September 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 18.44 ft (5.62 m) below land-surface datum, Sept. 14, 1972; lowest, 25.02 ft (7.63 m) below land-surface datum, Feb. 16, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	24.33	DEC 3	24.23	FEB 9	24.16	APR 15	23.70	JUN 15	23.50	AUG 15	23.18
15	24.39	15	24.22	15	24.15	MAY 16	23.50	JUL 15	23.31	SEP 16	23.45
NOV 16	24.28	JAN 17	24.20	MAR 14	23.98						

451913095370201. Local number, 121N39W06BDB01.

LOCATION.--Lat 45°19'13", long 95°37'02", in NW¼SE¼NW¼ sec.6, T.121 N., R.39 W., Hydrologic Unit 07020005, in Ambush Park.

Owner: City of Benson.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 3 in (0.08 m), depth 143 ft (43.6 m), screened 123 to 143 ft (37.5 to 43.6 m).

DATUM.--Altitude of land-surface datum is 1,030 ft (314 m). Measuring point: Top of shelter floor, 3.10 ft (0.94 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--May 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.48 ft (1.98 m) below land-surface datum, June 29, 1979; lowest, 19.90 ft (6.07 m) below land-surface datum, July 24, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	10.58	DEC 21	9.84	MAR 25	7.67	JUN 27	9.65	AUG 26	11.99	SEP 19	7.76

452211095570701. Local number, 122N42W21BBB01.

LOCATION.--Lat 45°22'11", long 95°57'07", in NW¼NW¼NW¼ sec.21, T.122 N., R.42 W., Hydrologic Unit 07020002, north of Holloway.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 27 ft (8.2 m), screened 25 to 27 ft (7.6 to 8.2 m).

DATUM.--Altitude of land-surface datum 1,048 ft (319 m). Measuring point: Top of casing, 2.80 ft (0.85 m) above land-surface datum.

PERIOD OF RECORD.--September 1972 to current year.

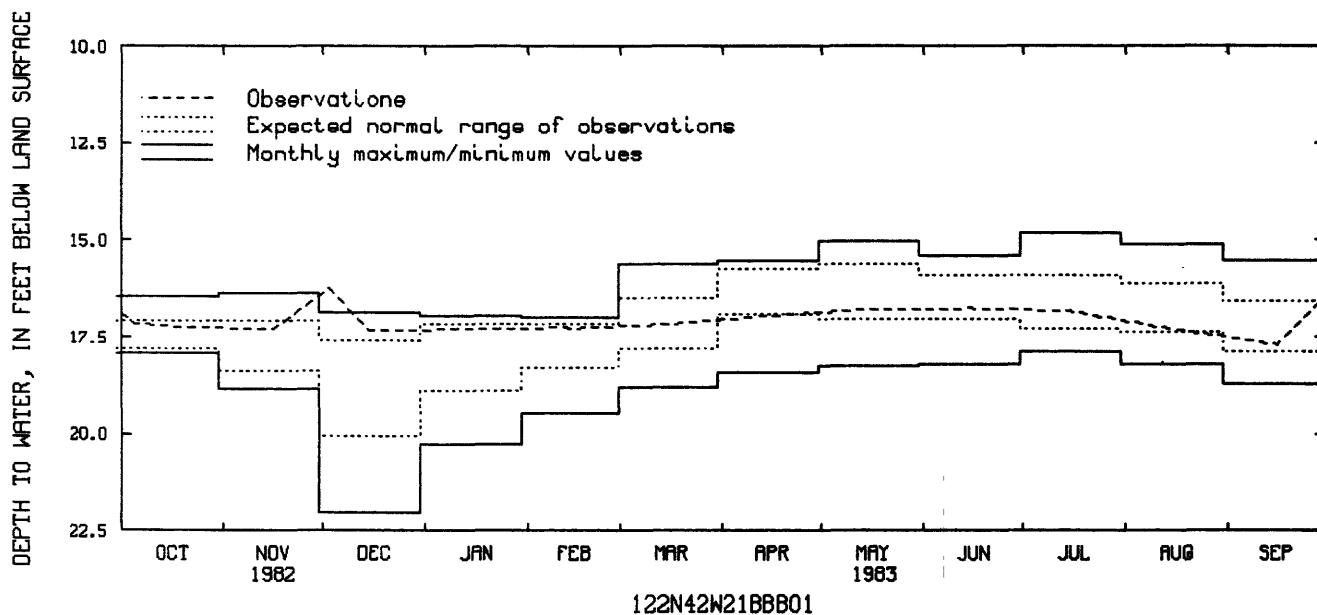
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 14.81 ft (4.51 m) below land-surface datum, July 9, 1979; lowest, 22.01 ft (6.71 m) below land-surface datum, Dec. 11, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	17.14	DEC 3	16.25	FEB 9	17.26	APR 15	16.95	JUN 15	16.76	AUG 15	17.30
15	17.22	15	17.32	15	17.27	MAY 16	16.78	JUL 15	16.83	SEP 16	17.69
NOV 16	17.30	JAN 17	17.30	MAR 14	17.17						

## GROUND-WATER LEVELS

SWIFT COUNTY--Continued



TODD COUNTY

455337094521001. Local number, 128N33W17CCB01.

LOCATION.--Lat 45°53'37", long 94°52'10", in NW¼SW¼SW¼ sec.17, T.128 N., R.33 W., Hydrologic Unit 07010202, 4.9 mi (7.9 km) south of Long Prairie.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 62 ft (18.9 m), screened 60 to 62 ft (18.3 to 18.9 m).

DATUM.--Altitude of land-surface datum 1,332 ft (406 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.77 ft (6.94 m) below land-surface datum, Nov. 27, 1979; lowest, 27.22 ft (8.30 m) below land-surface datum, Aug. 8, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	23.72	DEC 14	23.42	FEB 23	23.84	APR 14	23.24	JUN 15	24.15	AUG 18	23.34
NOV 17	23.45	JAN 18	23.66	MAR 17	23.55	MAY 19	23.51	JUL 12	22.85	SEP 16	22.80

460440094505901. Local number, 130N33W16BBA01.

LOCATION.--Lat 46°04'40", long 94°50'59", in NE¼NW¼NW¼ sec.16, T.130 N., R.33 W., Hydrologic Unit 07010108, 0.5 mi (0.8 km) east of Browerville.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 34 ft (10.4 m), screened 32 to 34 ft (9.8 to 10.4 m).

DATUM.--Altitude of land-surface datum 1,270 ft (387 m). Measuring point: Top of casing, 2.70 ft (0.82 m) above land-surface datum.

PERIOD OF RECORD.--June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 12.14 ft (3.70 m) below land-surface datum, Apr. 19, 1982; lowest, 14.18 ft (4.32 m) below land-surface datum, Mar. 16, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	12.58	DEC 14	13.03	FEB 14	13.44	APR 18	12.83	JUN 15	12.89	AUG 15	13.30
NOV 15	13.05	JAN 17	13.44	MAR 14	12.51	MAY 17	13.17	JUL 11	12.95	SEP 15	13.62



## TODD COUNTY--Continued

461234094480201. Local number, 132N33W26DCC01.

LOCATION.--Lat 46°12'34", long 94°48'02", in SW¼SW¼SE¼ sec.26, T.132 N., R.33 W., Hydrologic Unit 07010108, 11 mi (17.7 km) south of Staples.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 31 ft (9.4 m), screened 29 to 31 ft (8.8 to 9.4 m).

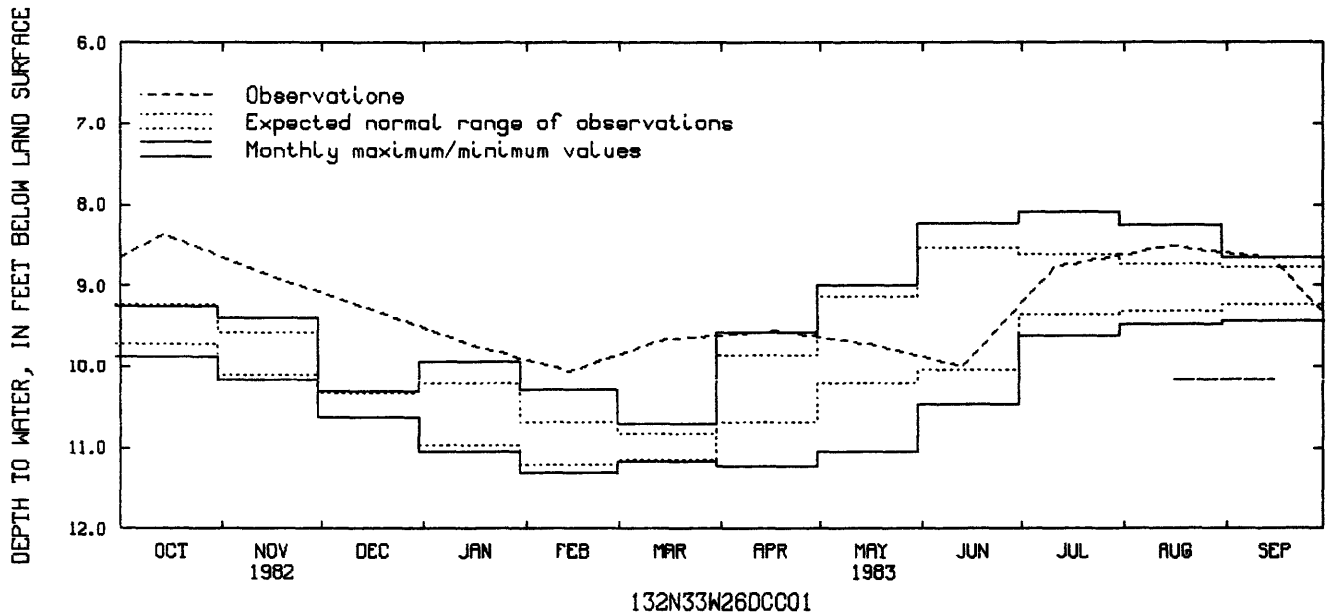
DATUM.--Altitude of land-surface datum 1,260 ft (384 m). Measuring point: Top of casing, 2.60 ft (0.79 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 8.08 ft (2.46 m) below land-surface datum, July 14, 1982; lowest, 11.31 ft (3.45 m) below land-surface datum, Feb. 28, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	8.36	DEC 15	9.28	FEB 14	10.06	APR 18	9.56	JUN 13	10.00	AUG 15	8.51
NOV 15	8.87	JAN 17	9.75	MAR 14	9.67	MAY 18	9.74	JUL 11	8.77	SEP 15	8.66



461935094413101. Local number, 133N32W14CCC01.

LOCATION.--Lat 46°19'35", long 94°41'31", in SW¼SW¼SW¼ sec.14, T.133 N., R.32 W., Hydrologic Unit 07010106, 2 mi (3.2 km) southwest of Motley.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 24 ft (7.3 m), screened 22 to 24 ft (6.7 to 7.3 m).

DATUM.--Altitude of land-surface datum 1,238 ft (377 m). Measuring point: Top of casing, 2.50 ft (0.76 m) above land-surface datum.

PERIOD OF RECORD.--May 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.14 ft (0.65 m) below land-surface datum, Apr. 19, 1982; lowest, 4.76 ft (1.45 m) below land-surface datum, Nov. 16, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	2.80	DEC 15	3.96	FEB 14	4.11	APR 18	2.99	JUN 13	3.87	AUG 15	4.21
NOV 15	3.51	JAN 17	4.08	MAR 14	2.90	MAY 18	3.31	JUL 13	3.43	SEP 15	4.42

## GROUND-WATER LEVELS

## TODD COUNTY--Continued

462024095091401. Local number, 133N35W07CCC01.

LOCATION.--Lat 46°20'24", long 95°09'14", in SW¼SW¼SW¼ sec.7, T.133 N., R.35 W., Hydrologic Unit 07010107, east of Kramer farm.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 15 ft (4.6 m), screened 13 to 15 ft (4.0 to 4.6 m).

DATUM.--Altitude of land-surface datum is 1,384 ft (422 m). Measuring point: Top of casing, 5.20 ft (1.58 m) above land-surface datum.

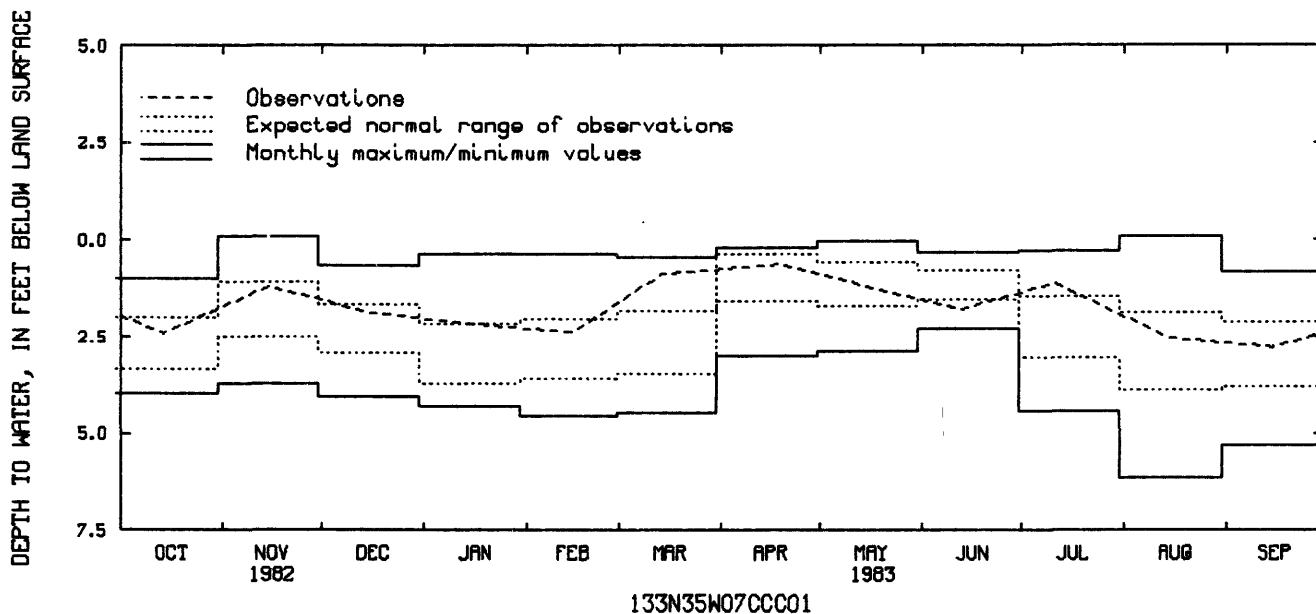
REMARKS.--Water level subject to freezing during winter.

PERIOD OF RECORD.--November 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.10 ft (0.03 m) above land-surface datum, Aug. 8, 1972; lowest, 6.13 ft (1.87 m) below land-surface datum, Aug. 10, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	2.40	DEC 15	1.86	FEB 15	2.38	APR 19	0.61	JUN 13	1.77	AUG 15	2.54
NOV 15	1.18	JAN 17	2.17	MAR 14	0.88	MAY 18	1.25	JUL 11	1.11	SEP 15	2.77



## GROUND-WATER LEVELS

## WABASHA COUNTY

442708092155401. Local number, 111N12W04BBD01.

LOCATION.--Lat 44°27'08", long 92°15'54", in SE¼NW¼NW¼ sec.04, T.111 N., R.12 W., Hydrologic Unit 07040001, at Lake City.

Owner: City of Lake City, well 3.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 16 in (0.41 m), depth 430 ft (131 m), cased to 258 ft (78.6 m).

DATUM.--Altitude of land-surface datum is 685 ft (209 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

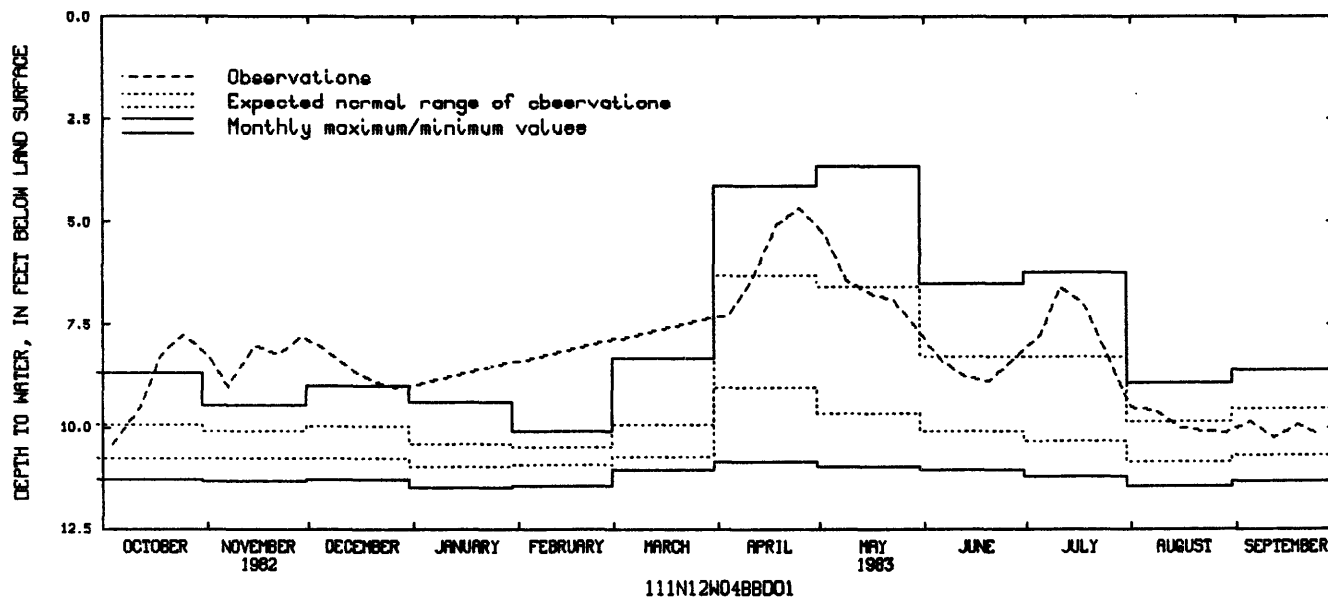
REMARKS.--Measured weekly by David Finley.

PERIOD OF RECORD.--August 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.63 ft (1.11 m) below land-surface datum, May 5, 1975; lowest, 11.50 ft (3.51 m) below land-surface datum, Jan. 31, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	10.42	DEC 6	8.12	FEB 14	9.48	APR 18	5.08	JUN 13	8.78	AUG 8	9.59
12	9.54	13	8.55	22	9.66	25	4.66	20	8.87	15	10.00
18	8.27	20	8.90	28	9.05	MAY 2	5.26	27	8.36	22	10.09
25	7.75	27	9.04	MAR 6	6.90	9	6.40	JUL 5	7.74	29	10.13
NOV 1	8.24	JAN 3	8.47	13	4.47	16	6.72	11	6.57	SEP 5	9.87
7	9.02	17	8.73	21	5.19	17	6.76	18	6.98	12	10.26
15	8.02	24	9.08	28	7.50	23	6.90	25	8.27	19	9.95
22	8.22	31	9.78	APR 4	7.24	JUN 1	7.86	AUG 1	9.52	26	10.18
29	7.80	FEB 8	9.85	11	6.40	6	8.39				



## GROUND-WATER LEVELS

## WADENA COUNTY

462415095003001. Local number, 134N34W19ADD01.

LOCATION.--Lat 46°24'21", long 95°00'36", in SE¼SE¼NE¼ sec.19, T.134 N., R.34 W., Hydrologic Unit 07010107, 0.05 mi (0.08 km) north of Verndale.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 37 ft (11.3 m), screened 34 to 37 ft (10.4 to 11.3 m).

DATUM.--Altitude of land-surface datum is 1,342 ft (409 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--September 1966 to current year.

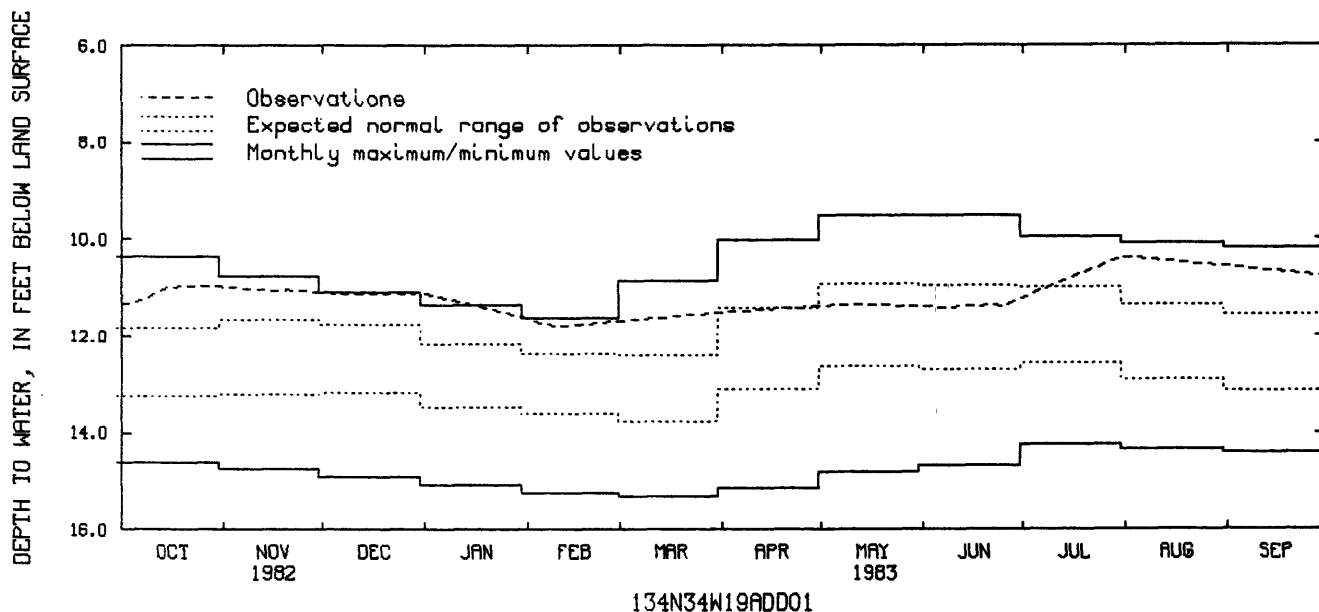
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 9.48 ft (2.89 m) below land-surface datum, June 2, 1972; lowest, 15.33 ft (4.41 m) below land-surface datum, Mar. 10-11, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	11.31	11.00	11.11	.....	.....	.....	11.48	11.37	11.41	.....	10.40	10.60
10	11.15	11.02	11.14	.....	11.80	.....	11.48	11.36	11.41	.....	10.43	10.63
15	11.00	11.05	11.13	.....	.....	.....	11.45	11.36	11.40	.....	10.46	10.66
20	10.94	11.04	11.12	.....	.....	.....	11.43	11.36	11.37	.....	10.50	10.70
25	10.95	11.06	11.12	.....	.....	.....	11.41	11.39	11.38	.....	10.53	10.73
DOM	10.97	11.09	11.10	.....	.....	.....	11.40	11.40	.....	10.37	10.55	10.77

WTR YEAR 1983      HIGHEST 10.93 OCT 28, 1982

LOWEST 11.80 FEB 10, 1983



134N34W19ADD01

463027094480201. Local number, 135N33W14ADD01.

LOCATION.--Lat 46°30'27", long 94°48'02", in SE¼SE¼NE¼ sec.14, T.135 N., R.33 W., Hydrologic Unit 07010106, 4.6 mi (7.4 km) south of Oyle.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 20 ft (6.1 m), screened 18 to 20 ft (5.5 to 6.1 m).

DATUM.--Altitude of land-surface datum is 1,265 ft (386 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.58 ft (3.22 m) below land-surface datum, May 16, 1979; lowest, 15.15 ft (4.62 m) below land-surface datum, Nov. 14, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	13.27	DEC 15	13.10	MAR 18	13.00	MAY 18	13.33	JUL 18	11.91	SEP 14	12.98
NOV 15	13.13	FEB 14	13.27	APR 18	13.10	JUN 15	13.28	AUG 17	12.29		

## GROUND-WATER LEVELS

## WADENA COUNTY--Continued

463906094521201. Local number, 137N33W29DAA01.

LOCATION.--Lat 46°39'06", long 94°52'12", in NE¼NE¼SE¼ sec.29, T.137 N., R.33 W., Hydrologic Unit 07010106, at Nimrod Ranger Station.

Owner: State of Minnesota.

AQUIFER.--Buried sand of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 2 in (0.05 m), depth 70 ft (21.3 m).

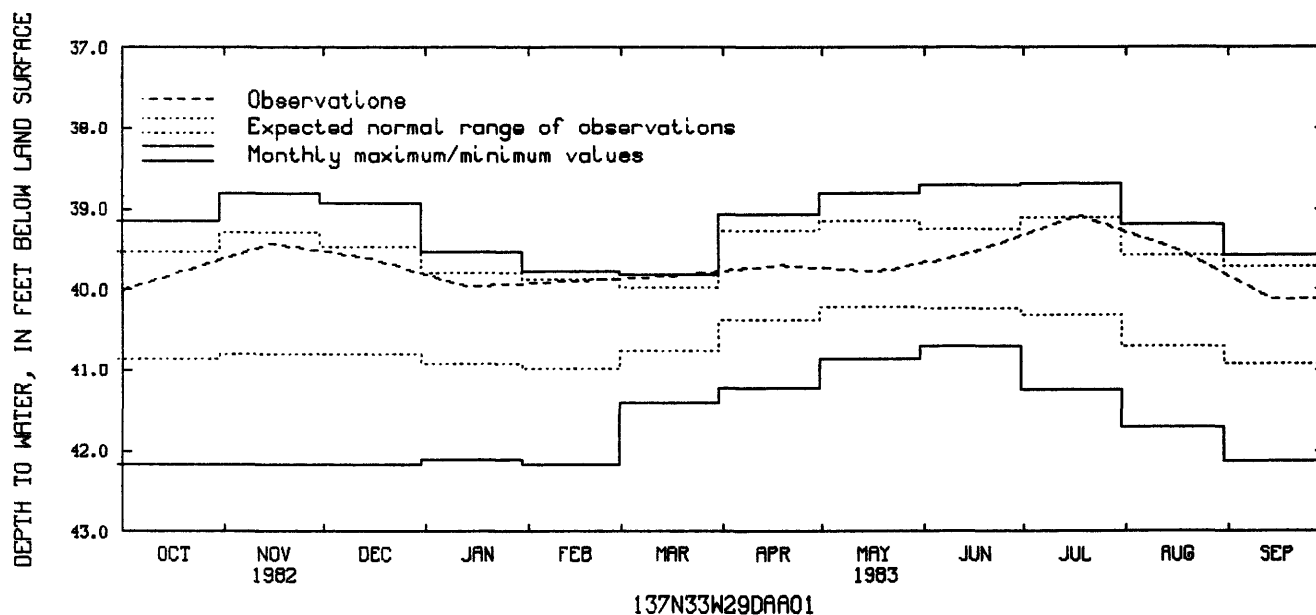
DATUM.--Altitude of land-surface datum is 1,372 ft (418 m). Measuring point: Top of casing, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 38.69 ft (11.79 m) below land-surface datum, July 16, 1979; lowest, 42.17 ft (12.85 m) below land-surface datum, Oct. 16, 1976.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	39.43	JAN 13	39.96	APR 18	39.70	JUN 15	39.55	AUG 17	39.51	SEP 14	40.11
DEC 15	39.61	MAR 17	39.83	MAY 18	39.78	JUL 18	39.08				



464116095010101. Local number, 137N34W07DDD01.

LOCATION.--Lat 46°41'16", long 95°01'01", in SE¼SE¼SE¼ sec.7, T.137 N., R.34 W., Hydrologic Unit 07010106, northeast of Sebeka.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 10 ft (3.1 m), screened 8 to 10 ft (2.4 to 3.1 m).

DATUM.--Altitude of land-surface datum is 1,368 ft (417 m). Measuring point: Top of casing, 2.80 ft (0.85 m) above land-surface datum.

PERIOD OF RECORD.--October 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.17 ft (0.05 m) below land-surface datum, Apr. 18, 1979; lowest, 5.59 ft (1.70 m) below land-surface datum, Jan. 15, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	1.91	JAN 13	2.90	MAR 17	4.36	MAY 18	1.94	JUL 18	1.81	SEP 14	3.56
DEC 15	2.40	FEB 14	3.57	APR 18	1.69	JUN 15	1.38	AUG 17	2.94		

## GROUND-WATER LEVELS

## WASHINGTON COUNTY

445125092464001. Local number, 027N20W02BCC01.

LOCATION.--Lat 44°51'25", long 92°46'40", in SW¼SW¼NW¼ sec.2, T.27 N., R.20 W., Hydrologic Unit 07030005, in Afton State Park by Afton Alps.

Owner: U.S. Geological Survey.

AQUIFER.--St. Lawrence Formation and Franconian Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in (0.15 m), depth 285 ft (86.9 m), cased to 105 ft (32.0 m).

DATUM.--Altitude of land-surface datum is 695 ft (212 m). Measuring point: Center of pressure guage, 4.50 ft (1.37 m) above land-surface datum.

PERIOD OF RECORD.--March 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 33.94 ft (10.38 m) above land-surface datum, May 2, 1980; lowest, 25.20 ft (7.68 m) above land-surface datum, Sept. 27, 1983.

WATER LEVEL, IN FEET ABOVE LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL
SEP 27	25.20

445125092464002. Local number, 027N20W02BCC02.

LOCATION.--Lat 44°51'25", long 92°46'40", in SW¼SW¼NW¼ sec.2, T.27 N., R.20 W., Hydrologic Unit 07030005, in Afton State Park by Afton Alps.

Owner: U.S. Geological Survey.

AQUIFER.--Ironton-Galesville Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.10 m), depth 385 ft (117 m), cased to 365 ft (111 m).

DATUM.--Altitude of land-surface datum is 695 ft (212 m). Measuring point: Center of pressure guage, 4.50 ft (1.37 m) above land-surface datum.

PERIOD OF RECORD.--March 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 42.35 ft (12.91 m) above land-surface datum, May 2, 1980; lowest, 31.18 ft (9.50 m) above land-surface datum, Sept. 27, 1983.

WATER LEVEL, IN FEET ABOVE LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL
SEP 27	31.18

445125092464003. Local number, 027N20W02BCC03.

LOCATION.--Lat 44°51'25", long 92°46'40", in SW¼SW¼NW¼ sec.2, T.27 N., R.20 W., Hydrologic Unit 07030005, in Afton State Park by Afton Alps.

Owner: U.S. Geological Survey.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 1½ in (0.04 m), depth 535 ft (163 m), screened 530 to 535 ft (162 to 163 m).

DATUM.--Altitude of land-surface datum is 695 ft (212 m). Measuring point: Center of pressure guage, 4.70 ft (1.43 m) above land-surface datum.

PERIOD OF RECORD.--March 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.05 ft (6.72 m) above land-surface datum, May 2, 1980; lowest, 13.70 ft (4.18 m) above land-surface datum, Sept. 27, 1983.

WATER LEVEL, IN FEET ABOVE LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL
SEP 27	13.70

## WASHINGTON COUNTY--Continued

444751092563101. Local number, 027N21W28BCC01.

LOCATION.--Lat 44°47'51", 92°55'31", in SW¼SW¼NW¼ sec.28, T.27 N., R.21 W., Hydrologic Unit 07010206, 0.1 mi (0.2 km) east of Ideal Avenue South.

Owner: Eugene Smallidge.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation water-table well, diameter 16 in (0.41 m), depth 345 ft (105 m), cased to 60 ft (18.3 m).

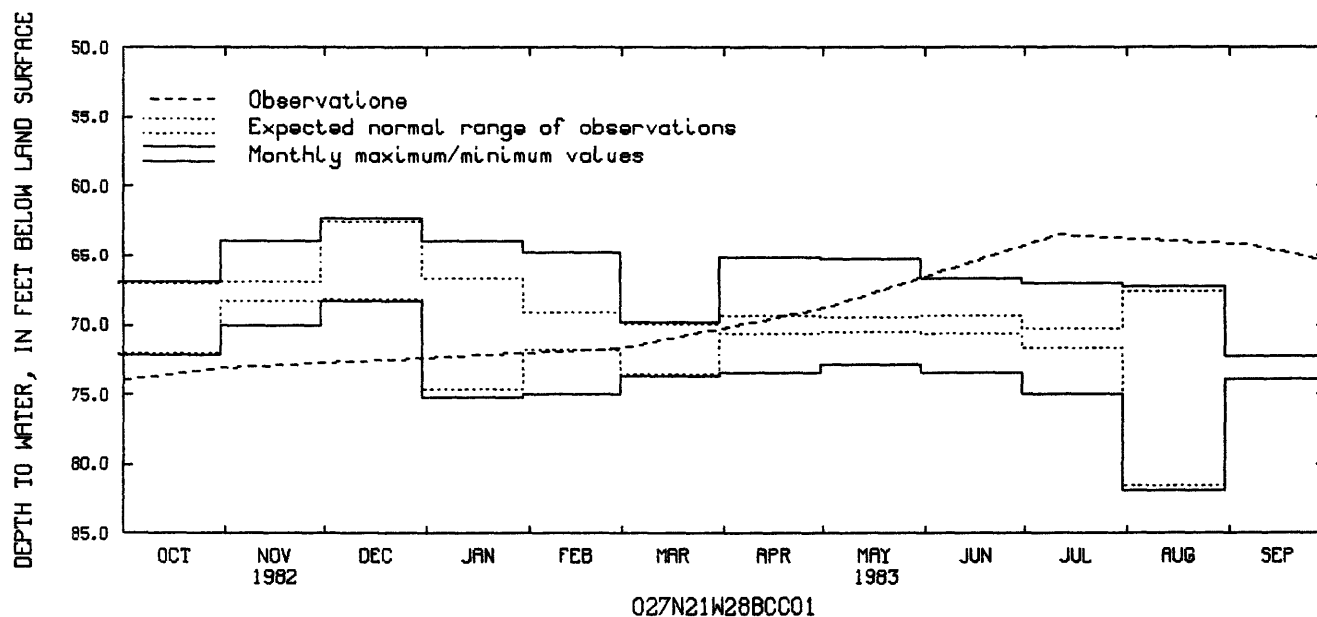
DATUM.--Altitude of land-surface datum is 807 ft (246 m). Measuring point: Hole in pump base, 2.10 ft (0.64 m) above land-surface datum.

PERIOD OF RECORD.--August 1977, January 1978, December 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 62.34 ft (19.00 m) below land-surface datum, Dec. 10, 1979; lowest, 81.87 ft (24.95 m) below land-surface datum, Aug. 3, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	73.09	JAN 3	72.35	FEB 28	71.73	MAY 2	68.76	JUL 11	63.50	SEP 7	64.23



445536092462401. Local number, 028N20W11CAA01.

LOCATION.--Lat 44°55'36", long 92°46'24", in NE¼NE¼SW¼ sec.11, T.28 N., R.20 W., Hydrologic Unit 07030005, at Lake St. Croix Beach.

Owner: Lower St. Croix Valley Fire Department.

AQUIFER.--Franconian Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled domestic water-table well, diameter 4 in (0.10 m), depth 94 ft (28.6 m), cased to 78 ft (23.8 m).

DATUM.--Altitude of land-surface datum is 720 ft (220 m). Measuring point: Top of electrical housing, 1.70 ft (0.52 m) above land-surface datum.

PERIOD OF RECORD.--June 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.78 ft (9.69 m) below land-surface datum, May 14, 1979; lowest, 38.65 ft (11.78 m) below land-surface datum, Mar. 3, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	36.72	JAN 13	36.94	MAR 9	36.73	MAY 4	31.85	JUL 6	34.77	SEP 13	37.46

## GROUND-WATER LEVELS

## WASHINGTON COUNTY--Continued

445220092465901. Local number, 028N20W34ADA01.

LOCATION.--Lat 44°52'20", long 92°46'59", in NE¼SE¼NE¼ sec.34, T.28 N., R.20 W., Hydrologic Unit 07030005, in Afton State Park.

Owner: State of Minnesota.

AQUIFER.--Franconia Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 4 in (0.10 m), depth 306 ft (93.2 m), cased to 276 ft (84.1 m).

DATUM.--Altitude of land-surface datum is 970 ft (296 m). Measuring point: Top of casing, 0.90 ft (0.27 m) above land-surface datum.

PERIOD OF RECORD.--August 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 242.0 ft (73.76 m) below land-surface datum, June 9, 1980; lowest, 245.2 ft (74.74 m) below land-surface datum, Jan. 6, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR 9	244.2	MAY 4	242.8	JUL 11	243.6	SEP 13	244.2

450134092583101. Local number, 029N21W06CAD01.

LOCATION.--Lat 45°01'34", long 92°58'31", in SE¼NE¼SW¼ sec.6, T.29 N., R.21 W., Hydrologic Unit 07010206, at 6488 North Highway 36 Boulevard.

Owner: Twenty Nine Pines Trailer Park.

AQUIFER.--St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in (0.15 m), depth 210 ft (64.0 m), cased to 141 ft (43.0 m).

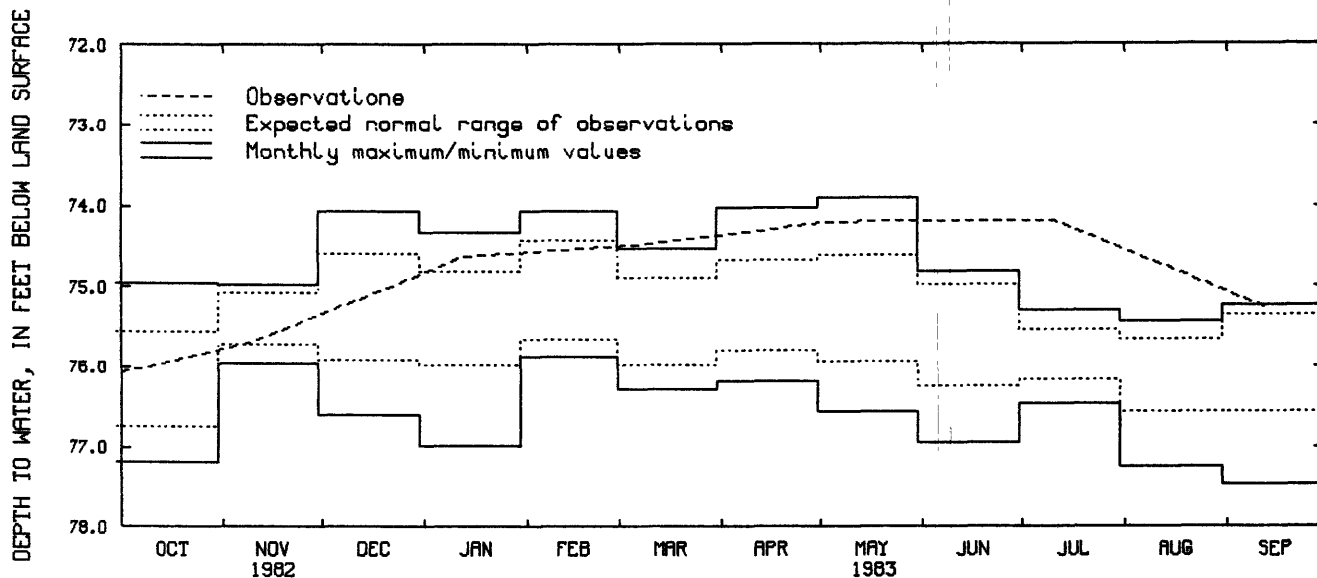
DATUM.--Altitude of land-surface datum is 980 ft (299 m). Measuring point: Hole in pump base, 2.20 ft (0.67 m) above land-surface datum.

PERIOD OF RECORD.--April 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 73.90 ft (22.52 m) below land-surface datum, May 10, 1982; lowest, 77.47 ft (23.61 m) below land-surface datum, Sept. 13, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 9	75.70	JAN 13	74.63	MAR 9	74.48	MAY 4	74.20	JUL 11	74.19	SEP 13	75.27



029N21W06CAD01



## WASHINGTON COUNTY--Continued

Owner: City of Lake Elmo.

Owner: City of Lake Elmo.  
AQUIFER.--Jordan Sandstone of Late Cambrian Age.

**WELL CHARACTERISTICS.**--Drilled unused artesian well, diameter 6 in (0.15 m), depth 348 ft (106 m), cased to 280 ft (85.3 m).

DATUM.--Altitude of land-surface datum is 935 ft (285 m). Measuring point: Top of well cap, 1.20 ft (0.37 m) above land-surface datum.

PERIOD OF RECORD.--September 1977, February 1978, February 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 38.08 ft (11.61 m) below land-surface datum, Sept. 13, 1983;  
lowest, 45.65 ft (13.91 m) below land-surface datum, Sept. 28, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	40.86	JAN 13	40.45	MAR 9	41.02	MAY 4	39.80	JUL 11	38.17	SEP 13	38.08

LOCATION.--Lat 44°59'58", long 92°52'39", in NW¼NE¼SW¼ sec.13, T.29 N., R.21 W., Hydrologic Unit 07010206, in City of Lake Elmo.

Owner: Elmo Lumber and Plywood. Formerly Lake Elmo Creamery.

**AQUIFER.**--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in (0.30 m), depth 122 ft (37.2 m), screened 106 to 122 ft (32.3 to 37.2 m).

DATUM.--Altitude of land-surface datum is 938 ft (286 m). Measuring point: Hole in pump base, 1.30 ft (0.40 m) above land-surface datum.

PERIOD OF RECORD.--August 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 46.16 ft (14.07 m) below land-surface datum, Sept. 13, 1983;  
lowest, 51.37 ft (15.66 m) below land-surface datum, June 12, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	47.70	JAN 13	47.85	MAR 9	47.87	MAY 4	47.13	JUL 11	46.29	SEP 13	46.16

LOCATION.--Lat 45°06'46", long 92°47'35", in SE¼NE¼SW¼ sec.3, T.30 N., R.20 W., Hydrologic Unit 07030005, at Little Carnelian Lake.

Owner: Stillwater Township.

AQUIFER.--Iron-ton-Galesville Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.10 m), depth 360 ft (110 m), cased to 303 ft (92.4 m).

DATUM.--Land-surface datum is 915.6 ft (279.1 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.30 ft (0.70 m) above land-surface datum.

PERIOD OF RECORD.--September 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 128.7 ft (39.23 m) below land-surface datum, Sept. 5, 1983;  
lowest, 139.2 ft (42.43 m) below land-surface datum, Sept. 25, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

[illegible]

## GROUND-WATER LEVELS

## WASHINGTON COUNTY--Continued

450647092473503. Local number, 030N20W03CAD03.

LOCATION.--Lat 45°06'47", long 92°47'35", in SE¼NE¼SW¼ sec.3, T.30 N., R.20 W., Hydrologic Unit, 07030005, at Little Carnelian Lake.

Owner: Stillwater Township.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 4 in (0.10 m), depth 130 ft (39.6 m), screened 126 to 130 ft (38.4 to 39.6 m).

DATUM.--Land-surface datum is 915.6 ft (279.1 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.30 ft (0.70 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 100.0 ft (30.48 m) below land-surface datum, Aug. 5, 1983; lowest, 106.4 ft (32.43 m) below land-surface datum, Oct. 21, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	103.0	DEC 5	102.4	FEB 4	101.7	APR 2	101.9	JUN 13	101.4	AUG 5	100.0
14	102.6	JAN 9	101.8	MAR 5	102.2	MAY 15	101.7	JUL 13	101.2	SEP 5	100.4
NOV 7	102.6										

450858092575001. Local number, 031N21W28ABD01.

LOCATION.--Lat 45°08'58", long 92°57'50", in SE¼NW¼NE¼ sec.28, T.31 N., R.21 W., Hydrologic Unit 07010206, County Road 8A, 1.65 mi (2.6 km) east of Highway 61.

Owner: White Bear Gun Club.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 4 in (0.10 m), depth 142 ft (43.3 m), cased to 94 ft (28.6 m).

DATUM.--Altitude of land-surface datum is 939 ft (28.6 m). Measuring point: Top of well cap, 1.30 ft (0.40 m) above land-surface datum.

PERIOD OF RECORD.--September 1977, February 1978, February 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 9.37 ft (2.86 m) below land-surface datum, July 19, 1983; lowest, 13.17 ft (4.01 m) below land-surface datum, Sept. 30, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	11.13	JAN 13	10.80	MAR 9	10.30	MAY 13	9.50	JUL 19	9.37	SEP 9	9.85

451355092532601. Local number, 032N20W30BCD01.

LOCATION.--Lat 45°13'55", long 92°53'26", in SE¼SW¼NW¼ sec.30, T.32 N., R.20 W., Hydrologic Unit 07030005, 0.25 mi (0.4 km) north of 192nd Street.

Owner: Arno Birr.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 260 ft (79.2 m), cased to 141 ft (43.0 m).

DATUM.--Altitude of land-surface datum is 990 ft (302 m). Measuring point: Vent pipe, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--March 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 52.64 ft (16.04 m) below land-surface datum, Sept. 9, 1983; lowest, 53.97 ft (16.43 m) below land-surface datum, Mar. 9, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	53.87	MAR 9	53.97	MAY 13	53.20	JUL 19	52.78	SEP 9	52.64

## GROUND-WATER LEVELS

## WATONWAN COUNTY

440037094372601. Local number, 106N32W01DDB01.

LOCATION.--Lat 44°00'37", long 94°37'26", in NW¼SE¼SE¼ sec.1, T.106 N., R.32 W., Hydrologic Unit 07020010, north of St. James.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 2 in (0.05 m), depth 22 ft (6.7 m), screened 19 to 22 ft (5.8 to 6.7 m).

DATUM.--Altitude of land-surface datum is 1,056.2 ft (321.9 m) National Geodetic Vertical Datum of 1929.

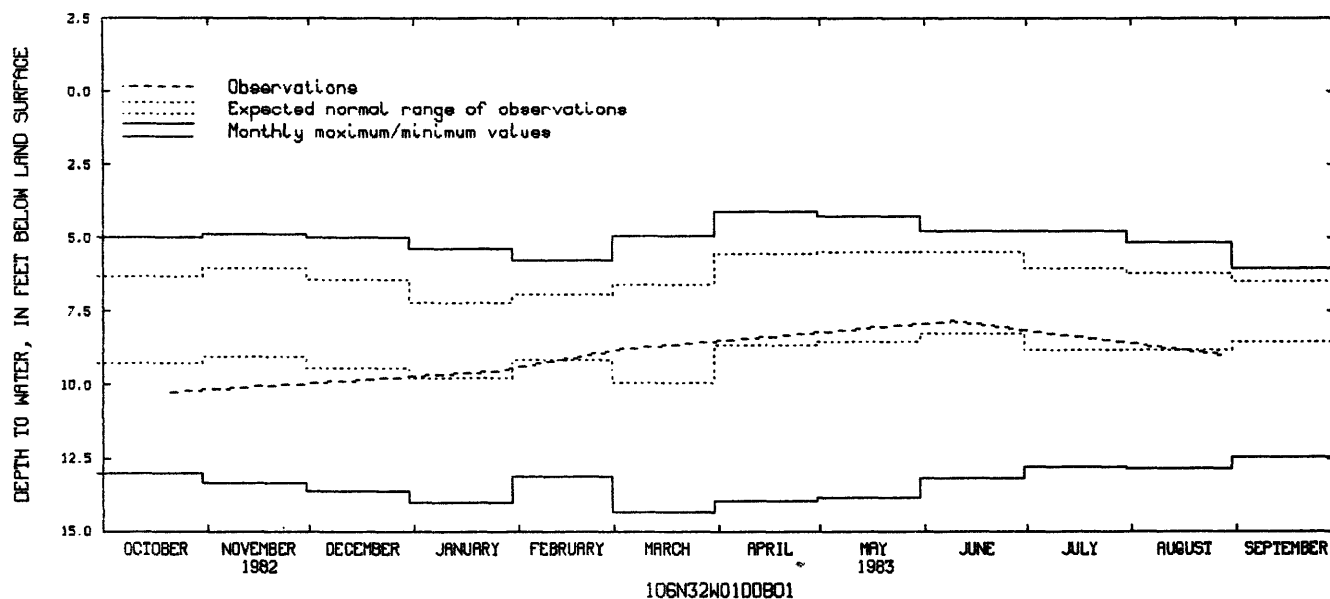
Measuring point: Top of wood platform, 0.80 ft (0.24 m) above land-surface datum.

PERIOD OF RECORD.--November 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.11 ft (1.25 m) below land-surface datum, Apr. 27, 1969; lowest, 14.34 ft (4.37 m) below land-surface datum, Mar. 1, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	10.24	JAN 25	9.52	MAR 4	8.77	JUN 9	7.83	AUG 29	8.99



440409094304901. Local number, 107N31W14DAC01.

LOCATION.--Lat 44°04'09", long 94°30'49", in SW¼NE¼SE¼ sec.14, T.107 N., R.31 W., Hydrologic Unit 07020010, 2.75 mi (4.4 km) east of LaSalle.

Owner: William Lassas.

AQUIFER.--Sandstone of Cretaceous Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 12 in (0.30 m), depth 150 ft (45.7 m), screened 100 to 135 ft (30.5 to 41.2 m).

DATUM.--Altitude of land-surface datum is 1,008 ft (307 m). Measuring point: Vent pipe, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--September 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.44 ft (3.18 m) below land-surface datum, May 9, 1983; lowest, 14.32 ft (4.36 m) below land-surface datum, Sept. 15, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	12.80	JAN 10	12.40	MAR 7	10.55	MAY 9	10.44	SEP 14	14.20

## GROUND-WATER LEVELS

## WATONWAN COUNTY--Continued

440133094312501. Local number, 107N31W35CAC01.

LOCATION.--Lat 44°01'33", long 94°31'25", in SW¼NE¼SW¼ sec.35, T.107 N., R.31 W., Hydrologic Unit 07020010, northeast of St. James.

Owner: Al Guyer.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled irrigation artesian well, diameter 10 in (0.25 m), depth 350 ft (107 m), screened 310 to 350 ft (94.5 to 107 m).

DATUM.--Altitude of land-surface datum is 1,055 ft (322 m). Measuring point: Vent pipe, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--September 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 29.83 ft (9.09 m) below land-surface datum, May 9, 1983; lowest, 33.70 ft (10.27 m) below land-surface datum, Sept. 15, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 28	32.20	MAY 9	29.83	JUL 20	31.82	SEP 14	33.68

## WRIGHT COUNTY

450318094040602. Local number, 118N27W03CAC01.

LOCATION.--Lat 45°03'18", long 94°04'06", in SW¼NE¼SW¼ sec.3, T.118 N., R.27 W., Hydrologic Unit 07010204, at Howard Lake, well 1.

Owner: City of Howard Lake.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age and Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in (0.20 m), depth 510 ft (155 m), originally drilled to 900 ft (274 m), cased to 483 ft (147 m).

DATUM.--Altitude of land-surface datum is 1,045 ft (318 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

REMARKS.--Water level affected by pumping from well 115 ft (35.05 m) away.

PERIOD OF RECORD.--September 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 144.3 ft (43.98 m) below land-surface datum, Apr. 5, 1983; lowest, 157.2 ft (47.91 m) below land-surface datum, Jan. 18, 1983.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	145.4	JAN 18	157.2	FEB 28	151.6	APR 5	144.3	JUN 8	150.3	SEP 1	152.7

## GROUND-WATER LEVELS

## WRIGHT COUNTY--Continued

450318094040603. Local number, 118N27W03CAC03.

LOCATION.--Lat 45°03'18", long 94°04'06", in SW¼NE¼SW¼ sec.3, T.118 N., R.27 W., Hydrologic Unit 07010204, at Howard Lake water tower.

Owner: City of Howard Lake, well 3.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled public-supply artesian well, diameter 12 in (0.30 m), depth 148 ft (45.1 m), screened 138 to 148 ft (42.1 to 45.1 m).

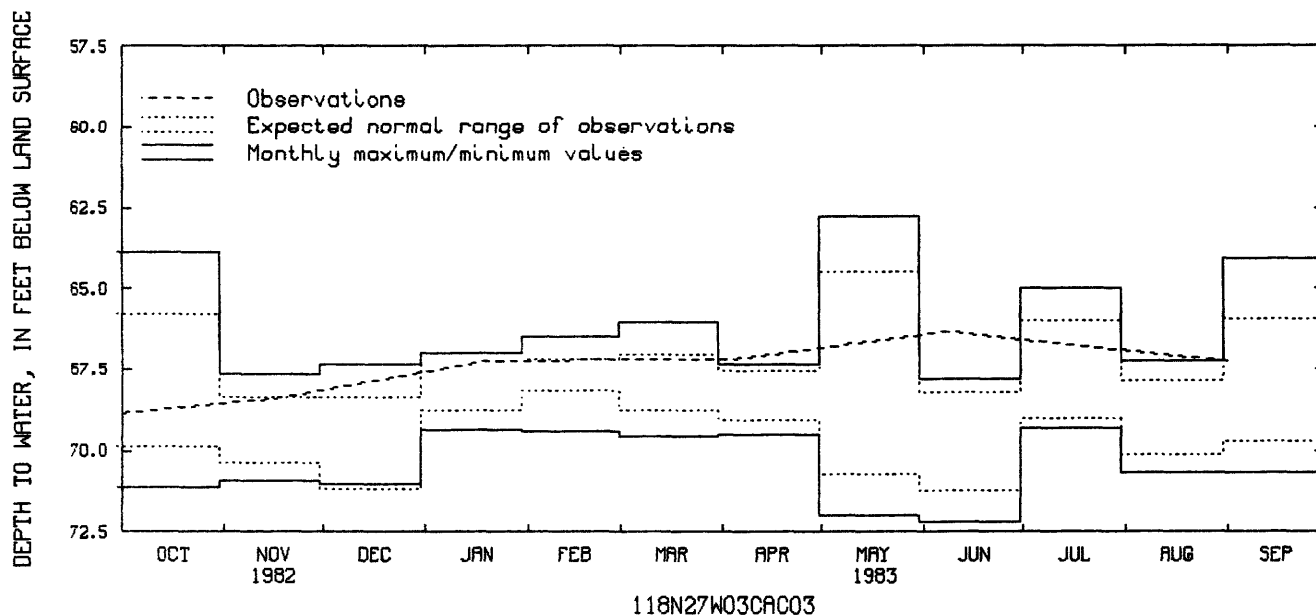
DATUM.--Altitude of land-surface datum is 1,045 ft (319 m). Measuring point: Top of breather pipe, 1.80 ft (0.55 m) above land-surface datum.

PERIOD OF RECORD.--September 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 62.78 ft (19.14 m) below land-surface datum, May 29, 1979; lowest, 72.19 ft (22.00 m) below land-surface datum, June 24, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	68.38	JAN 18	67.27	FEB 28	67.20	APR 5	67.18	JUN 8	66.34	SEP 1	67.27



450628093542102. Local number, 119N26W24BAB02.

LOCATION.--Lat 45°06'28", long 93°54'21", in NW¼NE¼NW¼ sec.24, T.119 N., R.26 W., Hydrologic Unit 07010204, 5.4 mi (1.65 km) south of Buffalo.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 13 ft (4.0 m), screened 11 to 13 ft (3.4 to 4.0 m).

DATUM.--Altitude of land-surface datum is 936 ft (285 m). Measuring point: Top of casing, 3.50 ft (1.07 m) above land-surface datum.

PERIOD OF RECORD.--December 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 2.92 ft (0.89 m) below land-surface datum, July 12, 1983; lowest, 8.03 ft (2.45 m) below land-surface datum, Aug. 17, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	6.67	DEC 8	5.23	FEB 4	5.53	APR 1	4.08	JUN 8	4.19	AUG 5	4.00
NOV 18	5.19	JAN 15	5.20	MAR 7	4.00	MAY 3	3.90	JUL 12	2.92	SEP 1	4.32

## GROUND-WATER LEVELS

## WRIGHT COUNTY--Continued

450403093544501. Local number, 119N26W35DDA01.

LOCATION.--Lat 45°04'03", long 93°54'45", in NE¼SE¼SE¼ sec.35, T.119 N., R.26 W., Hydrologic Unit 07010204, at Montrose.

Owner: City of Montrose, well 1.

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age and Hinckley Sandstone of Late Precambrian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 10 in (0.25 m), depth 693 ft (211 m), cased to 526 ft (160 m).

DATUM.--Altitude of land-surface datum is 1,000 ft (305 m). Measuring point: Edge of breather pipe, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--September 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 73.54 ft (22.41 m) below land-surface datum, Sept. 28, 1981; lowest, 78.38 ft (23.89 m) below land-surface datum, Nov. 3, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	76.34	JAN 18	76.37	FEB 28	76.05	APR 5	75.99	JUN 8	75.40	SEP 1	75.63

451738093492402. Local number, 121N25W15BBA02.

LOCATION.--Lat 45°17'38", long 93°49'24", in NE¼NW¼NW¼ sec.15, T.121 N., R.25 W., Hydrologic Unit 07010203, 1.4 mi (2.2 km) south of I-94.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1½ in (0.03 m), depth 40 ft (12.2 m), screened 38 to 40 ft (11.6 to 12.2 m).

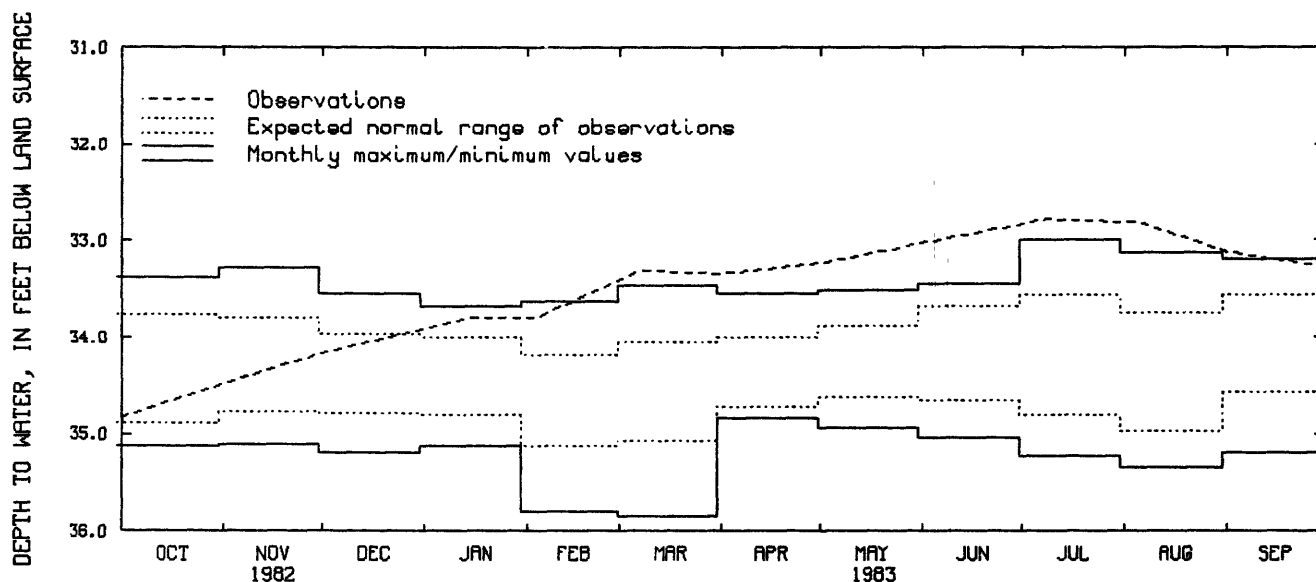
DATUM.--Altitude of land-surface datum is 966 ft (294 m). Measuring point: Top of casing, 4.00 ft (1.22 m) above land-surface datum.

PERIOD OF RECORD.--November 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 32.78 ft (9.99 m) below land-surface datum, July 8, 1983; lowest, 35.85 ft (10.93 m) below land-surface datum, Mar. 1, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	34.83	DEC 8	34.10	FEB 4	33.79	APR 1	33.34	JUN 3	33.01	AUG 5	32.81
NOV 18	34.29	JAN 15	33.80	MAR 7	33.31	MAY 3	33.22	JUL 8	32.78	SEP 1	33.12



## GROUND-WATER LEVELS

## YELLOW MEDICINE COUNTY

444111095404701. Local number, 114N40W16BAC01.

LOCATION.--Lat 44°41'11", long 95°40'47", in SW¼NE¼NW¼ sec.16, T.114 N., R.40 W., Hydrologic Unit 07020004, 3.3 mi (5.2 km) west of Hanley Falls.

Owner: Gilbert Orwoll.

AQUIFER.--Buried sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 5 in (0.13 m), depth 135 ft (41.1 m).

DATUM.--Altitude of land-surface datum is 1,055 ft (322 m). Measuring point: Top of casing, 1.30 ft (0.40 m) above land-surface datum.

REMARKS.--Water level affected by pumping from nearby irrigation well.

PERIOD OF RECORD.--June 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.56 ft (6.88 m) below land-surface datum, Jan. 18, 1983; lowest, 31.63 ft (9.64 m) below land-surface datum, Aug. 14, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	24.19	NOV 30	22.89	JAN 18	22.56

444219096165501. Local number, 114N45W04DCD01.

LOCATION.--Lat 44°42'19", long 96°16'55", in SE¼SW¼SE¼ sec.4, T.114 N., R.45 W., Hydrologic Unit 07020003, at Canby City Park.

Owner: City of Canby, well 6.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in (0.30 m), depth 62 ft (18.9 m), screened 44 to 68 ft (13.4 to 20.7 m).

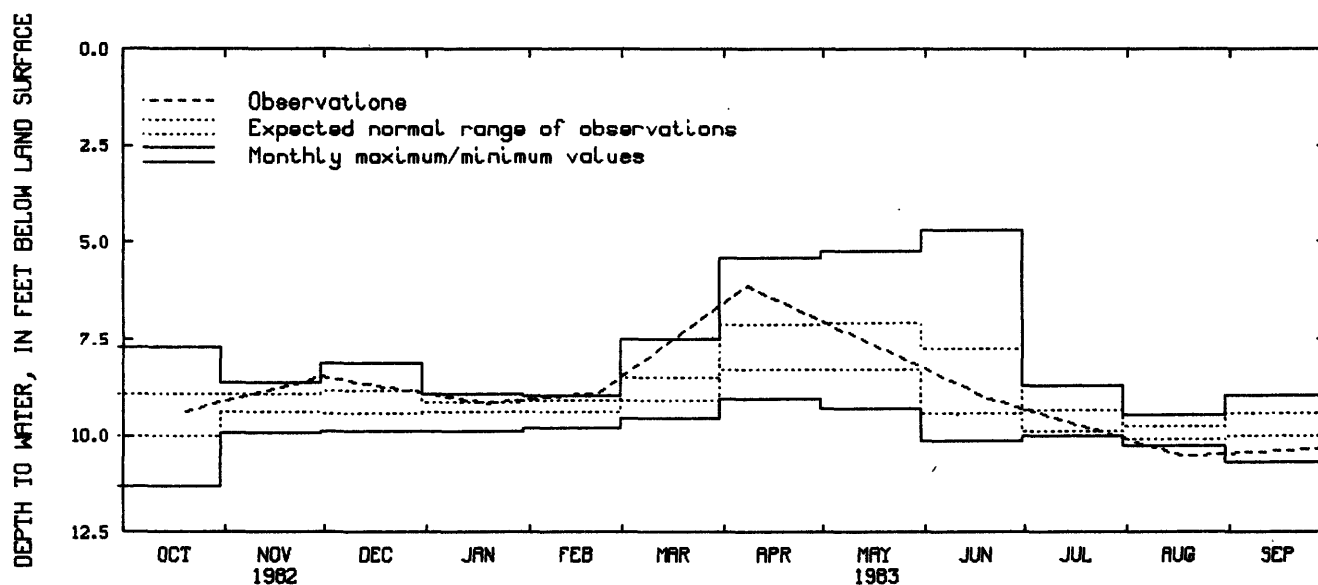
DATUM.--Altitude of land-surface datum is 1,255 ft (382 m). Measuring point: Top of casing, 2.90 ft (0.88 m) above land-surface datum.

PERIOD OF RECORD.--January 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.67 ft (1.42 m) below land-surface datum, June 5, 1965; lowest, 11.32 ft (3.45 m) below land-surface datum, Oct. 7, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	9.37	JAN 19	9.16	FEB 22	8.89	APR 8	6.13	JUN 20	9.04	AUG 18	10.53
NOV 30	8.48										



114N45W04DCD01

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## ANOKA COUNTY

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPECIFIC CONDUCTANCE (UMHOS) (00095)
451534093263204	032N25W15CAC4N0.RAMSEY E	112OTSH	83-09-13	1040	8.10	14.00	--	95
451534093263401	032N25W15CAC01FOSSEN_S(A	112OTSH	83-09-13	1020	9.60	14.00	881.00	225
451534093263402	032N25W15CAC02FOSSEN_D(A	112OTSH	83-09-13	1000	9.90	29.00	881.00	580
451535093263403	032N25W15CAC3N0.RAMSEY N	112OTSH	83-09-13	1050	10.40	14.00	--	555

DATE OF SAMPLE	TEMPERATURE (DEG C) (00010)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
83-09-13	13.0	1.4
83-09-13	12.0	2.3
83-09-13	--	.60
83-09-13	14.0	2.2

## CARLTON COUNTY

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPECIFIC CONDUCTANCE (UMHOS) (90095)	PH (STANDARD) (00400)	PH LAB (STANDARD) (00403)	COLOR (PLATINUM-COBALT) (00080)
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464043092374801 048N18W04BAA ALVINA TIES 400MDMR 83-08-30 1600 1325.00 235 6.4 7.6 1

DATE OF SAMPLE	TURBIDITY (NTU) (00076)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM DIS-SOLVED (MG/L AS MG) (00925)	SODIUM DIS-SOLVED (MG/L AS NA) (00930)	POTASSIUM DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2) (00405)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE DIS-SOLVED (MG/L AS F) (00950)	SILICA DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG C DIS-SOLVED (MG/L) (70300)
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83-08-30 2.0 28 10 7.6 .80 129 99 .8 .70 .30 17 134

DATE OF SAMPLE	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM TOTAL RECOVERABLE (UG/L AS BA) (01007)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CHROMIUM TOTAL RECOVERABLE (UG/L AS CR) (01034)	COPPER TOTAL RECOVERABLE (UG/L AS CU) (01042)	IRON TOTAL RECOVERABLE (UG/L AS FE) (01045)	LEAD TOTAL RECOVERABLE (UG/L AS PB) (01051)	MANGANESE TOTAL RECOVERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	SELENIUM TOTAL (UG/L AS SE) (01147)
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83-08-30 .01 <.10 3 <100 1 20 6 150 5 60 .3 <1

DATE OF SAMPLE	SILVER, TOTAL RECOVERABLE (UG/L AS AG) (01077)	STRONTIUM, DIS-SOLVED (UG/L AS SR) (01080)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)
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83-08-30 <1 120 560

## CHIPPEWA COUNTY

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (UMHOS) (90095)	PH (STANDARD) (00400)	PH LAB (STANDARD) (00403)	TEMPERATURE (DEG C) (00010)
450707095562401	119N42W17ADA K. KLEVEN	112BRDO	82-10-05	1300	150	1010	7.5	7.3	11.0



QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
CHIPPEWA COUNTY--Continued

DATE OF SAMPLE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY, LAB (MG/L AS CACO3) (90410)	ALKA- LITY, CARBON- ATE (MG/L - CACO3) (99430)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
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82-10-05	59	31	110	4.7	435	590	34	63	6.6	.50	12	539
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DATE OF SAMPLE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
82-10-05	.95	.05	1600	370	50	7.0

## DOUGLAS COUNTY

STATION NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	SAM- PLING DEPTH (FEET) (00003)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
454912095170001	127N37W12CCB01	DON TWAIT	1120TSH 83-02-24	1500	--	18.0	18.00	1394.00	325
			1120TSH 83-05-19	1435	--	--	18.00	1394.00	350
			1120TSH 83-07-27	1830	--	--	180	1394.00	400
454929095202801	127N37W09BDC01	ARLYS KAK	1120TSH 83-02-24	1730	14.88	18.4	18.00	1395.00	605
			1120TSH 83-05-19	1600	15.00	--	18.40	1395.00	605
			1120TSH 83-07-27	1730	15.70	--	18.40	1395.00	825
455900095162001	129N36W18CBB	RAY BIELKE	1120TSH 83-02-23	1245	8.63	19.4	19.40	1363.00	560
			1120TSH 83-05-18	1230	7.90	--	19.40	1363.00	650
			1120TSH 83-07-27	1430	7.00	--	19.40	1363.00	620
455902095161511	129N36W18CBB11	RAY BEILK	1120TSH 83-02-23	1230	8.52	30.6	30.60	1365.00	545
			1120TSH 83-05-18	1200	7.80	--	30.60	1365.00	580
			1120TSH 83-07-27	1245	7.90	--	30.60	1365.00	600
455902095161512	129N36W18CBB12	RAY BEILK	1120TSH 83-02-23	1130	8.51	10.0	10.00	1365.00	458
			1120TSH 83-05-18	1030	7.80	--	10.00	1365.00	625
			1120TSH 83-07-27	1345	7.90	--	10.00	1365.00	500
455920095163100	129N37W23BDA	RAY BIELKE	1120TSH 83-03-03	1845	--	--	--	--	1440
			1120TSH 83-05-18	1330	--	--	35.00	--	1580
			1120TSH 83-07-27	1500	--	--	35.00	--	1430
455926095122901	129N36W15BBB01	SCHOOL WE	1120TSH 83-02-23	1730	6.12	18.0	18.00	1345.00	550
			1120TSH 83-05-19	1215	5.50	--	18.00	1345.00	520
			1120TSH 83-07-26	1800	5.40	--	18.00	1345.00	530
460020095134301	129N36W09BBB01	DARRYL KL	1120TSH 83-02-23	1530	4.56	19.2	19.20	1352.00	555
			1120TSH 83-05-18	1530	4.10	--	19.20	1352.00	610
			1120TSH 83-07-27	1030	3.80	--	19.20	1352.00	600
460020095134302	129N36W09BBB02	DARRYL KL	1120TSH 83-02-23	1500	4.49	6.60	6.60	1352.00	555
			1120TSH 83-05-18	1500	4.10	--	6.60	1352.00	610
			1120TSH 83-07-27	1000	3.70	--	6.60	1352.00	560
460604095134402	130N36W04BCC02	NO.CO.LIN	1120TSH 83-02-23	1630	3.06	6.80	6.80	1417.00	645
			1120TSH 83-05-19	1330	3.30	--	6.80	1417.00	620
			1120TSH 83-07-26	1700	3.80	--	6.80	1417.00	625

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## DOUGLAS COUNTY--Continued

DATE OF SAMPLE	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)
83-02-24	--	8.0	--	10.0	--	--	.19	--	--	--
83-05-19	--	7.7	--	9.0	--	--	.16	--	--	--
83-07-27	--	7.7	--	10.5	--	--	.24	--	--	--
83-02-24	--	7.8	--	8.0	--	--	14.	--	--	--
83-05-19	--	7.5	--	6.0	--	--	19.	--	--	--
83-07-27	--	7.3	--	8.0	--	--	35.	--	--	--
83-02-23	--	7.9	--	9.0	--	--	13.	--	--	--
83-05-18	--	7.6	--	8.0	--	--	17.	--	--	--
83-07-27	--	7.5	--	9.0	--	--	19.	--	--	--
83-02-23	573	7.4	7.7	9.0	23	9.0	21.	.10	<.10	--
83-05-18	594	7.5	7.5	8.5	25	9.1	19.	.22	.30	19
83-07-27	592	7.4	7.3	9.0	25	13	17.	.04	.20	17
83-02-23	463	7.9	7.7	7.0	8.0	9.2	7.5	.06	.20	7.7
83-05-18	529	7.5	7.5	6.5	8.0	10	11.	.03	.30	11
83-07-27	533	7.3	7.3	12.0	35	4.3	9.4	.04	.20	9.6
83-03-03	--	7.3	--	7.0	--	--	59.	--	--	--
83-05-18	--	7.1	--	8.0	--	--	60.	--	--	--
83-07-27	--	6.9	--	8.0	--	--	54.	--	--	--
83-02-23	--	8.0	--	7.5	--	--	3.9	--	--	--
83-05-19	--	7.5	--	7.0	--	--	11.	--	--	--
83-07-26	--	7.2	--	8.5	--	--	14.	--	--	--
83-02-23	592	7.5	7.4	8.0	19	4.1	<.10	.46	.60	--
83-05-18	614	7.3	7.3	8.0	14	4.1	.18	.38	.60	.78
83-07-27	607	7.2	7.2	13.0	39	14	<.10	.37	.40	--
83-02-23	588	7.9	7.6	6.0	27	9.8	11.	.14	.20	11
83-05-18	620	7.1	7.3	7.5	29	13	8.9	.06	.40	9.3
83-07-27	692	7.0	7.0	14.5	42	15	8.0	.02	.30	8.3
83-02-23	--	7.3	--	5.0	--	--	2.6	--	--	--
83-05-19	--	7.2	--	9.0	--	--	1.7	--	--	--
83-07-26	--	7.0	--	15.0	--	--	1.4	--	--	--

DATE OF SAMPLE	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
83-02-24	--	--	--	--
83-05-19	--	--	--	--
83-07-27	--	--	--	--
83-02-24	--	--	--	--
83-05-19	--	--	--	--
83-07-27	--	--	--	--
83-02-23	--	--	--	--
83-05-18	--	--	--	--
83-07-27	--	--	--	--
83-02-23	.040	50	10	1.4
83-05-18	.030	80	20	--
83-07-27	.040	40	10	--
83-02-23	.020	30	10	1.5
83-05-18	<.010	170	60	--
83-07-27	<.010	280	90	--
83-03-03	--	--	--	--
83-05-18	--	--	--	--
83-07-27	--	--	--	--
83-02-23	--	--	--	--
83-05-19	--	--	--	--
83-07-26	--	--	--	--
83-02-23	.170	4200	280	2.9
83-05-18	.070	4900	240	--
83-07-27	.010	5400	220	--
83-02-23	.010	180	30	2.3
83-05-18	<.010	180	40	2.6
83-07-27	<.010	260	80	1.8
83-02-23	--	--	--	--
83-05-19	--	--	--	--
83-07-26	--	--	--	--

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## DOUGLAS COUNTY--Continued

## PESTICIDE ANALYSES

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME-TRYNE TOTAL (82184)	ATRA-TONE TOTAL (82185)
455902095161511	129N36W18CBB11 RAY BEILK	1120TSH	83-05-18	1200	7.80	30.60	1365.00	<.10	<.10
455902095161512	129N36W18CBB12 RAY BEILK	1120TSH	83-05-18	1030	7.80	10.00	1365.00	<.10	<.10
460020095134302	129N36W09BBB02 DARRYL KL	1120TSH	83-05-18	1500	4.10	6.60	1352.00	<.10	<.10

DATE OF SAMPLE	ATRA-ZINE TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	CYPRA-ZINE TOTAL (UG/L) (82187)	PROME-TONE TOTAL (UG/L) (39056)	PROME-TRYNE TOTAL (UG/L) (39057)	PRO-PAZINE TOTAL (UG/L) (39024)	SIMA-ZINE TOTAL (UG/L) (39055)	SIME-TONE TOTAL (UG/L) (82188)	SIME-TRYNE TOTAL (UG/L) (39054)
83-05-18	<.10	<.10	<.10	<.1	<.1	<.10	<.10	<.10	<.1
83-05-18	.30	<.10	<.10	<.1	<.1	<.10	<.10	<.10	<.1
83-05-18	.60	<.10	<.10	<.1	<.1	<.10	<.10	<.10	<.1

## GRANT COUNTY

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE LAB (UMHOS) (90095)	PH (STANDARD) (00400)	PH LAB (STANDARD) (00403)	TEMPERATURE (DEG C) (00010)
460017095543901	129N42W12BBA J RENSTROM	112BRDO	82-10-05	1800	190	1190	6.8	7.4	11.0

DATE OF SAMPLE	OXYGEN, DIS-SOLVED (MG/L) (00300)	CALCIUM DIS-SOLVED (MG/L) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L) (00925)	SODIUM, DIS-SOLVED (MG/L) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L) (00935)	ALKA-LINITY, CARBONATE LAB (MG/L) (90410)	ALKA-LINITY, CARBONATE IT-FLD (MG/L) (99430)	CARBON DIOXIDE DIS-SOLVED (MG/L) (00405)	SULFATE DIS-SOLVED (MG/L) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L) (00950)	SILICA, DIS-SOLVED (MG/L) (00955)
82-10-05	1.2	140	56	46	5.7	317	500	147	270	3.4	.30	30

DATE OF SAMPLE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L) (00631)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L) (00671)	BORON, DIS-SOLVED (UG/L) (01020)	IRON, DIS-SOLVED (UG/L) (01046)	MANGA-NESE, DIS-SOLVED (UG/L) (01056)	CARBON, ORGANIC TOTAL (MG/L) (00680)
82-10-05	692	<.10	.03	250	3000	81	2.9

## HENNEPIN COUNTY

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPECIFIC CONDUCTANCE LAB (UMHOS) (00095)	SPECIFIC CONDUCTANCE LAB (UMHOS) (90095)
445614093215307	117N21W17DDB07 SLP P202	112DSMO	83-06-23	1400	--	45.00	--	--	968
445614093220307	117N21W17DCA07 SLP P201	112DSMO	83-06-22	1400	--	41.50	--	--	1630
445615093220904	117N21W17DCB04 SLP P203	112DSMO	83-06-23	1900	--	45.00	--	--	2400
445617093202602	028N24W06CAD SLP W124	364PLVL	83-09-01	1100	--	--	--	1530	1500
445617093202604	028N24W06CAD 04 SLP P117	112DSMO	83-09-01	1140	--	33.00	--	1150	1110
445617093211001	117N21W16CDA3 SLP W123 M	364PLVL	83-09-07	1100	29.50	--	--	1000	1030
445617093211501	117N21W16CDB2 SLP W101	364PLVL	83-09-02	1345	34.60	106	915.00	1250	1140
445617093211502	117N21W16CDB3 SLP W117	112DSMO	83-09-02	1215	--	72.00	915.00	1600	1530
445625093230801	117N21W18CAC02 SLP PB137	112DSMO	83-08-31	1630	--	85.30	909.00	650	693
445625093230901	117N21W18CAC01 SLP PB136	112DSMO	83-08-31	1500	--	92.30	909.00	659	652
445634093205903	117N21W16DCB3 SLP W116	112DSMO	83-09-02	0930	28.70	67.00	906.00	1150	923

QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
HENNEPIN COUNTY--Continued

DATE OF SAMPLE	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
83-06-23	--	7.0	--	--	--	--	62	--	--	--	--	73
83-06-22	--	7.2	--	--	--	--	210	--	--	--	--	180
83-06-23	--	7.5	--	--	--	--	440	--	--	--	--	150
83-09-01	7.2	7.3	11.0	.1	150	63	43	3.3	193	24	72	230
83-09-01	7.6	7.2	13.0	.2	110	39	69	3.5	308	15	59	95
83-09-07	6.8	7.2	12.0	<.0	120	46	33	2.5	338	104	3.8	74
83-09-02	6.6	7.1	12.5	.0	120	47	40	3.5	402	196	6.9	100
83-09-02	6.2	7.1	12.5	.0	150	52	80	5.0	464	567	16	220
83-08-31	6.9	7.3	10.0	.4	63	34	41	2.6	367	89	20	4.0
83-08-31	7.5	7.5	10.0	.3	76	39	11	2.4	370	23	8.6	2.0
83-09-02	6.9	7.3	12.0	.0	100	39	55	3.8	194	47	52	150

DATE OF SAMPLE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L AS N) (70300)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
83-06-23	--	--	--	--	1.4	1.5	--	--	--	--	--	--
83-06-22	--	--	--	--	5.7	7.6	--	--	--	--	--	--
83-06-23	--	--	--	--	15.	22	--	--	--	--	--	--
83-09-01	24	840	<.01	<.10	.10	.80	--	.03	<10	2300	<1	360
83-09-01	26	652	<.01	2.4	.02	1.8	4.2	.01	10	51	<1	43
83-09-07	28	534	<.01	.12	.20	.40	.52	.11	10	6100	5	120
83-09-02	26	647	<.01	<.10	.12	1.0	--	<.01	10	6600	1	280
83-09-02	20	848	.03	<.10	.11	1.0	--	<.01	<10	7300	1	680
83-08-31	27	400	<.01	<.10	.23	.30	--	.03	<10	720	1	63
83-08-31	29	376	<.01	<.10	.23	.20	--	.04	<10	240	1	52
83-09-02	18	628	.02	<.10	.04	.50	--	<.01	10	3200	1	260

DATE OF SAMPLE	Z INC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDEED TOTAL (MG/L AS C) (00689)
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83-06-23	60	9.8	--
83-06-22	30	32	--
83-06-23	50	100	3.2
83-09-01	560	1.9	--
83-09-01	470	2.8	--
83-09-07	34	4.2	--
83-09-02	12	4.6	--
83-09-02	820	5.2	--
83-08-31	530	2.5	--
83-08-31	510	2.4	--
83-09-02	110	1.6	--

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## HUBBARD COUNTY

STATION NUMBER		LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPECIFIC CONDUCTANCE (UMHOS) (00095)	SPECIFIC CONDUCTANCE LAB (UMHOS) (90095)			
464940094593001		139N34W28BCC01	112OTSH	83-06-10	1130	16.00	--	510	495			
465035095000001		139N34W20ADC01	112OTSH	83-06-10	1230	40.00	--	775	740			
465315094554001		139N34W01BCA01	112OTSH	83-06-10	1430	80.00	--	510	476			
465515094411001		140N32W26ABA01	112OTSH	83-06-10	1530	101	--	430	411			
465515095061501		140N35W28AAA01	112OTSH	83-06-10	1330	30.00	--	590	564			
465707094400701		140N32W12CAD1 WELL 4 WIL	112PLSC	82-10-10	1220	--	--	325	--			
			112PLSC	83-09-23	0930	--	--	637	385			
465708094403201		140N32W12CBD WELL 6 WILL	112PLSC	82-10-10	1120	--	--	390	--			
			112PLSC	83-08-16	1030	38.70	--	428	480			
			112PLSC	83-09-25	1130	--	--	437	435			
465710094395101		140N32W12BBD1 WELL 8 WIL	112PLSC	82-11-28	1015	--	--	465	--			
			112PLSC	83-08-15	1030	29.50	--	392	425			
			112PLSC	83-09-24	0940	29.50	--	398	424			
465727094402402		140N32W12BDC OBS WELL W	112PLSC	82-10-11	0800	25.00	1399.00	480	--			
			112PLSC	82-11-28	0900	25.00	1399.00	500	--			
			112PLSC	83-09-25	0930	29.70	1399.00	471	469			
DATE OF SAMPLE	PH (STANDARD UNITS) (00400)	PH LAB (STANDARD UNITS) (00403)	TEMPERATURE (DEG C) (00010)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2) (00405)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)
83-06-10	7.1	7.5	--	75	--	--	--	--	--	--	19	--
83-06-10	7.2	7.5	10.0	110	--	--	--	--	--	--	21	--
83-06-10	7.2	7.5	10.5	72	--	--	--	--	--	--	4.6	--
83-06-10	7.1	7.6	10.5	64	--	--	--	--	--	--	2.7	--
83-06-10	7.1	7.5	10.0	78	--	--	--	--	--	--	21	--
82-10-10	7.5	--	9.0	--	--	--	--	--	--	--	--	--
83-09-23	7.3	7.3	9.0	61	12	2.5	2.1	207	20	2.0	1.5	13
82-10-10	7.6	--	9.0	--	--	--	--	--	--	--	--	--
83-08-16	7.8	6.9	8.0	64	16	3.4	2.1	222	6.8	16	2.1	13
83-09-25	--	7.2	10.0	63	16	2.3	.90	218	--	15	1.1	13
82-11-28	6.7	--	5.0	--	--	--	--	--	--	--	--	--
83-08-15	7.5	7.5	8.0	65	16	2.5	1.4	224	14	10	1.1	16
83-09-24	--	7.4	8.0	62	15	2.1	1.0	198	--	10	1.0	16
82-10-11	7.3	--	10.0	--	--	--	--	--	--	--	--	--
82-11-28	6.6	--	7.0	--	--	--	--	--	--	--	--	--
83-09-25	--	6.3	10.0	73	9.7	2.2	1.5	222	--	2.0	1.8	21
DATE OF SAMPLE				SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)				
				83-06-10	--	5.1	--	10	--			
				83-06-10	--	28.	--	10	--			
				83-06-10	--	5.7	--	10	--			
				83-06-10	--	2.6	--	10	--			
				83-06-10	--	11.	--	10	--			
				82-10-10	--	--	.022	--	--			
				83-09-23	228	--	.177	30	240			
				82-10-10	--	--	.045	--	--			
				83-08-16	257	--	.026	8	170			
				83-09-25	240	--	.023	23	170			
				82-11-28	--	--	<.001	--	--			
				83-08-15	264	--	.019	12	10			
				83-09-24	235	--	.009	16	3			
				82-10-11	--	--	.110	--	--			
				82-11-28	--	--	.180	--	--			
				83-09-25	252	--	.062	2800	300			

QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

KANDIYOHI COUNTY

STATION	NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)
451525094511401	121N33W29DCB1	CHRISTENSEN	1120TSH	83-04-27	1115	1.00	43.00	1160.00	650	--
			1120TSH	83-06-02	1930	1.30	43.00	1160.00	710	--
			1120TSH	83-08-05	1100	1.50	43.00	1160.00	720	--
451526094484801	121N33W27DCB1	WILLIAMSON	1120TSH	83-06-02	2045	--	20.00	1165.00	800	--
			1120TSH	83-08-05	1200	--	20.00	1165.00	930	--
451528094494001	121N33W28DAD1	DENGERUD (C)	1120TSH	83-04-27	0945	--	28.00	1164.00	555	--
			1120TSH	83-08-05	0915	--	28.00	1164.00	650	--
452056094553501	122N34W26BCC1	BAJARI L (N)	1120TSH	83-04-26	1530	--	29.00	1224.00	490	--
			1120TSH	83-06-01	1200	--	29.00	1224.00	525	526
			1120TSH	83-08-04	1730	--	29.00	1224.00	600	--
452103094591703	122N34W29BCB3	OLETJBRUENS	1120TSH	83-06-01	2030	--	20.00	1227.00	825	--
			1120TSH	83-08-04	1700	--	20.00	1227.00	890	--
452104094591901	122N34W29BCB1	OLETJBRUENS	1120TSH	83-04-26	1300	5.20	20.20	1225.00	650	--
			1120TSH	83-06-01	1600	5.70	20.20	1225.00	750	765
			1120TSH	83-08-16	1430	5.30	20.20	1225.00	760	756
452104094591902	122N34W29BCB2	OLETJBRUENS	1120TSH	83-04-26	1400	5.20	9.00	1225.00	460	--
			1120TSH	83-06-01	1430	5.70	9.00	1225.00	600	595
			1120TSH	83-08-16	1500	5.30	9.00	1225.00	750	729
452206094491801	122N33W22BBAL	HOEKSTRA (I)	1120TSH	83-04-26	1700	12.90	22.00	1229.00	720	--
			1120TSH	83-06-01	1030	13.10	22.00	1229.00	700	696
452300095020301	122N35W14AAB1	THORSON (C) D	1120TSH	83-08-04	1830	11.90	22.00	1229.00	730	--
			1120TSH	83-04-25	1530	2.10	21.80	1240.00	640	--
			1120TSH	83-06-02	1530	2.30	21.80	1240.00	650	684
			1120TSH	83-08-16	1130	2.00	21.80	1240.00	720	683
452300095020302	122N35W14AAB2	THORSON (C) S	1120TSH	83-04-25	1430	1.70	8.70	1240.00	290	--
			1120TSH	83-06-02	1430	2.50	8.70	1240.00	350	344
			1120TSH	83-08-16	1200	2.00	8.70	1240.00	430	371
452305095021901	122N35W11DCC1	LUNDGREN HO	1120TSH	83-06-02	1700	El6.00	31.00	1262.00	680	--
			1120TSH	83-08-16	1530	--	31.00	1262.00	690	--
452309095014401	122N35W12CCB1	THORSON HOU	1120TSH	83-06-02	1800	--	14.00	1252.00	670	--
			1120TSH	83-08-16	1615	--	14.00	1252.00	670	--

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## KANDIYOHI COUNTY--Continued

DATE OF SAMPLE	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
83-04-27	7.4	--	7.5	--	--	--	--	--	--	--	--
83-06-02	7.1	--	8.0	--	--	--	--	--	--	--	--
83-08-05	7.5	--	8.5	--	--	--	--	--	--	--	--
83-06-02	7.2	--	9.0	--	--	--	--	--	--	--	--
83-08-05	7.2	--	10.0	--	--	--	--	--	--	--	--
83-04-27	7.4	--	9.0	--	--	--	--	--	--	--	--
83-08-05	7.0	--	12.0	--	--	--	--	--	--	--	--
83-04-26	7.8	--	10.0	--	--	--	--	--	--	--	--
83-06-01	7.4	7.4	9.0	79	22	2.2	1.2	265	20	11	3.5
83-08-04	7.4	--	9.5	--	--	--	--	--	--	--	--
83-06-01	7.4	--	9.0	--	--	--	--	--	--	--	--
83-08-04	7.4	--	11.0	--	--	--	--	--	--	--	--
83-04-26	7.7	--	8.0	--	--	--	--	--	--	--	--
83-06-01	7.4	7.4	8.0	94	41	4.6	2.7	233	18	21	18
83-08-16	7.2	7.4	10.0	--	--	--	--	--	--	24	18
83-04-26	7.6	--	7.0	--	--	--	--	--	--	--	--
83-06-01	7.3	7.3	9.0	83	29	3.8	1.2	292	28	6.5	6.0
83-08-16	7.0	7.2	15.0	--	--	--	--	--	--	8.0	4.3
83-04-26	7.7	--	8.5	--	--	--	--	--	--	--	--
83-06-01	7.4	7.4	8.0	78	25	32	7.7	248	19	22	23
83-08-04	7.0	--	9.5	--	--	--	--	--	--	--	--
83-04-25	7.8	--	7.5	--	--	--	--	--	--	--	--
83-06-02	7.3	7.3	8.0	92	29	3.2	2.1	287	28	17	14
83-08-16	7.3	7.4	9.5	--	--	--	--	--	--	14	18
83-04-25	7.3	--	6.0	--	--	--	--	--	--	--	--
83-06-02	6.5	6.5	9.0	40	13	1.0	3.1	179	110	7.6	2.6
83-08-16	6.5	6.4	14.0	--	--	--	--	--	--	6.0	2.2
83-06-02	7.2	--	9.0	--	--	--	--	--	--	--	--
83-08-16	7.0	--	9.0	--	--	--	--	--	--	--	--
83-06-02	7.4	--	9.0	--	--	--	--	--	--	--	--
83-08-16	7.3	--	15.0	--	--	--	--	--	--	--	--

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## KANDIYOHI--Continued

DATE OF SAMPLE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BORON DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
83-04-27	--	--	<.10	--	--	--	--	--	--	--	--
83-06-02	--	--	<.10	--	--	--	--	--	--	--	--
83-08-05	--	--	<.10	--	--	--	--	--	--	--	--
83-06-02	--	--	11	--	--	--	--	--	--	--	--
83-08-05	--	--	17	--	--	--	--	--	--	--	--
83-04-27	--	--	<.10	--	--	--	--	--	--	--	--
83-08-05	--	--	<.10	--	--	--	--	--	--	--	--
83-04-26	--	--	2.3	--	--	--	--	--	--	--	--
83-06-01	.10	23	2.4	<.10	<.10	--	<.01	30	<3	<1	1.4
83-08-04	--	--	2.7	--	--	--	--	--	--	--	--
83-06-01	--	--	22	--	--	--	--	--	--	--	--
83-08-04	--	--	18	--	--	--	--	--	--	--	--
83-04-26	--	--	19	--	--	--	--	--	--	--	--
83-06-01	<.10	24	21	.04	<.10	--	<.01	20	960	24	1.2
83-08-16	--	--	17	<.01	.10	17	<.01	--	120	20	--
83-04-26	--	--	1.8	--	--	--	--	--	--	--	--
83-06-01	<.10	16	4.5	.07	.30	4.8	<.01	20	54	130	2.2
83-08-16	--	--	11	.02	.30	11	<.01	--	100	180	--
83-04-26	--	--	14	--	--	--	--	--	--	--	--
83-06-01	.10	19	15	<.01	.30	15	.02	30	12	2	2.8
83-08-04	--	--	22	--	--	--	--	--	--	--	--
83-04-25	--	--	9.0	--	--	--	--	--	--	--	--
83-06-02	.10	19	8.7	.08	.30	9.0	<.01	30	660	1500	2.7
83-08-16	--	--	6.0	<.01	.30	6.3	<.01	--	690	1400	--
83-04-25	--	--	.11	--	--	--	--	--	--	--	--
83-06-02	<.10	14	<.10	.13	.60	--	<.01	60	370	290	7.4
83-08-16	--	--	.12	.03	.20	.32	<.01	--	2200	280	--
83-06-02	--	--	.30	--	--	--	--	--	--	--	--
83-08-16	--	--	<.10	--	--	--	--	--	--	--	--
83-06-02	--	--	1.8	--	--	--	--	--	--	--	--
83-08-16	--	--	3.1	--	--	--	--	--	--	--	--

## PESTICIDE ANALYSES

STATION NUMBER	LOCAL IDENT- IFIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME- TRYNE TOTAL (82184)	ATRA- TONE TOTAL (82185)
452300095020302	122N35W14AAB2THORSON(C) S	1120TSH	83-06-02	1430	2.50	8.70	1240.00	<.10	<.10
DATE OF SAMPLE	ATRA- ZINE TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	CYPRA- ZINE TOTAL (UG/L) (82187)	PROME- TONE TOTAL (UG/L) (39056)	PROME- TRYNE TOTAL (UG/L) (39057)	PRO- PAZINE TOTAL (UG/L) (39024)	SIMA- ZINE TOTAL (UG/L) (29055)	SIME- TONE TOTAL (UG/L) (82188)	SIME- TRYNE TOTAL (UG/L) (39054)
83-06-02	<.10	<.10	<.10	<.1	<.1	<.10	<.10	<.10	<.1



## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## MORRISON COUNTY

STATION NUMBER	LOCAL IDENT- IFIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)
455030094191501	039N32W27CBB01	112OTSH	83-06-07	1100	17.00	--	260	254
455215094121501	039N31W16DAC01	112OTSH	83-06-08	1030	25.00	--	195	187
460030094210001	041N32W26BCA01	112OTSH	83-06-08	1130	21.00	--	320	292
460345094215001	130N29W18DDD02	112OTSH	83-06-08	1300	12.00	--	150	148
460725094211501	042N32W14BBC01	112OTSH	83-06-08	1230	21.00	1152.00	400	392

DATE OF SAMPLE	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
83-06-07	7.7	7.6	8.0	33	7.1	12	10
83-06-08	7.1	7.5	9.0	26	1.7	.60	10
83-06-08	7.0	7.7	10.0	35	9.0	4.5	10
83-06-08	6.3	6.3	10.0	8.0	17	2.1	1000
83-06-08	7.3	7.4	9.0	53	19	9.6	40

## OTTER TAIL COUNTY

STATION NUMBER	LOCAL IDENT- IFIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)
461235095162501	132N37W25DDC01	112OTSH	83-06-15	1530	20.00	625	638	6.9

DATE OF SAMPLE	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	IRON DIS- SOLVED (UG/L AS FE) (01046)
83-06-15	7.4	9.0	90	7.3	9.2	10

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## POPE COUNTY

STATION	NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	SAM- PLING DEPTH (FEET) (00003)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
452652095114401	123N36W21DAA01	ALLEN THO	1120TSH	83-03-03	1100	8.12	41.4	41.40	1302.00	510
			1120TSH	83-05-23	1900	8.30	--	41.40	1302.00	530
			1120TSH	83-08-04	1400	8.40	--	41.40	1302.00	570
452652095114402	123N36W21DAA02	ALLEN THO	1120TSH	83-03-03	1030	8.83	13.7	13.70	1302.00	415
			1120TSH	83-05-23	1830	9.20	--	13.70	1302.00	645
452839095140501	123N36W07ADD01	DALE JOHN	1120TSH	83-08-04	1500	9.20	--	13.70	1302.00	730
			1120TSH	83-03-04	1005	4.79	20.1	20.10	1311.00	580
			1120TSH	83-05-24	1215	4.80	--	20.10	1311.00	780
			1120TSH	83-08-04	1230	4.90	--	20.10	1311.00	825
452938095081502	123N36W01ACA02	CLINT WEL	1120TSH	83-03-02	1400	10.21	16.1	16.10	1305.00	580
452939095081501	123N36W01ACA01	CLINT WEL	1120TSH	83-05-23	1630	9.80	--	16.10	1305.00	745
			1120TSH	83-08-03	1600	8.50	--	16.10	1305.00	720
			1120TSH	83-03-02	1515	11.31	37.7	37.70	1305.00	510
			1120TSH	83-05-23	1530	11.00	--	37.70	1305.00	600
			1120TSH	83-08-03	1730	--	--	37.70	1305.00	670
453050095113701	124N36W28DDD01	GERALD VA	1120TSH	83-03-02	1730	--	22.0	22.00	1328.00	570
			1120TSH	83-05-24	1100	--	--	22.00	1328.00	740
453531095121901	125N36W33DAB02	THEO BRUH	1120TSH	83-05-23	1430	--	--	14.00	1342.00	680
			1120TSH	83-07-28	1645	--	--	14.00	1342.00	650
453830095185202	125N37W15ABB02	MIKE SAHL	1120TSH	83-03-24	1100	24.80	32.7	32.70	1365.00	420
453832095185101	125N37W15ABB01	MIKE SAHL	1120TSH	83-05-20	1330	24.80	--	32.70	1365.00	450
			1120TSH	83-08-03	1830	25.20	--	32.70	1365.00	450
			1120TSH	83-03-24	1830	32.21	55.0	55.00	1372.00	440
			1120TSH	83-05-20	1500	32.33	--	55.00	1372.00	500
			1120TSH	83-07-28	1300	32.60	--	55.00	1372.00	520
454002095120703	125N36W04ADA3MCKIGNEY BA		1120TSH	83-05-23	1000	--	--	40.00	1345.00	540
			1120TSH	83-07-28	1515	--	--	40.00	1345.00	540
454003095120401	125N36W04ADA MCKIGNEY(I)		1120TSH	83-05-23	1130	7.50	--	18.80	1345.00	510
			1120TSH	83-07-28	1545	7.40	--	18.80	1345.00	510
454004095120502	125N36W04ADA02	LEO MCKIG	1120TSH	83-02-24	1045	--	18.0	18.00	1345.00	490
454024095192201	126N37W34CCC01	JIMMIE JA	1120TSH	83-05-23	1100	--	--	18.00	1345.00	510
			1120TSH	83-07-28	1445	--	--	18.00	1345.00	580
			1120TSH	83-02-24	1330	--	35.0	35.00	1375.00	520
			1120TSH	83-05-19	1715	--	--	35.00	1375.00	560
			1120TSH	83-07-28	1230	--	--	35.00	1375.00	600
454033095170302	126N37W35DAD02	D. GARY R	1120TSH	83-05-19	1745	--	--	36.00	1355.00	580
			1120TSH	83-07-28	1200	--	--	36.00	1355.00	610
454228095123901	126N36W21DBB01	BRUCE HAN	1120TSH	83-02-24	1415	--	26.0	26.00	1342.00	550
			1120TSH	83-05-19	1820	--	--	26.00	1342.00	550
			1120TSH	83-07-28	1100	--	--	26.00	1342.00	560

QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

POPE COUNTY--Continued

DATE OF SAMPLE	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)
83-03-03	529	7.6	7.5	9.0	5.0	1.8	<.10	.27	<.50	--
83-05-23	532	7.4	7.6	9.0	<5.0	1.6	.13	.22	<.30	<.43
83-08-04	524	7.4	7.5	9.0	2.0	1.8	<.10	.24	.50	--
83-03-03	473	7.8	7.6	7.0	16	2.3	4.8	.02	<.10	--
83-05-23	656	7.5	7.7	7.0	24	7.9	20	.02	.30	20
83-08-04	713	7.2	7.5	11.0	26	13	18	.03	.70	19
83-03-04	--	7.8	--	8.5	--	--	20	--	--	--
83-05-24	--	7.6	--	8.0	--	--	26	--	--	--
83-08-04	--	7.4	--	10.0	--	--	30	--	--	--
83-03-02	630	7.8	7.6	7.5	28	27	21	.02	.20	21
83-05-23	735	7.6	7.7	7.0	27	28	28	.15	<.20	--
83-08-03	699	7.3	7.5	10.5	26	30	25	.08	<.10	--
83-03-02	578	7.8	7.6	8.5	58	19	9.1	.03	.20	9.3
83-05-23	615	7.6	7.8	7.5	54	16	7.3	.03	<.10	--
83-08-03	627	7.7	7.4	8.0	35	20	2.2	3.3	3.5	5.7
83-03-02	--	7.3	--	8.0	--	--	16	--	--	--
83-05-24	--	7.5	--	7.5	--	--	16	--	--	--
83-08-04	--	7.6	--	10.0	--	--	18	--	--	--
83-05-23	--	7.5	--	9.5	--	--	14	--	--	--
83-07-28	--	7.5	--	12.0	--	--	1.3	--	--	--
83-03-24	460	8.1	7.3	8.0	16	4.0	5.2	.09	.20	5.4
83-05-20	456	7.5	7.5	8.5	19	3.8	4.9	.05	.30	5.2
83-08-03	436	7.9	7.7	8.5	13	3.6	4.3	.05	.30	4.6
83-03-24	496	7.8	7.3	7.5	40	10	.39	.02	<.10	--
83-05-20	499	7.6	7.6	8.0	40	10	.33	<.01	.10	.43
83-07-28	498	7.5	7.5	9.0	38	44	.33	<.01	<.10	.43
83-05-23	--	7.7	--	9.0	--	--	.10	--	--	--
83-07-28	--	7.5	--	10.0	--	--	<.10	--	--	--
83-05-23	--	7.7	--	7.5	--	--	4.0	--	--	--
83-07-28	--	7.5	--	9.5	--	--	3.0	--	--	--
83-02-24	--	8.1	--	12.5	--	--	7.2	--	--	--
83-05-23	--	7.7	--	11.5	--	--	5.6	--	--	--
83-07-28	--	7.6	--	13.0	--	--	13	--	--	--
83-02-24	--	7.8	--	7.0	--	--	8.7	.03	.20	8.9
83-05-19	--	7.5	--	8.0	--	--	8.8	--	--	--
83-07-28	--	7.4	--	11.0	--	--	9.6	--	--	--
83-05-19	--	7.5	--	10.0	--	--	8.2	--	--	--
83-07-28	--	7.5	--	11.0	--	--	8.3	--	--	--
83-02-24	--	7.6	--	12.0	--	--	5.4	--	--	--
83-05-19	--	7.4	--	10.0	--	--	3.4	--	--	--
83-07-28	--	7.4	--	12.5	--	--	2.6	--	--	--

QUALITY OF GROUND WATER  
 WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
 POPE COUNTY--Continued

DATE OF SAMPLE	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UC/L AS MN) (01056)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
83-03-03	.02	2800	70	2.9
83-05-23	<.01	4100	100	--
83-08-04	.01	4400	100	--
83-03-03	.01	20	<10	2.2
83-05-23	.01	50	10	--
83-08-04	<.01	130	20	--
83-03-04	--	--	--	--
83-05-24	--	--	--	--
83-08-04	--	--	--	--
83-03-02	<.01	20	<10	2.5
83-05-23	.01	80	<10	1.7
83-08-03	<.01	90	10	1.3
83-03-02	<.01	100	80	1.3
83-05-23	<.01	30	20	--
83-08-03	<.01	1800	100	--
83-03-02	--	--	--	--
83-05-24	--	--	--	--
83-08-04	--	--	--	--
83-05-23	--	--	--	--
83-07-28	--	--	--	--
83-03-24	<.01	130	50	1.2
83-05-20	<.01	240	30	.90
83-08-03	.02	570	20	--
83-03-24	.01	40	110	.90
83-05-20	<.01	60	120	1.0
83-07-28	<.01	60	100	--
83-05-23	--	--	--	--
83-07-28	--	--	--	--
83-05-23	--	--	--	--
83-07-28	--	--	--	--
83-02-24	--	--	--	--
83-05-23	--	--	--	--
83-07-28	--	--	--	--
83-02-24	--	--	--	--
83-05-19	--	--	--	--
83-07-28	--	--	--	--
83-05-19	--	--	--	--
83-07-28	--	--	--	--
83-02-24	--	--	--	--
83-05-19	--	--	--	--
83-07-28	--	--	--	--

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## POPE COUNTY--Continued

## PESTICIDE ANALYSES

STATION	NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME-TRYNE TOTAL (82184)	ATRA-TONE TOTAL (UG/L) (82185)
452938095081502	123N36W01ACA02	CLINT WEL	112OTSH	83-05-23	1630	9.80	16.10	1305.00	<.10	<.10
454004095120502	125N36W04ADA02	LEO MCKIG	112OTSH	83-07-28	1445	--	18.00	1345.00	<.10	<.10

## ST LOUIS COUNTY

STATION	NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	SAM- PLING DEPTH (FEET) (00003)	DEPTH OF WELL, TOTAL (FEET) (72008)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)
472217093033502	056N21W06BBA02	KTB-26	111HLCN	82-10-14	1500	24.0	--	760	794	7.8
			111HLCN	82-11-02	0930	24.0	--	810	793	7.7
			111HLCN	82-11-16	1230	24.0	--	750	740	7.9
			111HLCN	82-11-29	1330	24.0	--	700	688	6.8
			111HLCN	83-09-09	1245	--	25.00	980	980	7.8
472228093032203	057N21W31DCB03	KTB-31	112BRDO	82-10-19	1115	60.0	--	440	464	8.6
			112BRDO	82-11-01	1130	60.0	--	400	411	9.1
			112BRDO	82-11-16	1500	60.0	--	380	304	9.3
			112BRDO	82-11-29	1545	60.0	--	360	278	9.5
			112BRDO	83-09-09	1050	--	60.00	550	477	7.7
472228093032204	057N21W31DCB04	KTB-32	111HLCN	82-10-19	1245	17.0	--	340	343	8.4
			111HLCN	82-11-01	1400	17.0	--	405	388	8.5
			111HLCN	82-11-16	1530	17.0	--	400	392	8.2
			111HLCN	82-11-29	1600	17.0	--	380	375	8.6
			111HLCN	83-09-09	1100	--	18.00	400	391	6.9
472330093032103	057N21W30DBB03	KTB30	112PLSC	82-10-14	1100	26.0	--	110	124	6.2
			112PLSC	82-11-02	1100	26.0	--	105	100	6.1
			112PLSC	82-11-16	1130	26.0	--	105	97	6.1
			112PLSC	82-11-29	1200	26.0	--	105	96	6.2
			112PLSC	83-09-09	1430	--	21.00	110	97	5.8

QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ST. LOUIS COUNTY--Continued

DATE OF SAMPLE	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L) AS MG (00925)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	POTAS- SIUM, DIS- SOLVED (MG/L) AS K (00935)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CARBON DIOXIDE DIS- SOLVED (MG/L) AS CO2 (00405)	SULFATE DIS- SOLVED (MG/L) AS SO4 (00945)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)
82-10-14	7.8	9.0	--	49	30	60	75	8.6	264	8.1	96	18
82-11-02	8.0	9.0	--	--	26	50	62	9.1	304	12	89	16
82-11-16	7.9	9.0	--	--	25	47	50	8.8	297	7.2	87	17
82-11-29	7.9	9.0	--	--	23	44	57	8.6	280	86	74	12
83-09-09	7.8	10.0	.7	--	32	69	65	8.7	254	7.8	110	16
82-10-19	8.2	7.0	--	46	57	19	18	3.9	211	1.0	26	9.7
82-11-01	8.4	8.0	--	--	58	17	19	3.9	188	.3	19	9.4
82-11-16	8.6	8.0	--	--	30	12	14	4.3	120	.1	21	8.9
82-11-29	8.6	8.0	--	--	26	11	17	4.3	117	.0	19	8.2
83-09-09	7.5	6.0	.8	--	58	17	17	4.2	215	8.3	22	12
82-10-19	8.1	10.0	--	42	23	21	15	2.4	81	.6	70	19
82-11-01	8.2	10.0	--	--	24	22	19	2.9	105	.6	61	18
82-11-16	8.5	9.0	--	--	23	23	15	2.5	109	1.3	60	14
82-11-29	8.2	8.5	--	--	23	22	16	2.3	109	.5	61	12
83-09-09	7.5	12.0	2.3	--	24	24	15	1.8	120	29	70	16
82-10-14	6.3	9.0	--	<10	13	3.2	3.8	1.4	47	57	5.0	1.4
82-11-02	6.4	8.0	--	--	11	2.8	3.5	1.2	38	58	8.0	1.2
82-11-16	5.9	9.0	--	--	12	2.4	2.6	1.2	38	58	7.0	.90
82-11-29	6.0	9.0	--	--	11	2.4	3.3	1.2	37	45	6.0	1.0
83-09-09	5.6	8.0	4.6	--	10	2.6	3.6	1.1	30	92	12	2.0
DATE OF SAMPLE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, VOLA- TILE, DIS- SOLVED (MG/L) (00520)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)
82-10-14	1.5	25	469	103	6.9	6.1	.09	1.1	8.0	<.01	5	60
82-11-02	1.5	22	463	--	4.7	4.7	.10	.30	5.0	<.01	--	--
82-11-16	1.5	22	442	--	1.8	1.8	.12	.20	2.0	<.01	--	--
82-11-29	1.7	22	414	--	1.0	1.0	.12	.20	1.2	<.01	--	--
83-09-09	1.3	22	612	--	48	3.8	.06	.90	49	<.01	--	--
82-10-19	.30	29	312	52	<.10	<.10	.15	.20	--	<.01	1	24
82-11-01	.30	27	251	--	<.10	<.10	.18	2.5	--	<.01	--	--
82-11-16	.30	25	219	--	<.10	<.10	.24	.60	--	<.01	--	--
82-11-29	.30	25	203	--	<.10	<.10	.33	.40	--	<.01	--	--
83-09-09	.30	32	295	--	<.10	<.10	.21	.90	--	.02	--	--
82-10-19	1.5	23	243	58	.30	<.10	.48	.80	1.1	.28	5	15
82-11-01	1.4	25	232	--	.20	<.10	.28	.30	.50	.09	--	--
82-11-16	1.3	24	250	--	<.10	<.10	.50	.50	--	.14	--	--
82-11-29	1.5	22	212	--	.40	<.10	.60	.60	1.0	.27	--	--
83-09-09	1.3	21	231	--	<.10	<.10	.12	.70	--	<.01	--	--
82-10-14	<.10	23	74	17	.80	.80	.06	.50	1.3	.01	1	30
82-11-02	<.10	21	77	--	1.0	.99	.02	.20	1.2	<.01	--	--
82-11-16	<.10	20	78	--	1.1	1.1	.04	.30	1.4	<.01	--	--
82-11-29	<.10	20	110	--	1.2	1.2	.05	.30	1.5	.02	--	--
83-09-09	.10	20	75	--	1.4	1.4	.06	.70	2.1	<.01	--	--

QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
ST. LOUIS COUNTY--Continued

DATE OF SAMPLE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)
82-10-14	<.5	150	<1	1	<3	<10	16	<10	30	300	.3	130
82-11-02	--	--	--	--	--	--	--	--	--	290	--	--
82-11-16	--	--	--	--	--	--	--	--	--	270	--	--
82-11-29	--	--	--	--	--	--	--	--	--	260	--	--
83-09-09	--	--	--	--	--	--	--	--	--	300	--	--
82-10-19	<1	30	<1	<1	<3	<10	16	<10	8	1400	.2	10
82-11-01	--	--	--	--	--	--	--	--	--	1100	--	--
82-11-16	--	--	--	--	--	--	--	--	--	610	--	--
82-11-29	--	--	--	--	--	--	--	--	--	520	--	--
83-09-09	--	--	--	--	--	--	--	--	--	1500	--	--
82-10-19	<1	60	<1	<1	<3	<10	91	10	<4	280	.4	100
82-11-01	--	--	--	--	--	--	--	--	--	380	--	--
82-11-16	--	--	--	--	--	--	--	--	--	360	--	--
82-11-29	--	--	--	--	--	--	--	--	--	350	--	--
83-09-09	--	--	--	--	--	--	--	--	--	1100	--	--
82-10-14	<.5	20	<1	1	4	<10	14	<10	<4	500	<.1	<10
82-11-02	--	--	--	--	--	--	--	--	--	470	--	--
82-11-16	--	--	--	--	--	--	--	--	--	400	--	--
82-11-29	--	--	--	--	--	--	--	--	--	410	--	--
83-09-09	--	--	--	--	--	--	--	--	--	130	--	--

DATE OF SAMPLE	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
82-10-14	3	<1	130	<3	2.9	<1
82-11-02	--	--	--	--	2.9	<1
82-11-16	--	--	--	--	2.0	--
82-11-29	--	--	--	--	1.8	--
83-09-09	--	--	--	--	1.9	--
82-10-19	3	<1	140	<4	6.2	<1
82-11-01	--	--	--	--	7.5	<1
82-11-16	--	--	--	--	5.9	--
82-11-29	--	--	--	--	5.9	--
83-09-09	--	--	--	--	7.4	--
82-10-19	2	<1	69	<4	3.8	<1
82-11-01	--	--	--	--	27	<1
82-11-16	--	--	--	--	>90	--
82-11-29	--	--	--	--	42	--
83-09-09	--	--	--	--	60	--
82-10-14	10	<1	70	19	3.3	<1
82-11-02	--	--	--	--	3.7	<1
82-11-16	--	--	--	--	1.8	--
82-11-29	--	--	--	--	1.6	--
83-09-09	--	--	--	--	3.3	--

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## STEARNS COUNTY

STATION NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	SAM- PLING DEPTH (FEET) (00003)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
452526094420701	123N32W33AAD01	STEPHEN G	1120TSH 83-02-25	1030	--	20.0	20.00	1187.00	550
			1120TSH 83-08-03	1200	--	--	20.00	1187.00	660
452531094575801	123N34W33BBB01	DALLAS RA	1120TSH 83-08-03	1330	--	--	35.00	1239.00	680
452636095064001	123N35W19DDA01	JOHN BROW	1120TSH 83-03-04	1230	--	20.0	20.00	1295.00	565
			1120TSH 83-05-24	1330	--	--	20.00	1295.00	590
			1120TSH 83-08-02	1645	--	--	20.00	1295.00	600
452647094571602	123N34W21DBD02	BORGERDIN	1120TSH 83-05-25	0930	--	--	20.00	1245.00	625
			1120TSH 83-08-03	1400	--	--	20.00	1245.00	720
452721094293601	123N30W19ABA01	EDWIN TOR	1120TSH 83-05-25	1345	4.90	--	12.70	1102.00	990
			1120TSH 83-08-02	1000	4.60	--	12.70	1102.00	890
452731094585901	123N34W17CDB01	GEORGE RU	1120TSH 83-03-04	1350	--	22.0	22.00	1263.00	550
			1120TSH 83-08-02	1445	--	--	22.00	1263.00	600
452748095053703	123N35W17ADC3	SANDVIG HOU	1120TSH 83-05-24	1530	--	--	17.00	1290.00	790
			1120TSH 83-08-02	1745	--	--	17.00	1290.00	820
452750095054001	123N35W04ADC01	HARLAN SA	1120TSH 83-03-02	0930	16.00	30.3	30.30	1294.00	615
			1120TSH 83-05-24	1700	16.10	--	30.30	1294.00	675
			1120TSH 83-08-02	1830	15.60	--	30.30	1294.00	770
452750095054002	123N35W04ADC02	HARLAN SA	1120TSH 83-03-02	0830	15.80	21.0	21.00	1294.00	1020
			1120TSH 83-05-24	1630	16.00	--	21.00	1294.00	1000
			1120TSH 83-08-02	1900	15.40	--	21.00	1294.00	1140
452759094302801	123N31W13AAC4	TORBORG (I) M	1120TSH 83-04-27	1545	4.90	--	26.30	1116.00	700
			1120TSH 83-05-25	1200	5.20	--	26.30	1116.00	800
			1120TSH 83-08-02	1130	4.70	--	28.00	1116.00	750
452843094230501	123N30W12ADD01	LEANDER H	1120TSH 83-02-25	1445	7.58	34.0	34.00	1110.00	590
			1120TSH 83-05-25	1500	7.10	--	34.00	1110.00	660
			1120TSH 83-08-01	1830	6.20	--	34.00	1110.00	720
452843094230502	123N30W12ADD02	LEANDER H	1120TSH 83-02-25	1430	7.26	15.0	15.00	1110.00	937
			1120TSH 83-05-25	1430	6.80	--	15.00	1110.00	1160
			1120TSH 83-08-01	1930	5.90	--	15.00	1110.00	1000
453124094395201	124N32W26ADB01	RALPH TER	1120TSH 83-02-25	1130	--	27.0	27.00	1140.00	430
			1120TSH 83-08-02	1245	--	--	27.00	1140.00	490
453927094464201	125N33W01CDD01	HAROLD TO	1120TSH 83-08-04	1000	--	--	73.00	1202.00	690
454428095051701	126N35W09BAD01	GERALD BE	1120TSH 83-02-24	0930	6.27	26.3	26.30	1312.00	520
			1120TSH 83-05-20	1430	5.80	--	26.30	1312.00	575
			1120TSH 83-07-29	1045	5.20	--	26.30	1312.00	520
454428095051702	126N35W09BAD02	GERALD BE	1120TSH 83-02-24	0900	6.26	10.3	10.30	1312.00	740
			1120TSH 83-05-20	1400	5.80	--	10.30	1312.00	1000
			1120TSH 83-07-29	1115	5.20	--	10.30	1312.00	790



QUALITY OF GROUND WATER  
WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983  
STEARNS COUNTY--Continued

DATE OF SAMPLE	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	ALKA- LINITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
83-02-25	--	7.2	--	10.5	--	--	--	--	--	--	--	--
83-08-03	--	7.2	--	15.0	--	--	--	--	--	--	--	--
83-08-03	--	7.3	--	13.0	--	--	--	--	--	--	--	--
83-03-04	--	7.7	--	10.5	--	--	--	--	--	--	--	--
83-05-24	--	7.5	--	9.5	--	--	--	--	--	--	--	--
83-08-02	--	7.4	--	12.5	--	--	--	--	--	--	--	--
83-05-25	--	7.3	--	9.0	--	--	--	--	--	--	--	--
83-08-03	--	6.9	--	16.0	--	--	--	--	--	--	--	--
83-05-25	--	7.4	--	7.0	--	--	--	--	--	--	--	--
83-08-02	--	7.3	--	12.0	--	--	--	--	--	--	--	--
83-03-04	--	7.7	--	12.0	--	--	--	--	--	--	--	--
83-08-02	--	7.2	--	13.5	--	--	--	--	--	--	--	--
83-05-24	--	7.6	--	8.5	--	--	--	--	--	--	--	--
83-08-02	--	7.4	--	12.0	--	--	--	--	--	--	--	--
83-03-02	642	7.4	7.7	9.5	--	--	--	--	--	--	--	16
83-05-24	674	7.6	7.7	9.0	--	--	--	--	--	--	--	12
83-08-02	717	7.4	7.6	9.0	--	--	--	--	--	--	--	11
83-03-02	1060	7.3	7.5	9.0	--	--	--	--	--	--	--	14
83-05-24	1040	7.5	7.6	8.0	--	--	--	--	--	--	--	9.0
83-08-02	1090	7.1	7.4	9.5	--	--	--	--	--	--	--	6.0
83-04-27	--	7.4	--	8.0	--	--	--	--	--	--	--	--
83-05-25	781	7.6	7.1	8.0	100	36	5.5	1.6	336	--	16	19
83-08-02	--	7.3	--	9.5	--	--	--	--	--	--	--	--
83-02-25	639	7.7	7.4	9.0	--	--	--	--	--	--	--	38
83-05-25	665	7.4	7.7	8.0	--	--	--	--	--	--	--	33
83-08-01	655	7.4	7.3	8.5	--	--	--	--	--	--	--	33
83-02-25	974	7.6	7.4	7.5	--	--	--	--	--	--	--	36
83-05-25	1190	7.4	7.5	7.0	--	--	--	--	--	--	--	30
83-08-01	1030	7.3	7.4	10.0	--	--	--	--	--	--	--	32
83-02-25	--	7.7	--	11.5	--	--	--	--	--	--	--	--
83-08-02	--	7.4	--	8.5	--	--	--	--	--	--	--	--
83-08-04	--	7.2	--	9.5	--	--	--	--	--	--	--	--
83-02-24	563	7.7	7.5	8.0	--	--	--	--	--	--	--	38
83-05-20	580	7.4	7.4	8.0	--	--	--	--	--	--	--	40
83-07-29	568	7.3	7.3	8.5	--	--	--	--	--	--	--	36
83-02-24	784	7.5	7.6	5.5	--	--	--	--	--	--	--	40
83-05-20	1010	7.5	7.5	7.0	--	--	--	--	--	--	--	40
83-07-29	794	7.4	7.4	12.5	--	--	--	--	--	--	--	43

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## STEARNS COUNTY--Continued

DATE OF SAMPLE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
83-02-25	--	--	--	9.5	--	--	--	--	--	--	--	--
83-08-03	--	--	--	9.9	--	--	--	--	--	--	--	--
83-08-03	--	--	--	2.7	--	--	--	--	--	--	--	--
83-03-04	--	--	--	4.7	--	--	--	--	--	--	--	--
83-05-24	--	--	--	4.5	--	--	--	--	--	--	--	--
83-08-02	--	--	--	7.0	--	--	--	--	--	--	--	--
83-05-25	--	--	--	<.10	--	--	--	--	--	--	--	--
83-08-03	--	--	--	1.3	--	--	--	--	--	--	--	--
83-05-25	--	--	--	3.8	--	--	--	--	--	--	--	--
83-08-02	--	--	--	5.8	--	--	--	--	--	--	--	--
83-03-04	--	--	--	3.1	--	--	--	--	--	--	--	--
83-08-02	--	--	--	6.9	--	--	--	--	--	--	--	--
83-05-24	--	--	--	28.	--	--	--	--	--	--	--	--
83-08-02	--	--	--	34.	--	--	--	--	--	--	--	--
83-03-02	36	--	--	21.	.03	<.10	--	.02	--	20	<10	1.2
83-05-24	32	--	--	22.	<.01	<.10	--	.02	--	10	10	--
83-08-02	43	--	--	26.	.17	.50	27	<.01	--	60	10	--
83-03-02	55	--	--	60.	.07	.30	60	.01	--	30	<10	1.7
83-05-24	43	--	--	51.	.09	<.10	--	.01	--	10	10	1.4
83-08-02	44	--	--	66.	.05	<.10	--	<.01	--	30	10	2.0
83-04-27	--	--	--	2.2	--	--	--	--	--	--	--	--
83-05-25	14	.20	20	18.	.05	<.10	--	.04	60	17	380	2.4
83-08-02	--	--	--	3.0	--	--	--	--	--	--	--	--
83-02-25	15	--	--	<.10	.17	<.20	--	<.01	--	4900	100	2.2
83-05-25	15	--	--	.27	.06	.10	.37	<.01	--	6000	100	--
83-08-01	19	--	--	.20	.07	.30	.50	<.01	--	6800	90	--
83-02-25	35	--	--	49.	.18	<.20	--	<.01	--	40	740	1.9
83-05-25	33	--	--	72.	.25	<.30	72	<.01	--	200	590	--
83-08-01	34	--	--	50.	.45	.80	51	<.01	--	1700	440	--
83-02-25	--	--	--	9.1	--	--	--	--	--	--	--	--
83-08-02	--	--	--	12.	--	--	--	--	--	--	--	--
83-08-04	--	--	--	2.7	--	--	--	--	--	--	--	--
83-02-24	5.3	--	--	.10	.10	.10	.20	.03	--	1000	290	2.5
83-05-20	5.6	--	--	<.10	.10	.20	--	.02	--	1400	250	--
83-07-29	10	--	--	<.10	.06	.20	--	.01	--	1400	240	--
83-02-24	41	--	--	30	.13	<.20	--	<.01	--	40	20	1.6
83-05-20	64	--	--	54	.09	<.10	--	<.01	--	90	20	--
83-07-29	10	--	--	20	.30	.30	20	<.01	--	530	40	--

## PESTICIDE ANALYSES

STATION	NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME- TRYNE TOTAL (82184)	ATRA- TONE TOTAL (UG/L) (82185)		
452750095054002	123N35W04	ADC02	HARLAN SA	1120TSH	83-08-02	1900	15.40	21.00	1294.00	<.10	<.10	
454428095051702	126N35W09	BAD02	GERALD BE	1120TSH	83-05-20	1400	5.80	10.30	1312.00	<.10	<.10	
DATE OF SAMPLE	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	CYPRA- ZINE TOTAL (UG/L) (82187)	METHO- MYL TOTAL (UG/L) (39051)	PROME- TONE TOTAL (UG/L) (39056)	PROME- TRYNE TOTAL (UG/L) (39057)	PRO- PAZINE TOTAL (UG/L) (39024)	PROPHAM TOTAL (UG/L) (39052)	SEVIN, TOTAL (UG/L) (39750)	SIMA- ZINE TOTAL (UG/L) (39055)	SIME- TONE TOTAL (UG/L) (82188)	SIME- TRYNE TOTAL (UG/L) (39054)
83-08-02	.20	<.10	<.10	<.5	<.1	<.1	<.10	<.5	<.50	<.10	<.10	<.1
83-05-20	<.10	<.10	<.10	--	<.1	<.1	<.10	--	--	<.10	<.10	<.1

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

**STEVENS COUNTY**

STATION	NUMBER	LOCAL IDENTIFIER	GEOLOGIC UNIT	DATE OF SAMPLE	TIME	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (UMHOS) (00095)	SPECIFIC CONDUCTANCE (UMHOS) (90095)	PH (STANDARD UNITS) (00400)	PH LAB (STANDARD UNITS) (00403)		
453150095570701		124N42W21CCB K. CHRISTEN	112BRDO	82-10-06	0900	78.0	--	2250	7.2	7.0		
454341095480701		126N41W15AAD A RATHKE	112BRDO	82-10-05	1600	135	785	1150	6.9	7.2		
DATE OF SAMPLE	TEMPERATURE (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	CALCIUM DIS-SOLVED (MG/L) (00915)	MAGNESIUM, DIS-SOLVED (MG/L) (00925)	SODIUM, DIS-SOLVED (MG/L) (00930)	POTASSIUM, DIS-SOLVED (MG/L) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2) (00405)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)
82-10-06	11.0	1.7	360	120	72	9.6	390	51	970	12	.20	28
82-10-05	10.0	1.3	150	57	23	5.8	278	76	260	2.7	.20	29
DATE OF SAMPLE	DEG. C	SOLIDS, RESIDUE AT 180 (MG/L) (70300)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)				
82-10-06	1960		<.10	<.01	470	4300	720	3.4				
82-10-05	627		<.10	.01	240	5300	210	3.1				

## SWIFT COUNTY

STATION	NUMBER	LOCAL IDENTIFIER	GEOLOGIC UNIT	DATE OF SAMPLE	TIME	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (UMHOS) (00095)	SPECIFIC CONDUCTANCE LAB (UMHOS) (90095)	PH (STANDARD UNITS) (00400)	PH LAB (STANDARD UNITS) (00403)		
451328096053201		120N43W07ABB 79-12 DEEP	112BRDO	82-10-04	1530	173	--	661	7.0	7.4		
451402096010001		120N43W11BCA K TOSEL	112BRDO	82-10-28	1535	102	500	580	7.4	7.7		
DATE OF SAMPLE	TEMPERATURE (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	ALKALINITY, CARBONATE (MG/L - CACO3) (99430)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2) (00405)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)
82-10-04	10.5	2.0	88	24	12	2.7	214	290	56	100	2.5	.20
82-10-28	9.0	--	89	33	8.5	3.0	242	--	20	160	6.3	.20
DATE OF SAMPLE		SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)			
82-10-04		26	429	<.10	<.01	90	1100	78	2.8			
82-10-28		23	463	.19	.02	80	500	300	2.4			

## QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

## WADENA COUNTY

STATION NUMBER	LOCAL IDENTIFIER	GEO-LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	SPECIFIC CONDUCTANCE (UMHOS) (00095)	SPE-CIFIC CONDUCTANCE LAB (UMHOS) (90095)	PH (STANDARD UNITS) (00400)
462215094591501	134N34W32DCB02	1120TSH	83-06-09	1100	42.00	700	667	7.0
462530095050001	134N35W10CDC01	1120TSH	83-06-09	1145	24.00	675	664	7.1
462815094532001	135N33W30DCD01	1120TSH	83-06-09	1530	87.00	530	502	7.0
463000094583001	135N34W16DBC01	1120TSH	83-06-09	1430	65.00	500	479	6.9
464300094533001	137N33W06AAA01	1120TSH	83-06-09	1330	13.00	500	447	6.5

DATE OF SAMPLE	PH LAB (STANDARD UNITS) (00403)	TEMPERATURE (DEG C) (00010)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
83-06-09	7.2	8.0	97	22	6.6	3400
83-06-09	7.2	11.0	95	11	.27	4100
83-06-09	7.6	10.0	70	10	12	10
83-06-09	7.6	8.0	69	2.0	<.10	1600
83-06-09	6.3	9.0	44	7.3	.66	6100



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## FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI). This report contains both the inch-pound and SI unit equivalents in the station manuscript descriptions.

Multiply inch-pound units	By	To obtain SI units
<i>Length</i>		
inches (in)	$2.54 \times 10^1$	millimeters (mm)
	$2.54 \times 10^{-2}$	meters (m)
feet (ft)	$3.048 \times 10^{-1}$	meters (m)
miles (mi)	$1.609 \times 10^0$	kilometers (km)
<i>Area</i>		
acres	$4.047 \times 10^3$	square meters (m <sup>2</sup> )
	$4.047 \times 10^{-1}$	square hectometers (hm <sup>2</sup> )
	$4.047 \times 10^{-3}$	square kilometers (km <sup>2</sup> )
square miles (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometers (km <sup>2</sup> )
<i>Volume</i>		
gallons (gal)	$3.785 \times 10^0$	liters (L)
	$3.785 \times 10^0$	cubic decimeters (dm <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic meters (m <sup>3</sup> )
million gallons	$3.785 \times 10^3$	cubic meters (m <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
cubic feet (ft <sup>3</sup> )	$2.832 \times 10^1$	cubic decimeters (dm <sup>3</sup> )
	$2.832 \times 10^{-2}$	cubic meters (m <sup>3</sup> )
cfs-days	$2.447 \times 10^3$	cubic meters (m <sup>3</sup> )
	$2.447 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
acre-feet (acre-ft)	$1.233 \times 10^3$	cubic meters (m <sup>3</sup> )
	$1.233 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
	$1.233 \times 10^{-6}$	cubic kilometers (km <sup>3</sup> )
<i>Flow</i>		
cubic feet per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liters per second (L/s)
	$2.832 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$2.832 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
gallons per minute (gal/min)	$6.309 \times 10^{-2}$	liters per second (L/s)
	$6.309 \times 10^{-2}$	cubic decimeters per second (dm <sup>3</sup> /s)
	$6.309 \times 10^{-5}$	cubic meters per second (m <sup>3</sup> /s)
million gallons per day	$4.381 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$4.381 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
<i>Mass</i>		
tons (short)	$9.072 \times 10^{-1}$	megagrams (Mg) or metric tons

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