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Water Resources Data Minnesota Water Year 1984

Volume 2. Upper Mississippi and Missouri River Basins



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MN-84-2
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 1984

1983

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
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27	28	29	30			

DECEMBER

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30	31					

1984

JANUARY

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FEBRUARY

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JULY

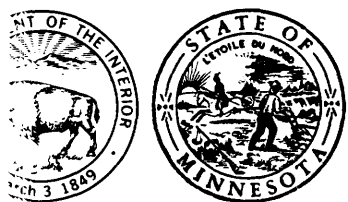
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AUGUST

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SEPTEMBER

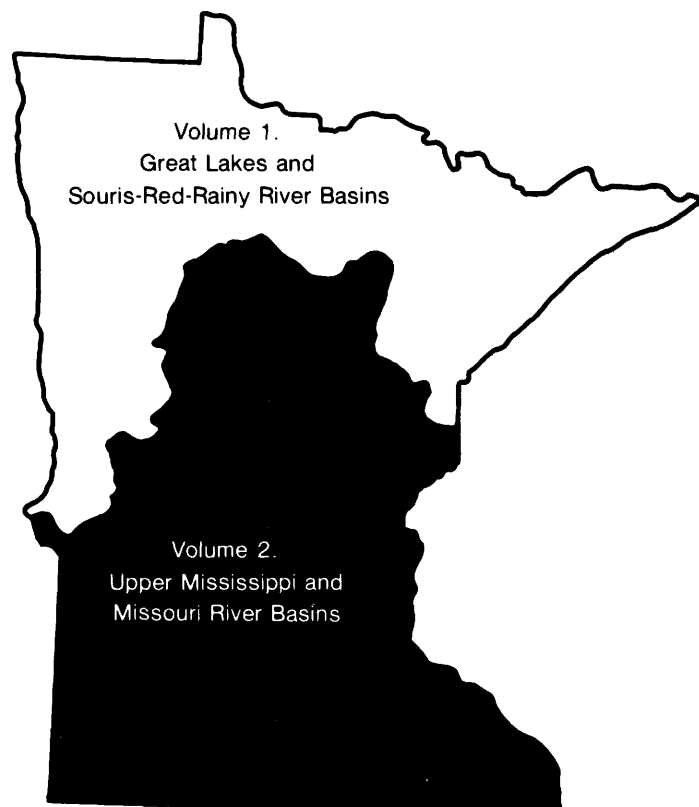
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Water Resources Data Minnesota Water Year 1984

Volume 2. Upper Mississippi and Missouri River Basins

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



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MN-84-2
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

UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

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U.S. Geological Survey
702 Post Office Building
St. Paul, Minnesota 55101**

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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Henry W. Anderson, Jr., Ground-Water Project Chief, Minnesota District

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CONTENTS

	Page
Preface	III
List of gaging stations, in downstream order, for which records are published.....	VI
List of ground-water wells, by county, for which records are published.....	VIII
Introduction.....	1
Cooperation.....	1
Summary of hydrologic conditions.....	2
Precipitation.....	2
Streamflow.....	2
Water quality.....	2
Ground-water levels.....	7
Special networks and programs.....	7
Explanation of the records.....	11
Station identification numbers.....	11
Downstream order system and station number.....	11
Latitude-longitude system for wells and miscellaneous sites.....	11
Records of stage and water-discharge.....	12
Data collection and computation.....	12
Data presentation.....	13
Accuracy of the records.....	14
Other records available.....	15
Records of surface water-quality.....	15
Classification of records.....	15
Arrangement of records.....	15
On-site measurement and collection.....	15
Water temperature.....	16
Sediment.....	16
Laboratory measurements.....	16
Data presentation.....	16
Remark codes.....	17
Records of ground-water levels.....	17
Data collection and computation.....	18
Data presentation.....	18
Records of ground-water quality.....	19
Data collection and computation.....	19
Data presentation.....	19
Access to WATSTORE data.....	19
Definition of terms.....	19
Publications on techniques of water-resources investigations.....	30
Discontinued gaging stations.....	31
Station records, surface water.....	35
Discharge at partial-record stations and miscellaneous sites.....	240
Low-flow partial-record stations.....	240
High-flow partial-record stations.....	247
Miscellaneous sites.....	262
Analyses of samples collected at water-quality partial-record stations.....	265
Miscellaneous analyses of streams.....	266
Station records, ground water.....	277
Ground-water levels.....	280
Quality of ground-water.....	382
Chemical quality of precipitation.....	410
Index.....	413

ILLUSTRATIONS

Figure 1. Map showing precipitation, in inches, during 1984 water year compared with normal annual precipitation for Minnesota.....	3
2. Graph showing comparison of discharge at three long-term representative gaging stations for 1984 water year with median discharge for water years 1951-80.....	4
3. Graph showing comparison of dissolved-solids concentrations for 1984 water year with mean monthly values for the period of record.....	6
4. Graph showing comparison of suspended-sediment loads for 1984 water year with mean monthly values for period of record.....	8
5. Map showing relationship of seasonal water-table levels to long-term mean levels..	9
6. Map showing relationship of seasonal water levels in confined aquifers to long-term mean levels.....	10
7. Diagram showing system for numbering wells and miscellaneous sites.....	11
8. Map showing location of water-discharge stations.....	26
9. Map showing location of water-quality stations.....	28
10. Map showing location of high-flow partial-record stations.....	248
11. Map showing location of ground-water wells.....	278

Note.--Data for partial-record stations and miscellaneous sites for both surface-water quantity and quality are published in separate sections of the data report. See references at the end of this list for page numbers for these sections.

[Letters after station name designates type of data: (d) discharge; (e) gage height, elevation, or contents; (c) chemical, radio-chemical, or pesticides; (b) biological or micro-biological; (p) physical (water temperature, sediment, or specific conductance)]

|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-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UPPER MISSISSIPPI RIVER BASIN--Continued

MINNESOTA RIVER BASIN--Continued						
Redwood River near Marshall.....	(d	-	-	-	p)...	126,262
Redwood River near Redwood Falls.....	(d	-	-	-	p)...	127,262
Cottonwood River:						
Plum Creek:						
Lake Laura South Inlet near Walnut Grove.....	(d	-	c	b	p)...	128
Lake Laura North Inlet near Walnut Grove.....	(d	-	c	b	p)...	133
Lake Laura near Walnut Grove.....	(-	e	c	b	p)...	137
Lake Laura Outlet near Walnut Grove.....	(d	-	c	b	p)...	141
Dry Creek near Jeffers.....	(d	-	c	b	p)...	146
Cottonwood River near New Ulm.....	(d	-	-	-	p)...	151,262
Little Cottonwood River near Courtland.....	(d	-	-	-	p)...	152,263
Blue Earth River:						
Watonwan River near Garden City.....	(d	-	-	-	p)...	153,263
Blue Earth River near Rapidan.....	(d	-	-	-	p)...	154,263
Le Sueur River near Rapidan.....	(d	-	-	-	p)...	155,263
Minnesota River at Mankato.....	(d	-	-	-	p)...	156,263
High Island Creek near Henderson.....	(d	-	-	-	p)...	160,264
Minnesota River near Jordan.....	(d	-	c	b	p)...	161,264
Mississippi River at St. Paul.....	(d	-	-	-	p)...	170,264
Mississippi River at Industrial Molasses at St. Paul.....	(-	-	c	-	p)...	173
Mississippi River at Fifth Street at Newport.....	(-	-	c	-	p)...	180
Mississippi River at Grey Cloud Island near Cottage Grove.....	(-	-	c	-	p)...	187
Mississippi River at Nininger.....	(-	-	c	b	p)...	194
Mississippi River at lock and dam 2, at Hastings.....	(-	-	c	-	p)...	196
ST. CROIX RIVER BASIN						
St. Croix River:						
Kettle River:						
Kettle River below Sandstone.....	(d	-	-	-	p)...	203,272
Snake River:						
Knife River near Mora.....	(d	-	-	-	p)...	204,272
Sunrise River near Lindstrom.....	(d	-	-	-	p)...	205,273
St. Croix River at St. Croix Falls, WI.....	(d	-	c	b	p)...	206
Mississippi River at Prescott, WI.....	(d	-	-	-	p)...	209,273
VERMILLION RIVER BASIN						
Vermillion River near Empire.....	(d	-	c	-	p)...	210,273
CANNON RIVER BASIN						
Cannon River:						
Straight River near Faribault.....	(d	-	-	-	p)...	218,273
ZUMBRO RIVER BASIN						
South Fork Zumbro River at Rochester.....	(d	-	-	-	p)...	219,273
Zumbro River at Kellogg.....	(d	-	-	-	p)...	220,273
WHITEWATER RIVER BASIN						
North Fork Whitewater River near Elba.....	(d	-	c	b	p)...	221,274
Whitewater River near Beaver.....	(d	-	-	-	p)...	224,274
GARVIN BROOK BASIN						
Garvin Brook:						
Stockton Valley Creek at Stockton.....	(d	-	c	-	p)...	225,274
Garvin Brook near Minnesota City.....	(d	-	c	-	p)...	228,274
Rollingstone Creek:						
Straight Valley Creek near Rollingstone.....	(d	-	-	-	p)...	231,274
Mississippi River at Winona.....	(d	-	c	b	p)...	232,274
ROOT RIVER BASIN						
Root River near Lanesboro.....	(d	-	-	-	p)...	237,274
IOWA RIVER BASIN						
Iowa River:						
Cedar River near Austin.....	(d	-	-	-	p)...	238,275
DES MOINES RIVER BASIN						
Des Moines River at Jackson.....	(d	-	-	-	p)...	239,275
* * * * *						
Discharge at partial-record stations and miscellaneous sites.....						240
Low-flow partial-record stations.....						240
High-flow partial-record stations.....						247
Special study and miscellaneous sites.....						262
Analyses of samples collected at water quality partial-record stations						
and miscellaneous sites.....						265

GROUND-WATER WELLS, BY COUNTY, FOR WHICH
RECORDS ARE PUBLISHED

GROUND-WATER LEVELS

						Page
AITKIN						
Well	462447093154401	Local	number	045N23W05ADD01.....		280
Well	463135093433901	Local	number	047N27W26BBC01.....		280
ANOKA						
Well	451056093072201	Local	number	031N22W18AAA01.....		281
Well	451056093072205	Local	number	031N22W18AAA05.....		281
Well	450927093033801	Local	number	031N22W23CBC01.....		282
Well	450927093033802	Local	number	031N22W23CBC02.....		282
Well	451210093170201	Local	number	031N24W01CBB01.....		283
Well	451742093122102	Local	number	032N23W04AAD02.....		283
Well	452305093141501	Local	number	033N23W05BAB01.....		284
Well	451938093223101	Local	number	033N24W30ABB01.....		284
Well	452416093160801	Local	number	034N24W25DAC01.....		285
BECKER						
Well	465239095121601	Local	number	139N36W02CCC01.....		286
Well	470206095225301	Local	number	141N37W17AAA01.....		286
BELTRAMI						
Well	473023094570901	Local	number	147N34W35ADC01.....		287
BENTON						
Well	453454094002402	Local	number	036N29W30BCC02.....		288
Well	454657094143701	Local	number	038N31W18DCA01.....		288
Well	454648094144102	Local	number	038N31W18DCD02.....		289
BIG STONE						
Well	451517096104501	Local	number	121N44W27CCC01.....		289
Well	453330096420201	Local	number	124N48W17AAA01.....		290
Well	453237096381601	Local	number	124N48W23AAA04.....		290
BLUE EARTH						
Well	440050094102801	Local	number	106N28W03DBA01.....		291
Well	441134093505301	Local	number	108N25W04BBC01.....		291
BROWN						
Well	441030094254501	Local	number	108N30W09ADD01.....		292
Well	441800094434301	Local	number	110N32W30DDB01.....		292
CARLTON						
Well	462712092453401	Local	number	046N19W21CBB01.....		293
Well	463747092372701	Local	number	048N18W21ACD01.....		294
CARVER						
Well	445155093320101	Local	number	116N23W12CDB01.....		295
CASS						
Well	462720094433801	Local	number	135N32W33CDD01.....		296
Well	464629094420901	Local	number	138N32W15AAA01.....		296
CHIPPEWA						
Well	450447095490101	Local	number	119N41W29DDD01.....		297
Well	450631095562201	Local	number	119N42W17DDD01.....		297
CHISAGO						
Well	453138092445502	Local	number	035N19W17BAB02.....		298
Well	453125092445401	Local	number	035N19W17BDB01.....		298
Well	452936092561901	Local	number	035N21W26BCC01.....		299
COTTONWOOD						
Well	435458095110801	Local	number	105N36W08ACA01.....		300
Well	435258095255301	Local	number	105N38W20BAA01.....		300
CROW WING						
Well	463006094131201	Local	number	135N28W16CCD01.....		301
DAKOTA						
Well	445044093102401	Local	number	027N23W09ABD01.....		302
Well	444702093170101	Local	number	027N24W34BDC01.....		302
Well	445330093054301	Local	number	028N22W19DCC02.....		303
Well	443146093002201	Local	number	112N18W08ABA01.....		303
Well	443134093010601	Local	number	112N18W08BBC01.....		304
Well	442830093085201	Local	number	112N19W30DBD01.....		304
Well	443645093014701	Local	number	113N18W07BAC01.....		304
Well	444205092500001	Local	number	114N17W10AAA01.....		305
Well	444047092521901	Local	number	114N17W16CBB01.....		306
Well	443827092521801	Local	number	114N17W33BBC01.....		306
Well	444117092595701	Local	number	114N18W17AAB01.....		306
Well	443801092571301	Local	number	114N18W35CCB01.....		307
Well	444220093055001	Local	number	114N19W04DAC01.....		307
Well	443831093074201	Local	number	114N19W32BAD01.....		308
Well	444616093020101	Local	number	115N18W18BBC01.....		308
DODGE						
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Well	440448092485501	Local	number	107N17W13BBA01.....		309
DOUGLAS						
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Well	455900095162001	Local	number	129N36W18CBB01.....		310
Well	460604095134401	Local	number	130N36W04BCC01.....		311
Well	460300095100201	Local	number	130N36W23DDD01.....		311
FARIBAULT						
Well	434237094082901	Local	number	103N28W24BDC01.....		311
Well	434558093540001	Local	number	103N28W24BDC01.....		312

FREEBORN

Well 433434093331201	Local number	101N23W02DAC01	312
Well 433846093220601	Local number	102N21W09CCB01	313
Well 434032093111801	Local number	103N20W36CCB01	313
Well 434308093322001	Local number	103N23W13CDA01	313

GOODHUE

Well 441737092400501	Local number	110N15W31BBD01	314
Well 442401092372501	Local number	111N15W21CDA01	314
Well 443012092362201	Local number	113N15W27BAB01	315

GRANT

Well 455010095523701	Local number	127N41W06CAC01	315
Well 454624095513201	Local number	127N41W32BBA01	316
Well 455641095524001	Local number	129N41W31ACA01	316
Well 460316095551301	Local number	130N42W23DBD01	316

HENNEPIN

Well 444815093194901	Local number	027N24W30AAA01	317
Well 444801093202801	Local number	027N24W30BDA01	317
Well 445356093145301	Local number	028N24W23ADD01	318
Well 450116093205301	Local number	029N24W06CCC01	318
Well 445849093155802	Local number	029N24W23CCB02	319
Well 445833093154301	Local number	029N24W26BAB01	319
Well 445829093162901	Local number	029N24W27ABD01	320
Well 445158093225101	Local number	116N21W07DAD01	320
Well 445615093212301	Local number	117N21W16CCA01	321
Well 445618093211801	Local number	117N21W16CDB01	321
Well 445347093213901	Local number	117N21W32DAD01	322
Well 445740093333001	Local number	117N23W11BBD01	322
Well 450223093231801	Local number	118N21W07DCB01	323
Well 445905093224401	Local number	118N21W32DCB01	323
Well 445857093223101	Local number	118N21W32CBD01	324
Well 450854093212801	Local number	119N21W04BBA01	324
Well 450519093281401	Local number	119N22W28ACC01	325

HOUSTON

Well 433953091251801	Local number	102N50W03DCC01	326
Well 433935091252001	Local number	102N05W03DCC02	326
Well 443935191252914	Local number	102N05W03DCC03	326

HUBBARD

Well 465142094433201	Local number	139N32W16AAA01	327
Well 465112095021501	Local number	139N35W13DAD01	327
Well 465420094453901	Local number	140N32W32BBA01	328
Well 465640095072101	Local number	140N35W16BCC01	328

ISANTI

Well 453125093181101	Local number	035N24W14BCD01	329
Well 453058093175901	Local number	035N24W14CDC01	329
Well 453410093140001	Local number	036N23W32ACB01	330

ITASCA

Well 471450093322001	Local number	055N25W17ACD01	330
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JACKSON

Well 434742095191501	Local number	104N37W19DBD01	331
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KANABEC

Well 454744093151601	Local number	038N23W07DBB01	332
Well 455342093134001	Local number	039N23W05DAC01	332
Well 455236093172301	Local number	039N24W11DDC01	333
Well 455047093205401	Local number	039N24W20DDD01	333

KANDIYOHI

Well 450730095014801	Local number	119N35W14ABB01	334
Well 452415094503001	Local number	122N33W04BCD01	334
Well 452400095004001	Local number	122N34W06CBC01	335

LAC QUI PARLE

Well 445258096224001	Local number	116N46W02CBC01	335
Well 445122096224501	Local number	116N46W15ADD01	336

LE SUEUR

Well 442522093543901	Local number	111N26W14ADA01	336
Well 443234093333501	Local number	112N23W02BAB01	336
Well 443147093374501	Local number	112N23W06DDD01	337

LINCOLN

Well 441705096084501	Local number	110N44W33DCD01	337
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MARTIN

Well 434359094422201	Local number	103N32W08CCD01	337
Well 434725094483001	Local number	104N33W28BAB01	338

MC LEOD

Well 444630094021601	Local number	115N27W14ABA01	338
Well 444758094132101	Local number	115N28W05ACC01	339
Well 444704094090801	Local number	115N28W11ADD01	339
Well 444819094164701	Local number	116N29W35DDC01	340
Well 445721094031201	Local number	117N27W10DAA01	340

MEEKER

Well 450632094290801	Local number	119N30W19AAB01	341
Well 451542094322301	Local number	121N31W26BDC01	341

MILLE LACS

Well 454450093395701	Local number	038N27W35ABC01	342
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MORRISON

Well 455135094092801	Local number	039N31W23DAA01	342
Well 455253094195801	Local number	039N32W09DCC01	343

MOWER

Well	434010093010801	Local	number	102N18W05ACB01.....	344
Well	434417093521001	Local	number	103N17W09DAA01.....	344

MURRAY

Well	435357096034701	Local	number	105N43W18BCC01.....	345
Well	440028095352401	Local	number	106N40W12ABB01.....	345
Well	444254095071201	Local	number	108N41W36BBC01.....	346

OLMSTED

Well	435920092273801	Local	number	106N14W14ADB01.....	346
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OTTER TAIL

Well	460838095150000	Local	number	131N36W20BCC01.....	347
Well	461850095191401	Local	number	133N37W23CCB01.....	347
Well	462024095352301	Local	number	133N39W10CCD01.....	348

PINE

Well	455737092390001	Local	number	040N18W18DBC01.....	348
Well	455939092365801	Local	number	041N18W33AAD01.....	348
Well	455947092542301	Local	number	041N20W32BBB01.....	349
Well	461809092481301	Local	number	044N20W13AAA01.....	349
Well	462112092495801	Local	number	045N20W26DBB01.....	349

PIPESTONE

Well	435610096082601	Local	number	106N44W33CCD01.....	350
Well	440456096263201	Local	number	107N47W12CDC01.....	350

POPE

Well	452940095414501	Local	number	123N40W04BDA01.....	350
Well	453150095130001	Local	number	124N36W20DDD01.....	351
Well	453250095434501	Local	number	124N40W18DAD01.....	351
Well	453810095174501	Local	number	125N37W14DBB01.....	351
Well	454230095143001	Local	number	126N36W20BCC01.....	352

RAMSEY

Well	445648093053402	Local	number	028N22W06ABD02.....	352
Well	445632093084901	Local	number	028N23W03ADD01.....	352
Well	445955093011001	Local	number	029N22W14CAB01.....	353
Well	445955093011002	Local	number	029N22W14CAB02.....	353
Well	445955093011003	Local	number	029N22W14CAB03.....	353
Well	450001093024701	Local	number	029N22W16ADD01.....	354
Well	445918092590901	Local	number	029N22W24ADA01.....	354
Well	445700093051001	Local	number	029N22W31DDD01.....	354
Well	450026093084201	Local	number	029N23W11CCC01.....	355
Well	445751093072301	Local	number	029N23W25CCD01.....	355
Well	445739093081201	Local	number	029N23W35BAD01.....	355
Well	450414093012701	Local	number	030N22W23CBB01.....	356
Well	450723093071801	Local	number	030N23W01BAB01.....	356
Well	450238093082501	Local	number	030N23W35BDC01.....	356

REDWOOD

Well	441513095183001	Local	number	109N37W09CCC01.....	357
Well	441323095280701	Local	number	109N38W30BBB01.....	357
Well	442027095341401	Local	number	110N39W17AAA01.....	357
Well	443051095074201	Local	number	112N36W14AAA01.....	358
Well	442906095064101	Local	number	112N36W24DDC01.....	358
Well	442917095183701	Local	number	112N37W21CCC01.....	359
Well	442950095255301	Local	number	112N38W21BBC01.....	359
Well	442959095315901	Local	number	112N39W22BBB01.....	359

RENVILLE

Well	444437094425001	Local	number	115N32W29AAC01.....	360
------	-----------------	-------	--------	---------------------	-----

RICE

Well	441912093162901	Local	number	110N20W19BDC01.....	360
Well	442543093113701	Local	number	111N20W11CDC01.....	360
Well	442751093240701	Local	number	112N21W31CBB01.....	361

ROCK

Well	433515096114901	Local	number	102N45W35DDC01.....	361
Well	433843096184701	Local	number	102N46W14AAA01.....	361
Well	434726096073201	Local	number	104N44W21CDC01.....	362

SCOTT

Well	443732093460301	Local	number	113N24W06BCB01.....	362
Well	443352093423001	Local	number	113N24W28DAA01.....	362
Well	443352093423002	Local	number	113N24W28DAA02.....	363
Well	443715093480801	Local	number	113N25W02CAC01.....	363
Well	444025093220801	Local	number	114N21W20BAA01.....	363
Well	443752093254401	Local	number	114N22W35DCC01.....	364
Well	444633093212901	Local	number	115N21W09CCC01.....	364
Well	444720093241801	Local	number	115N22W12ABA01.....	364
Well	444442093351001	Local	number	115N23W28AAC01.....	365

SHERBURNE

Well	451954093424801	Local	number	033N27W21CCA01.....	365
Well	451852093435301	Local	number	033N27W29CDC01.....	365
Well	452638093442001	Local	number	034N27W18AAB01.....	366
Well	452339093521402	Local	number	034N28W31BDD02.....	366
Well	453121093334401	Local	number	035N26W15DBB01.....	366
Well	452952093570801	Local	number	035N29W28ABC01.....	367

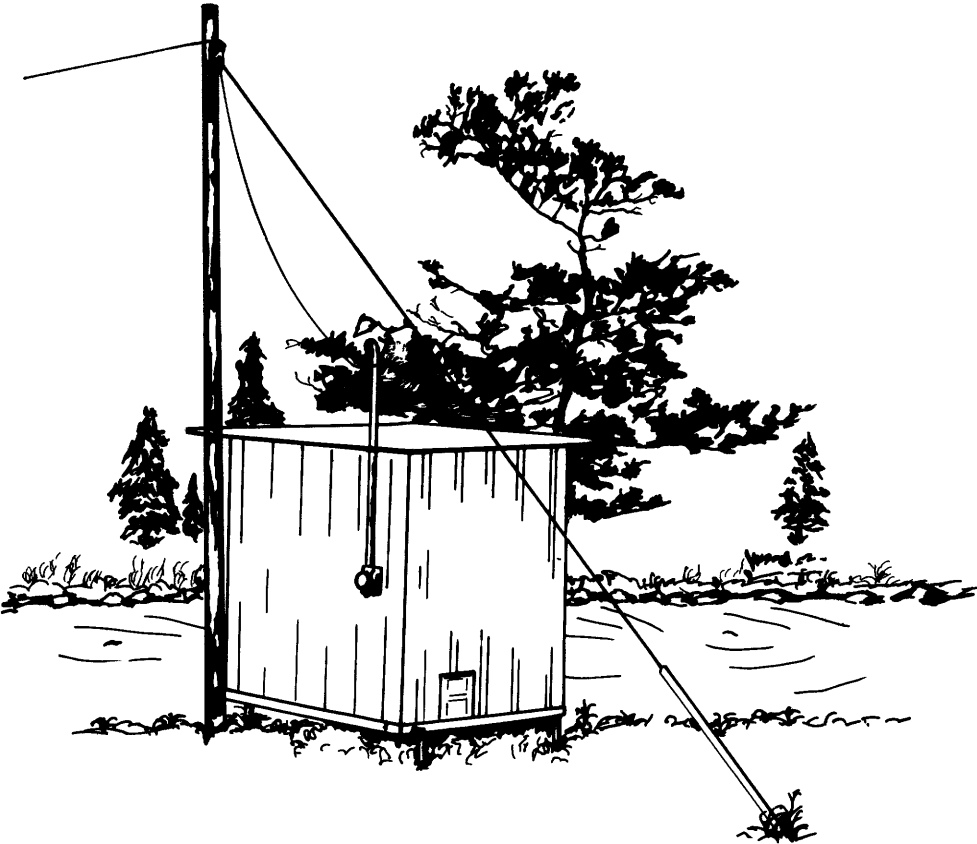
STEARNS

Well	452357094145302	Local	number	122N28W07ABA02.....	367
Well	452527094420702	Local	number	123N32W33AAD02.....	367
Well	453158094123701	Local	number	124N28W21CDA01.....	368

STEELE				
Well	435742093164001	Local number	106N20W30BAD01.....	369
Well	440442093135801	Local number	107N20W16ABD01.....	369
SWIFT				
Well	451329096000101	Local number	120N43W02DDD01.....	369
Well	451913095370201	Local number	121N39W06BDB01.....	370
Well	452211095570701	Local number	122N42W21BBB01.....	370
TODD				
Well	455337094521001	Local number	128N33W17CCB01.....	370
Well	460440094505901	Local number	130N33W16BBA01.....	371
Well	461234904480201	Local number	132N33W26DCC01.....	371
Well	461935094413101	Local number	133N32W14CCC01.....	371
Well	462024095091401	Local number	133N35W07CCC01.....	372
WABASHA				
Well	442708092155401	Local number	111N12W04BBD01.....	372
WADENA				
Well	462415095003001	Local number	134N34W19ADD01.....	372
Well	463027094480201	Local number	135N33W14ADD01.....	373
Well	463906094521201	Local number	137N33W29DAA01.....	373
Well	464116095010101	Local number	137N34W07DDD01.....	373
WASHINGTON				
Well	445125092464001	Local number	027N20W02BCC01.....	347
Well	445125092464002	Local number	027N20W02BCC02.....	347
Well	445125092464003	Local number	027N20W02BCC03.....	347
Well	444751092563101	Local number	027N21W28BCC01.....	375
Well	445536092462401	Local number	028N20W11CAA01.....	375
Well	445220092465901	Local number	028N20W34ADA01.....	375
Well	450134092583101	Local number	029N21W06CAD01.....	376
Well	450027092552101	Local number	029N21W10CCC01.....	376
Well	445958092523901	Local number	029N21W13CAB01.....	376
Well	450646092473501	Local number	030N20W03CAD01.....	377
Well	450647092473503	Local number	030N20W03CAD03.....	377
Well	450858092575001	Local number	031N21W28ABD01.....	377
Well	451355912532601	Local number	032N20W30BCD01.....	378
WATONWAN				
Well	440037194372601	Local number	106N32W01DDB01.....	378
Well	440409094304901	Local number	107N31W14DAC01.....	378
Well	440133094312501	Local number	107N31W35CAC01.....	379
WINONA				
Well	435746092034202	Local number	106N10W19DDA02.....	379
WRIGHT				
Well	450318094040602	Local number	118N27W03CAC01.....	379
Well	450318094040603	Local number	118N27W03CAC03.....	380
Well	450628093542102	Local number	119N26W24BAB02.....	380
Well	450403093544501	Local number	119N26W35DDA01.....	380
Well	451738093492402	Local number	121N25W15BBA02.....	381
YELLOW MEDICINE				
Well	444219096165501	Local number	114N45W04DCD01.....	381

COUNTIES WITH QUALITY OF GROUND WATER RECORDS

ANOKA	382
BECKER	385
BELTRAMI	386
CHISAGO	387
DOUGLAS	388
HENNEPIN	390
HUBBARD	392
ISANTI	393
KANDIYOHI	395
MORRISON	396
OTTER TAIL	397
POPE	397
SHERBURNE	399
STEARNS	404
WADENA	409



WATER RESOURCES DATA FOR MINNESOTA, 1984

INTRODUCTION

The Water Resources Division of the U.S Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Minnesota each water year. These data, accumulated during many years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Minnesota."

Water resources data for the 1984 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 68 gaging stations; stage and contents for 11 lakes and reservoirs; water quality for 28 stream stations, 2 partial-record stations, 4 lake stations, 1 precipitation station, and 175 wells; and water levels for 238 observation wells. Also included are 97 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.

This series of annual reports for Minnesota began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Minnesota were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 4, 5 and 6A." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." The above mentioned Water-Supply papers can be consulted in the libraries of the principal cities of the United States and may be purchased from Distribution Branch, Text Products Section, U.S. Geological Survey, 604 Pickett Street, Alexandria, VA 22304

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and volume number. For example, this volume is identified as the "U.S. Geological Survey Water-Data Report MN-84-2. For archiving and general distribution, the reports for 1971-1974 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche 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, Beatta Blomquist, mayor.

WATER RESOURCES DATA FOR MINNESOTA, 1984

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting records for 48 gaging stations and 15 water-quality stations published in this report.

Thirteen 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."

SUMMARY OF HYDROLOGIC CONDITIONS

PRECIPITATION

Precipitation during the 1984 water year varied from 6 inches below normal in the northwest to 8 inches above normal in the central and southeastern parts of Minnesota (fig. 1). Normal annual precipitation in Minnesota ranges from 19 inches in the northwest to 32 inches in the southeast. Precipitation was above normal statewide during the first quarter of the 1984 water year. The greatest total snowfall in November in more than 100 years of record occurred in the Twin Cities area ---30.4 inches. The previous record was 26.3 inches in 1940. The second quarter of 1984 began with precipitation below normal over the entire State, but precipitation during the quarter increased to normal or above normal except in the north. Precipitation was below normal in much of northern and central Minnesota during the third quarter until June. Several storms covering large areas swept through Minnesota in June, producing above-normal rainfall over most of the State. Rainfall in several areas in the southwest was greater than 10 inches for June, which exceeded the value for the 100-year recurrence interval. During the fourth quarter, precipitation generally was below normal. However, precipitation in small areas in central and southern Minnesota was above normal some months of the fourth quarter.

STREAMFLOW

Average annual runoff in Minnesota ranges from about 2 inches in the west to 14 inches in the northeast. Annual runoff in 1984 ranged from 1.3 inches in the northwest to about 20 inches in the northeast, and varied from 50 percent of average in parts of the northwest to 420 percent of average in parts of the southwest where the annual runoff was about 10 inches. Generally, annual streamflow in the northwest ranged from 50 to 130 percent of the long-term average, while that in the north-central and northeast parts of the State ranged from 100 to 130 percent. In the central part of Minnesota, the degree of exceedance of the long-term average was considerably greater, ranging from 150 to 300 percent. Annual streamflow in the southwest was even greater, ranging from 250 to about 400 percent of the long-term average. In the remainder of southern Minnesota, streamflow ranged from 150 to 300 percent of the long-term average, similar to central Minnesota.

Records for stations in central and southern Minnesota in 1984 indicate considerable variation in annual runoff from near average to much above average. Runoff in the Mississippi River at Aitkin in east-central Minnesota was 6.19 inches, slightly less than the 39-year average annual runoff of 6.43 inches. Runoff in the Crow River at Rockford, in the southern part of central Minnesota, was 11.01 inches almost 3 times the average annual runoff of 3.70 inches and the greatest in 59 years of record. This is the second consecutive year of record-breaking runoff in the Crow River basin; runoff in 1983 was 9.84 inches breaking the previous record of 9.14 inches set in 1972. In west-central Minnesota, the station on the Chippewa River near Milan recorded runoff of 5.42 inches, about 2.7 times the average annual runoff of 2.03 inches and the third highest in 47 years of record. The highest annual runoff, 5.81 inches, occurred in 1952. Runoff to the Des Moines River at Jackson, in southwestern Minnesota, was 12.43 inches, 3.6 times the average annual runoff of 3.48 inches, and the second highest in 49 years of record. The highest annual runoff, 13.34 inches, occurred in 1983. Annual and monthly mean discharges for these stations are compared to median discharges for a 30-year base period in figure 2.

Although record-breaking monthly and annual runoff volumes were recorded at several gaging stations, no peaks of record were exceeded during 1984 at any 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), located in northern and central Minnesota was 1,368,164 acre-feet at the end of the 1984 water year--a decrease of 52,641 acre-feet from the corresponding date a year ago.

WATER QUALITY

Dissolved-solids data from benchmark and 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 generally were high at all stations when compared to the historical record (fig. 3). The hydrologic benchmark station, North Fork Whitewater River near Elba, shows the most consistent departure from the historical record. Dissolved-solids concentrations at Elba have been increasing in recent years.

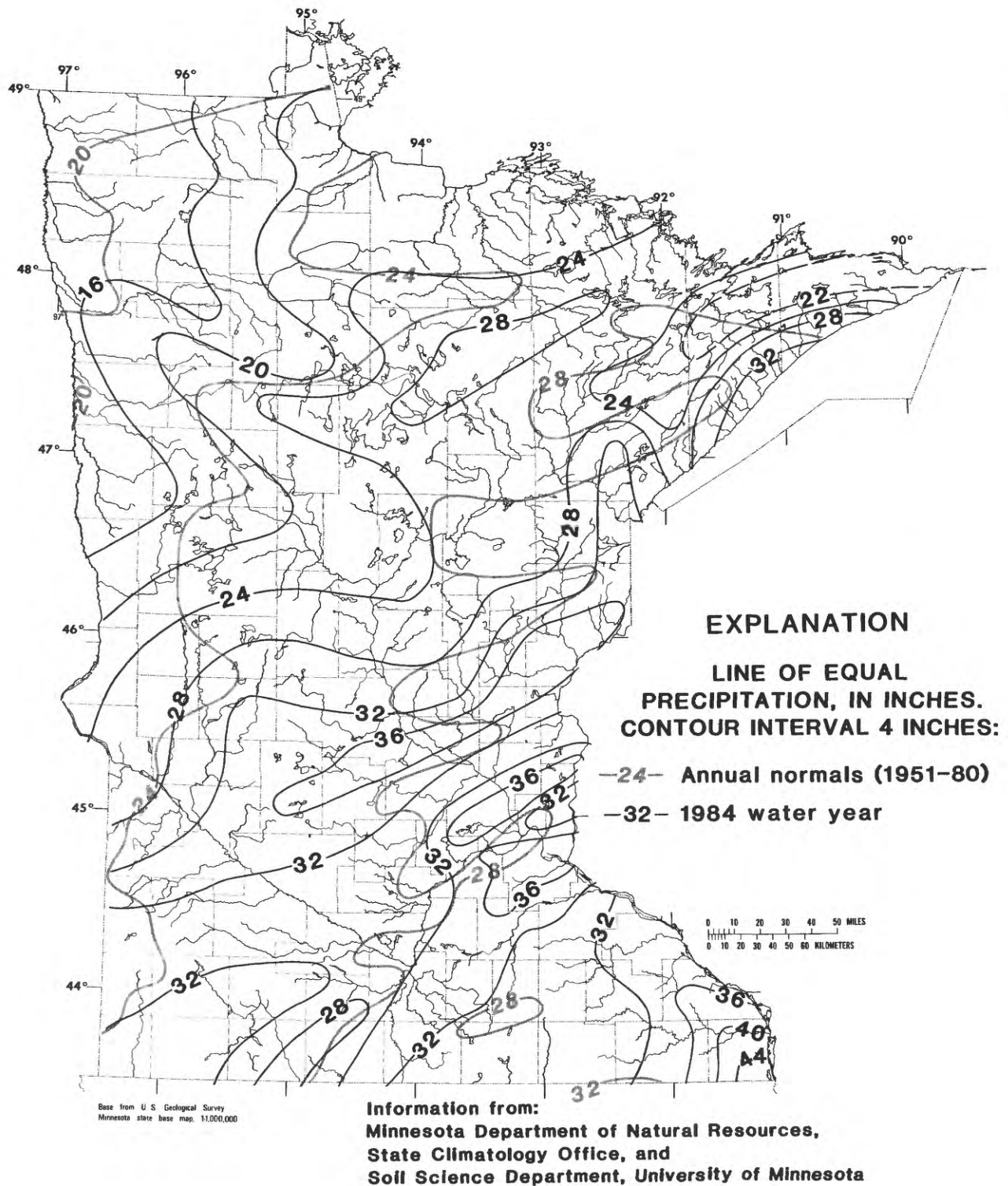


Figure 1.--Precipitation, In Inches, during 1984 water year compared with normal annual precipitation for Minnesota

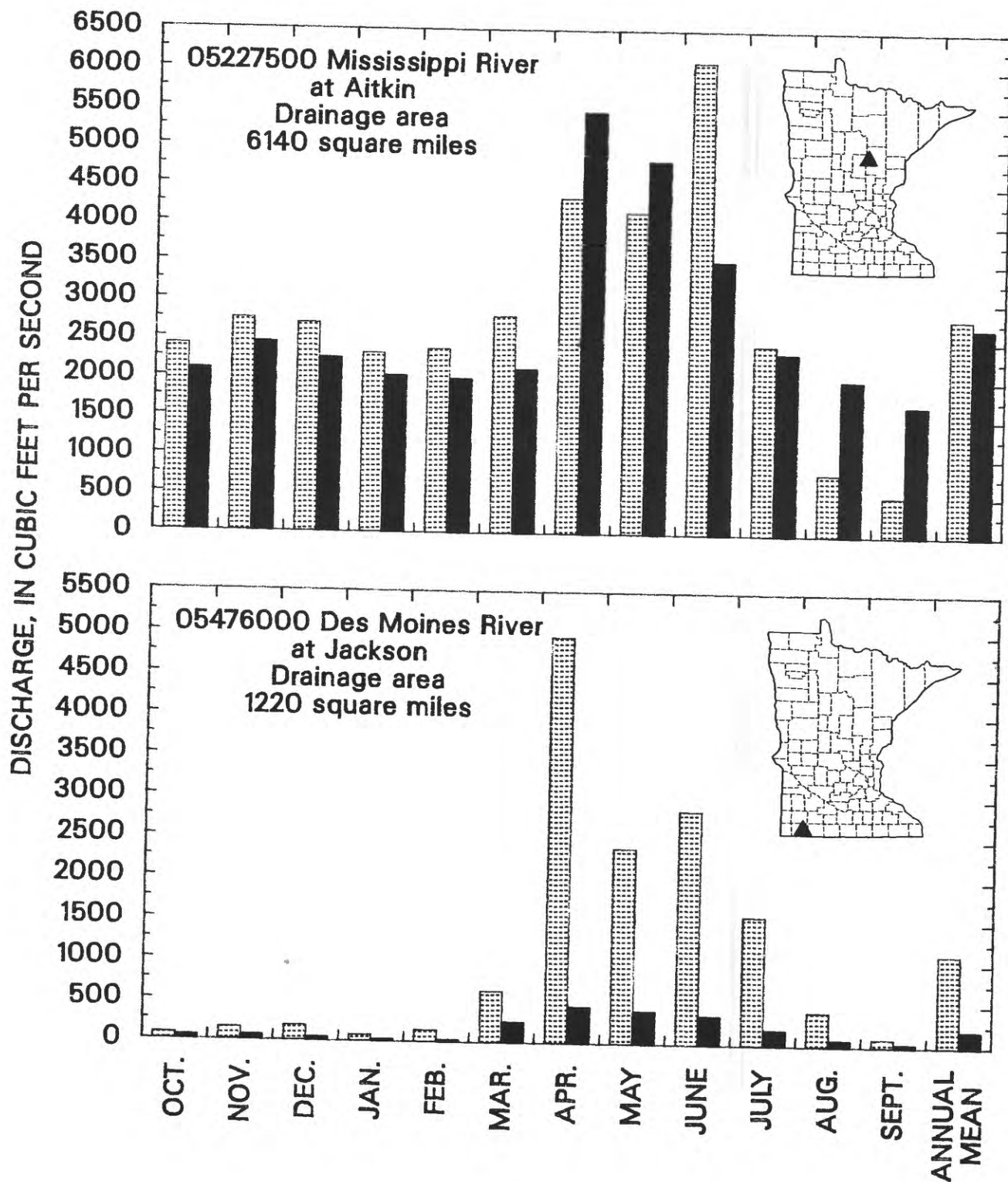
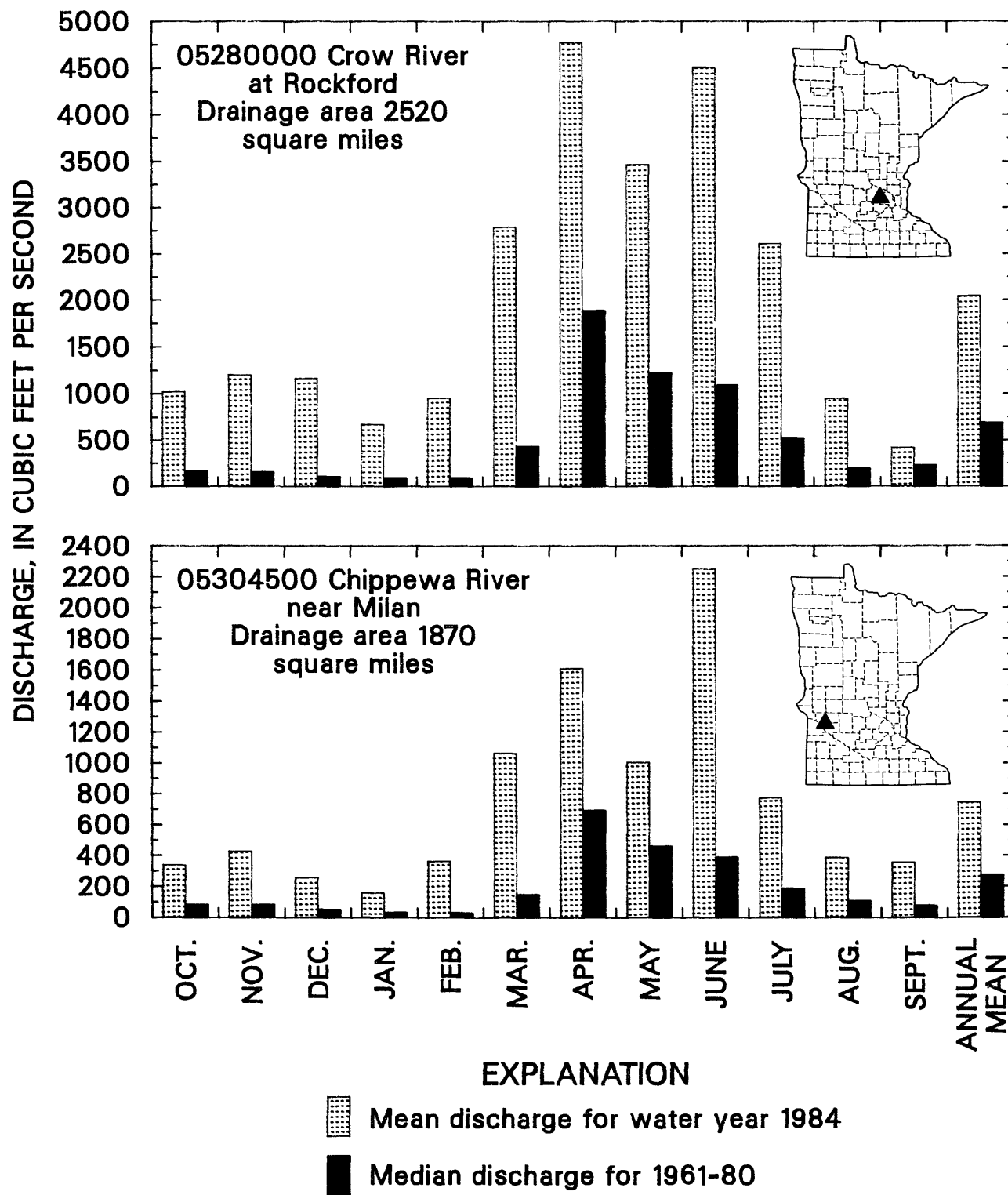
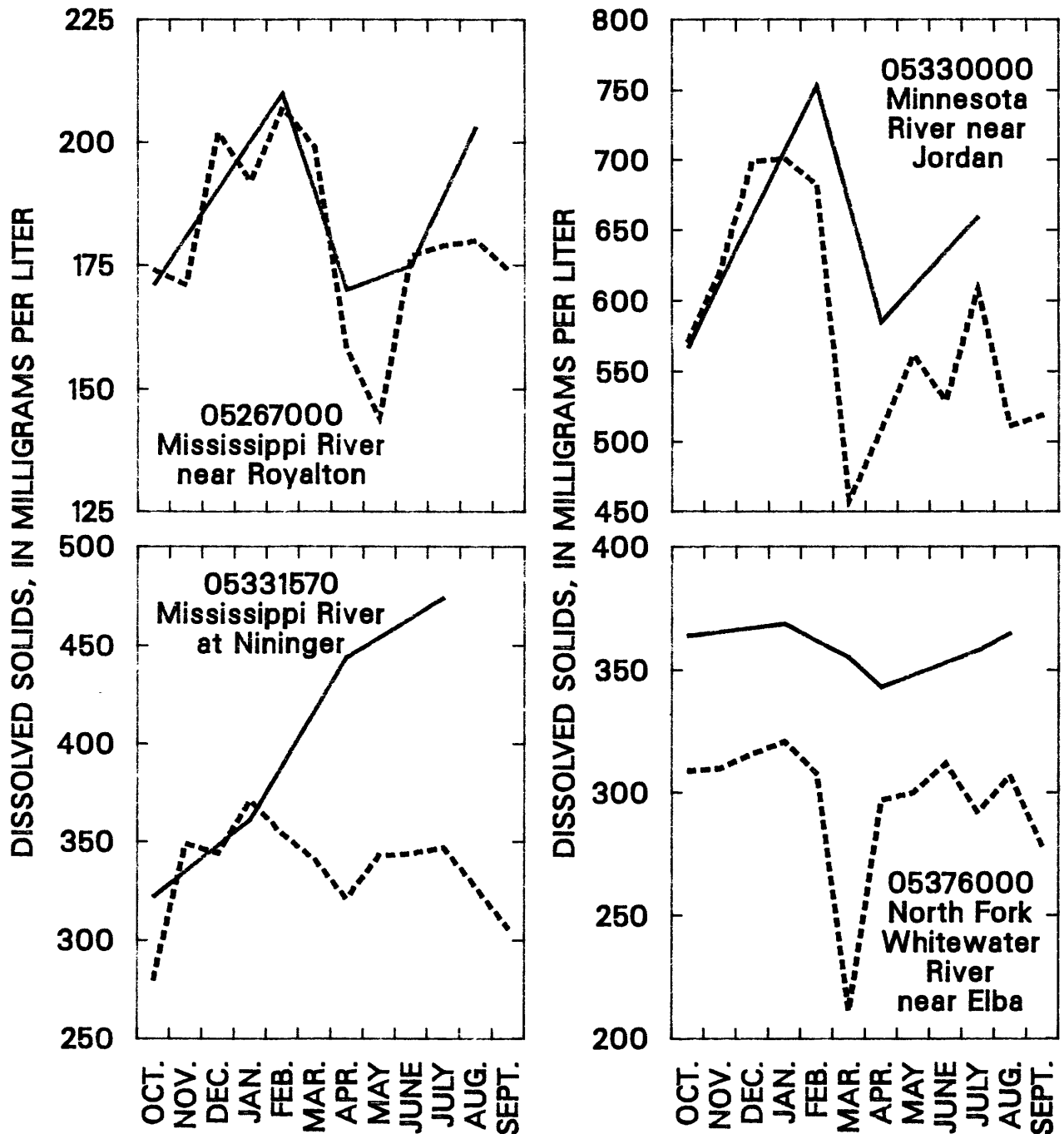


Figure 2.--Comparison of discharges at four long-term representative gaging



stations for the 1984 water year with median discharges for a 30-year base period



EXPLANATION

- Mean monthly dissolved-solids concentration for period of record
- Monthly dissolved-solids concentration for 1984 water year

Figure 3.--Comparison of dissolved-solids concentrations for 1984 water year with mean monthly values for the periods of record

WATER RESOURCES DATA FOR MINNESOTA, 1984

Four daily-sediment stations are used to show suspended loads (fig. 4). High loads occurred in June at Yellow Bank River near Odessa, which is in western Minnesota, and at Mississippi River near Anoka, which is in the Twin Cities metro area. 1984 suspended sediment loads at Whetstone River near Big Stone City, South Dakota, on the western border of the State, were near the historical monthly means throughout the year. Minnesota River at Mankato had high suspended sediment loads throughout the first half of 1984 but was near normal during the second half of the year.

Several samples of ground water collected at wells throughout the Upper Mississippi River basin exceeded State drinking water standards for iron, manganese, and nitrite plus nitrate nitrogen (Minnesota Pollution Control Agency, 1978).

GROUND-WATER LEVELS

Water levels in unconfined (water-table) aquifers generally were normal in 53 percent of the 126 observation wells at the beginning of the 1984 water year. Water levels rose during the winter and spring so that in spring 1984 water levels were above normal in 58 percent of the observation wells. New monthly record-high-water levels were recorded in 40 percent of the 126 observation wells during the months of April, May and June. Unconfined water levels declined seasonally during the summer, but water levels remained above normal in 52 percent of the 126 observation wells. Unusually heavy rains in late fall and again in spring in many areas of the State resulted in above-normal recharge to the aquifers. Figure 5 shows how water levels relate seasonally to normal levels, based on water-level fluctuations in 126 wells. Levels for the 1984 water year are compared to the long-term normal for each month and grouped by seasons. Water levels in eastern Minnesota were consistently above normal throughout the 1984 water year. Water levels in part of west-central Minnesota were consistently below normal.

Water levels in confined drift and bedrock aquifers generally were normal or above during the first quarter of the 1984 water year (October through December 1983). Water levels rose during winter and spring followed by a seasonal decline in summer 1984 (fig. 6). Confined water levels in 94 observation wells were compared seasonally to long-term normal levels. In fall 1983 (October through December) above normal levels were recorded in 47 percent of the wells, normal levels in 33 percent of the wells, and below-normal levels in 20 percent of the wells. Water levels rose during winter and spring, so that above-normal water levels were recorded during the months of April, May, and June 1984 in 62 percent of the observation wells in confined aquifers, normal levels in 25 percent of the wells, and below-normal levels in only 13 percent of the wells. Numerous seasonal record-high water levels were recorded in northeastern, east-central, central, and southern Minnesota. During the spring, new monthly record-high water levels were recorded in 38 percent of the observation wells in confined aquifers. Water levels declined seasonally during the summer, but remained above normal in 59 percent of the observation wells. New monthly record-high water levels in summer were recorded in 37 percent of the observation wells in confined aquifers. Levels in the Mount Simon-Hinckley aquifer in the Twin Cities basin were consistently below normal, and new seasonal record-low water levels were recorded.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream Quality Accounting Network (NASQAN) is a national data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of the hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, and aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. 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 baseline 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.

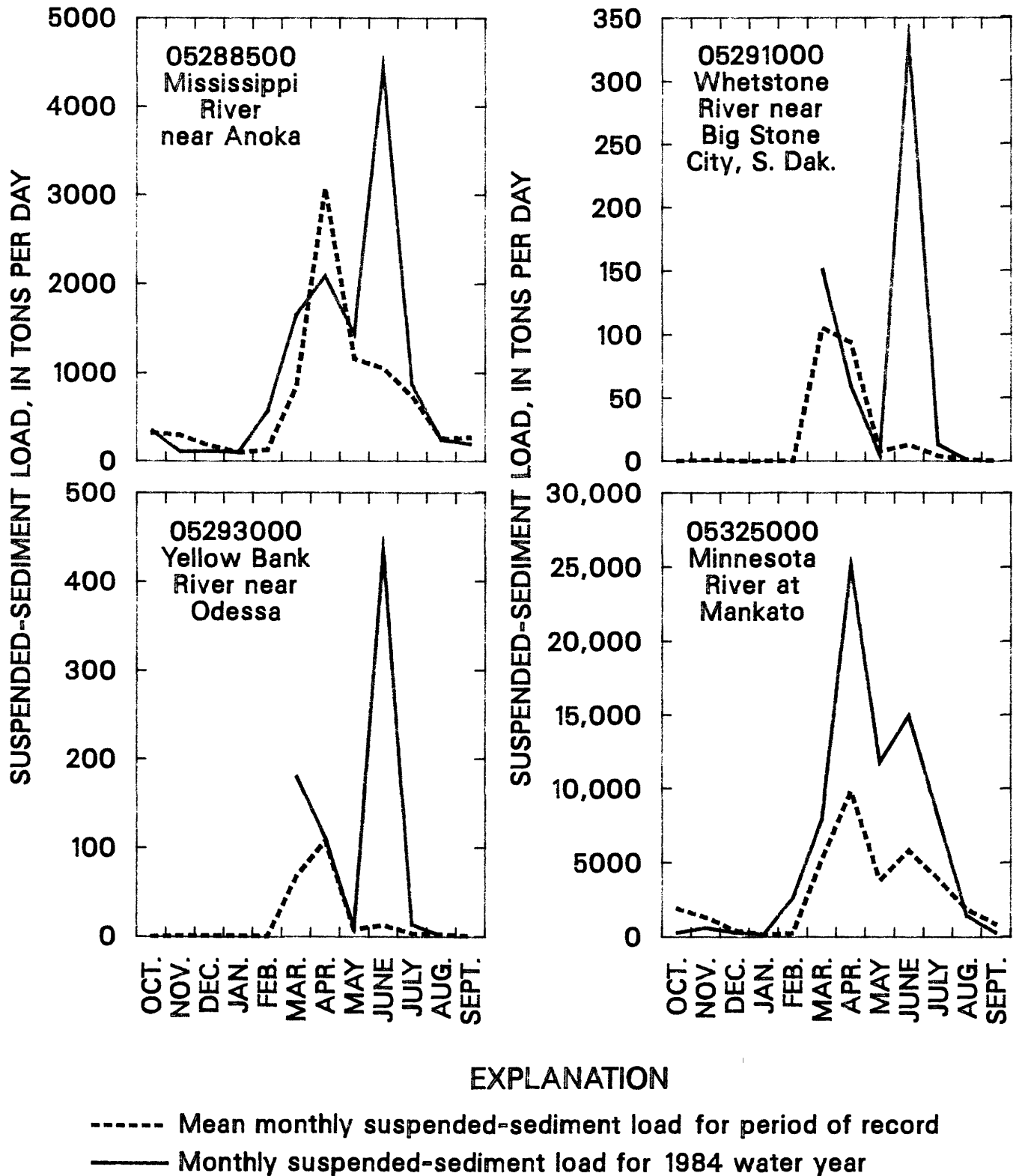
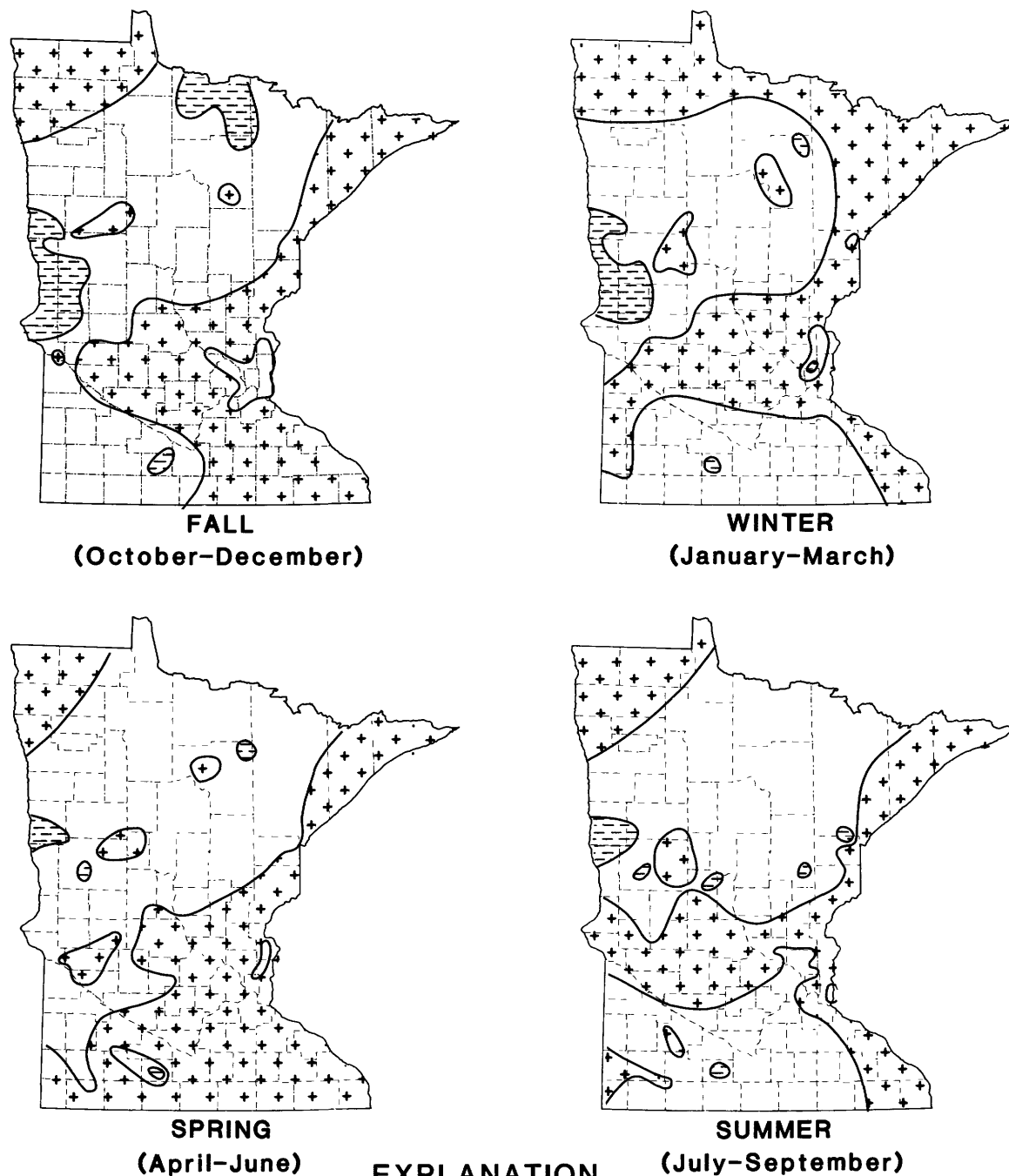


Figure 4.--Comparison of suspended-sediment loads for 1984 water year with mean monthly values for the period of record

1984 WATER YEAR



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

1984 WATER YEAR

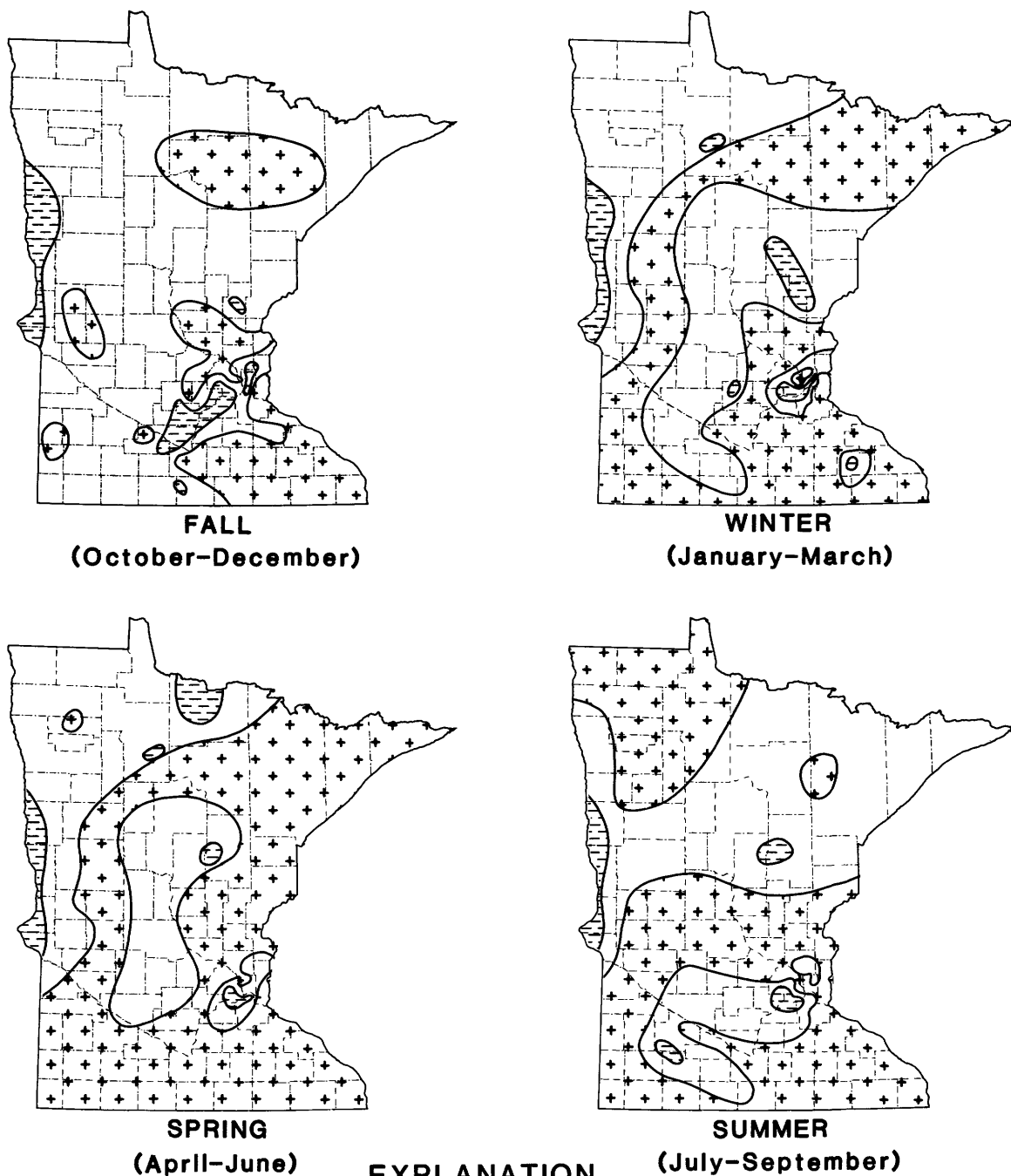


Figure 6.--Relationship of seasonal water levels in confined aquifers to long-term mean levels

WATER RESOURCES DATA FOR MINNESOTA, 1984

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1984 water year that began October 1, 1983, and ended September 30, 1984. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for the surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 8, 9, and 11. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

STATION IDENTIFICATION NUMBERS

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The system used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and, in Minnesota, for surface-water stations where only miscellaneous measurements are made.

Downstream Order System 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 sections is listed between them. A similar order is followed by 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 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 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."

Latitude-Longitude 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.

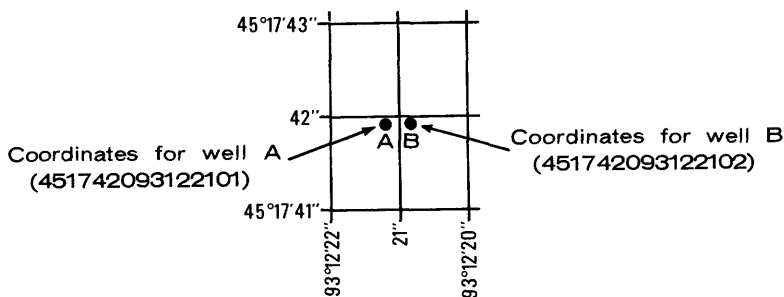


Figure 7.--Example of system for numbering wells and miscellaneous sites

WATER RESOURCES DATA FOR MINNESOTA, 1984

RECORDS OF STAGE AND WATER DISCHARGE

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharge may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations".

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "High-flow partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report. Location of all complete-record and high-flow partial-record stations for which data are given in this report are shown in figures 8 and 10.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adapted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of current-meter measurements, the curves are extended using: (1) logarithmic-plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. 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 determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

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.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves, or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as time since the last survey increases. Discharge over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

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 from the recorded range in stage, previous or following record, discharge

WATER RESOURCES DATA FOR MINNESOTA, 1984

basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information as appropriate is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for only a few stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time when the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all reports in which revisions have been published for the station and water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted 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 most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record, if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is the information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

WATER RESOURCES DATA FOR MINNESOTA, 1984

EXTREMES FOR THE CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing which may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the District office to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

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.

The daily table for stream-gaging stations gives 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 is usually 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 or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

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 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 an 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.

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. 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.

Accuracy of the Records

The accuracy of streamflow records 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 measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned, are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft³/s; to the nearest tenth between 1.0 and 10 ft³/s; to whole numbers between 10 and 1000 ft³/s; and to 3 significant figures for more than 1000 ft³/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

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

WATER RESOURCES DATA FOR MINNESOTA, 1984

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 Records 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.

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 as well as an index of records of discharge collected by other agencies but not published by the Geological Survey. Information on records available at specific sites can be obtained upon request.

RECORDS OF SURFACE-WATER QUALITY

Records of surface water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 8.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-Site Measurement and Collection

In obtaining water quality data, a major concern needs to be assuring that the data obtained represents the in situ quality of water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. C2; Book 5 Chap. A1, A3, and A4. All of these references are listed on p. 30 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey District office.

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. All samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

WATER RESOURCES DATA FOR MINNESOTA, 1984

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 U.S.G.S. district office whose address is given on the back of the title page of this report.

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 diurnal 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. Water temperatures measured at the time of water-discharge measurements are on file in the District office.

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.

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 and in predicting long-term sediment-discharge characteristics of the stream.

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

Laboratory Measurements

Samples for indicator bacteria and specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratories in Arvada, Colo., Doraville, Ga., or Iowa City, Ia. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratories are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, when appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of stage and Water Discharge"; same comments apply.

WATER RESOURCES DATA FOR MINNESOTA, 1984

DRAINAGE AREA.--See Data Presentation under "Records of stage and Water Discharge"; same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor, temperature recorder, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--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.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this report:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organisms count less than 0.5 percent (organisms may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

RECORDS OF GROUND-WATER LEVELS

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Minnesota are shown in figure 11.

Although, in this report, records of water levels are presented for fewer than 200 wells, records are obtained through cooperative efforts of many Federal, State, and local agencies for several hundred observation wells throughout Minnesota and are placed in computer storage. Each spring, the Minnesota Department of Natural Resources, Division of Waters publishes a report for the previous water year entitled "Observation Well Data Summary, Water Year 19__." This report contains hydrographs of recorder wells, detailed maps showing the location of active observation wells, and other useful items. Information about the availability of the data in the water-level file may be obtained from the District Chief, Minnesota District. (See address on back of front page).

WATER RESOURCES DATA FOR MINNESOTA, 1984

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well assure that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is the 15-digit number that appears in the upper left corner of the table. The secondary identification number is the local well number, an alphanumeric number, derived from the township-range location of the well.

Water-level records are obtained from direct measurements with a steel tape or from the graph or punched tape of a water-stage recorder. The water-level measurements in this report are given in feet with reference to land-surface datum (lsd). Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the elevation of the land-surface datum 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 57 representative wells; 18 bedrock, 27 surficial sand, and 12 buried-sand wells.

Data Presentation

Each well consists of two parts, the station description and the data table of water levels observed during the water year. The description of the well is presented first through use of descriptive headings preceeding the tabular data. The comments to follow clarify information presented under the various headings.

LOCATION.--This paragraph follows the well-identification number and reports the latitude and longitude (given in degrees, minutes and seconds); a landline location designation; the hydrologic-unit number; the distance and direction from a geographic point of reference; and the owner's name.

AQUIFER.-- This entry designates by name(if a name exists) and geologic age the aquifer(s) open to the well.

WELL CHARACTERISTICS.--This entry describes the well in terms of depth, diameter, casing depth and/or screened interval, method of construction, use, and includes additional information such as casing breaks, collapsed screen, and other changes since construction.

DATUM.--This entry describes both the measuring point and the land-surface elevation at the well. The measuring point is described physically (such as top of collar, notch in the top of casing, plug in pump base and so on), and in relation to land surface (such as 1.3 ft above land-surface datum). The elevation of the land-surface datum is described in feet above (or below) National Geodetic Vertical Datum of 1929 (NGVD of 1929); it is reported with a precision depending on the method of determination.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level. It should identify wells that are also water-quality observation wells, and may be used to acknowledge the assistance of local (non-Survey) observers.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the start of the publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year. Periods for which water-level records are available, but are not published by the Geological Survey, may be noted.

EXTREMES FOR THE PERIOD OF RECORD.--This entry contains the highest and lowest water levels of the period of published record, with respect to land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum and all taped measurements of water level are listed. For wells equipped with recorders, abbreviated tables are published; generally, only water-level lows are listed for every fifth day and at the end of the month (eom). The highest and lowest water levels of the water year and their dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

WATER RESOURCES DATA FOR MINNESOTA, 1984

RECORDS OF GROUND-WATER QUALITY

Records of ground-water quality in this report differ from other types of records in that for most sampling sites they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general purposes one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate concentration. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

Data Collection and Computation

The records of ground-water quality in this report were obtained mostly as a part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some counties but none are presented for others. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality statewide. Such a view can be attained only by considering records for this year in context with similar records obtained for these and other counties in earlier years.

Most methods for collecting and analyzing water samples are described in the "U.S. Geological Survey Techniques of Water-Resources Investigation" manuals listed on a following page. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

Data Presentation

The records of ground-water quality are published in a section titled QUALITY OF GROUND WATER immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County, and are identified by well number. The prime identification number for wells sampled is the 15-digit number derived from the latitude-longitude locations. No descriptive statements are given for ground-water-quality records; however, the well number, depth of well, date of sampling, and other pertinent data are given in the table containing the chemical analyses of the ground water. The REMARK codes listed for surface-water-quality records are also applicable to ground-water-quality records.

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

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.

WATER RESOURCES DATA FOR MINNESOTA, 1984

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 \pm 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 \pm 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 \pm 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/m³), and periphyton and benthic organisms in grams per square meter (g/m²).

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.

WATER RESOURCES DATA FOR MINNESOTA, 1984

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 (FT³/s, ft³/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.

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 (CaCO₃).

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.

WATER RESOURCES DATA FOR MINNESOTA, 1984

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 (m²), 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.

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.

WATER RESOURCES DATA FOR MINNESOTA, 1984

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{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 $\text{mg C}/(\text{m}^3 \cdot \text{time})$ 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 $\text{mg O}_2/(\text{m}^3 \cdot \text{time})$ 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.

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).

WATER RESOURCES DATA FOR MINNESOTA, 1984

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 emersed 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.

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."

WATER RESOURCES DATA FOR MINNESOTA, 1984

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.

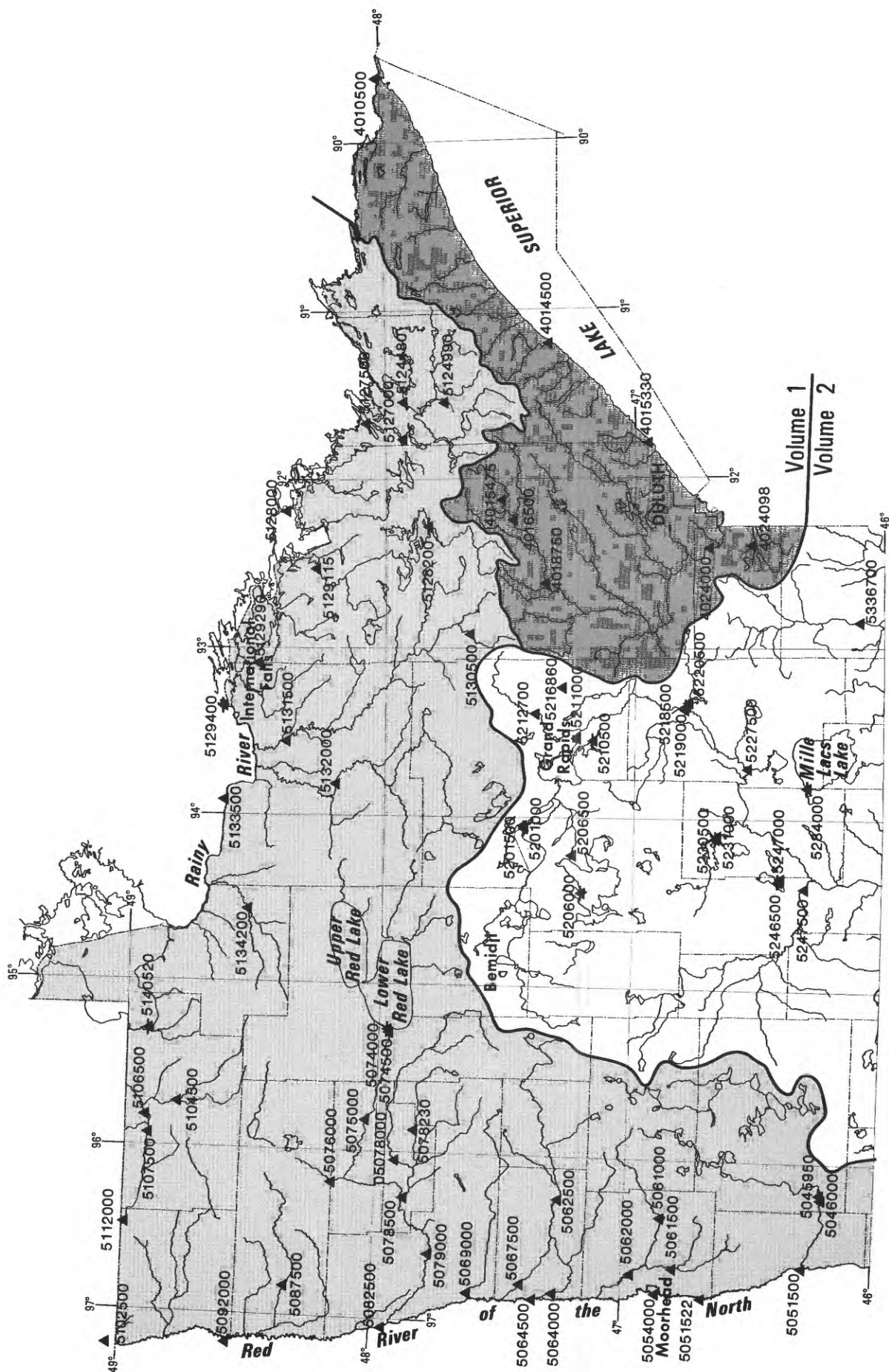
Total recoverable refers to the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate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



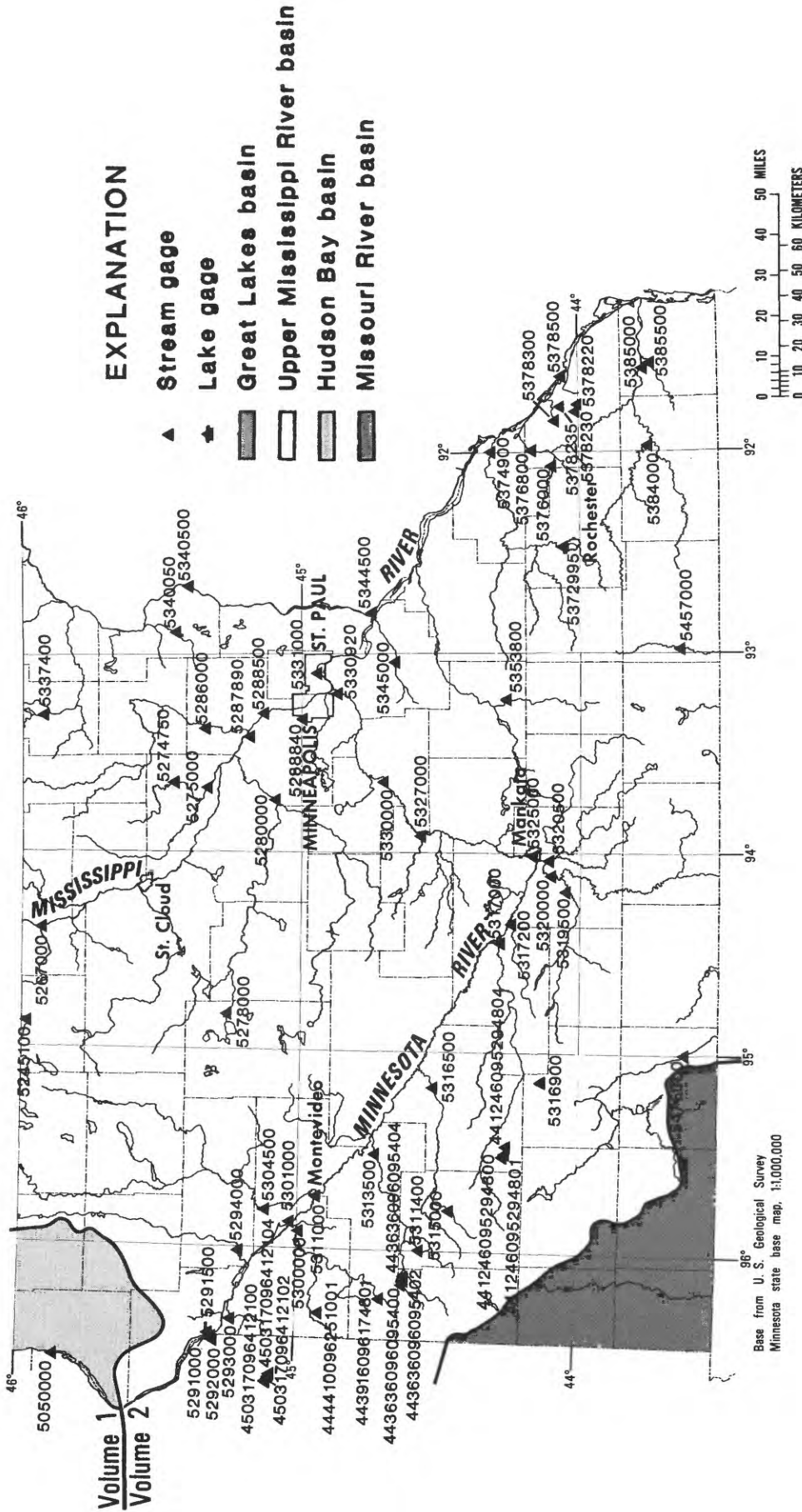
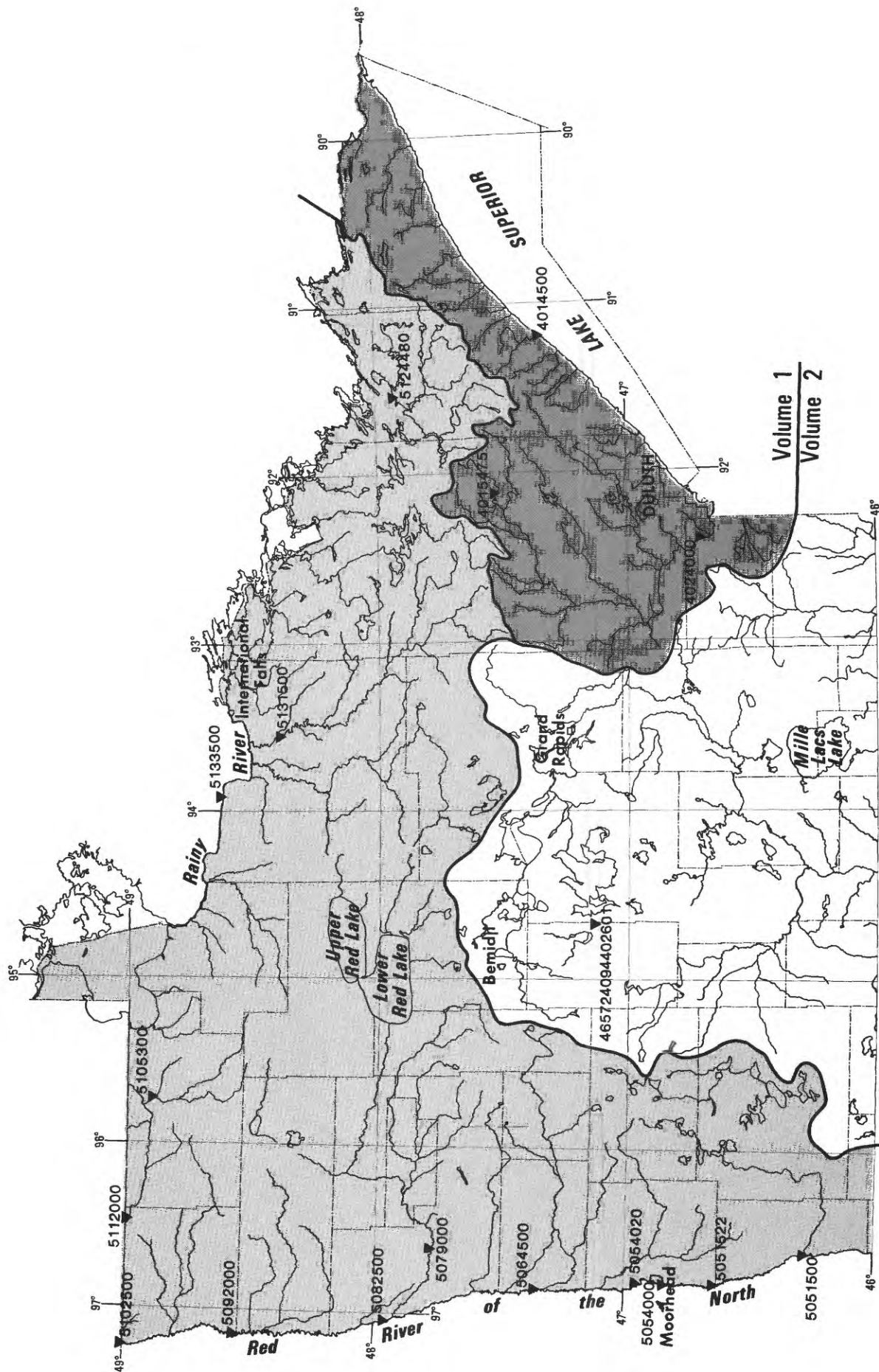


Figure 8.--Location of water-discharge stations



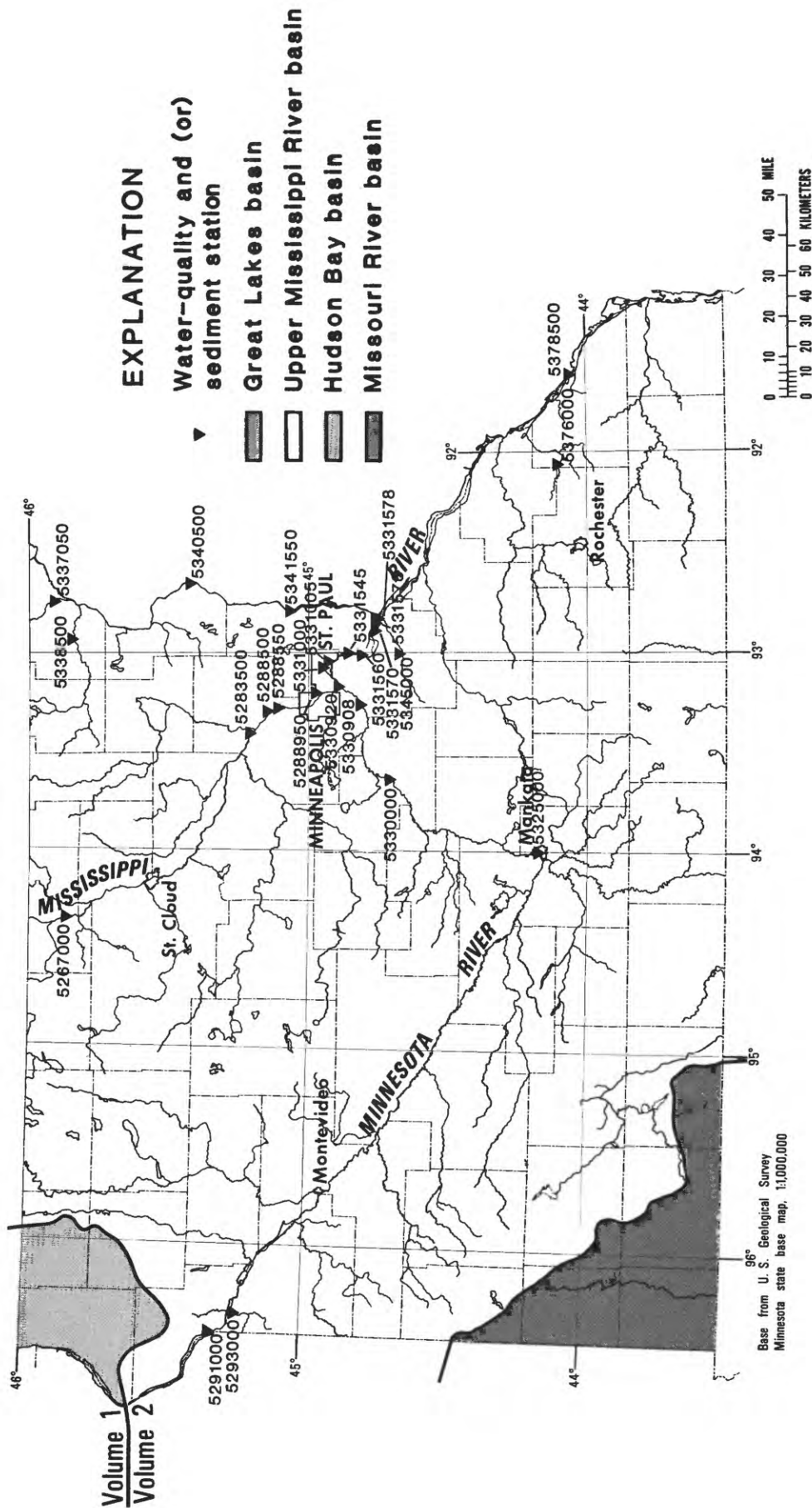


Figure 9.--Location of water-quality stations

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. I. 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 STATION

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 ²)	Period of record
Upper Mississippi River basin			
05210000	Mississippi River near Deer River, MN	^a 3,190	1945-50
05212700	Prairie River near Taconite, MN	^a 360	1967-83
*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	^a 290	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	^a 74	1930-41
*05244000	Crow Wing River at Nimrod, MN	^a 1,010	1910-14, 1930-81
05244500	Crow Wing River at Motley, MN	^a 2,140	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	^a 3,230	1903†, 1909-13, 1925-50
*05261000	Mississippi River near Fort Ripley, MN	^a 11,010	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	^a 12,400	1903-06
05270000	Mississippi River at Sartell, MN	^a 12,450	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	^a 14,500	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 ²)	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	^a 1,170	1934-79
05279500	South Fork Crow River near Rockford, MN	^a 1,250	1909-12
05283500	Mississippi River at Anoka, MN	^a 17,100	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	^a 1,160	1909-14
05285500	Rum River at St. Francis, MN	-	1903
05286500	Rum River near Anoka, MN	1,430	1905-06, 1909
05288840	Bassett Creek in Golden Valley, MN	31.7	1980-83
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	^a 1,340	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	^a 54	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	^a 1,270	1949-51
05304000	Shakopee Creek near Benson, MN	352	1949-54
05305000	Chippewa River near Watson, MN	^a 2,050	1910-17, 1931-36
*05311400	South Branch Yellow Medicine River at Minneota, MN	^a 111	1960-81
05311500	Yellow Medicine River near Cottonwood, MN	465	1945-46
05312000	Spring Creek near Clarkfield, MN	^a 89	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	^a 200	1949-51
*05314500	Hawk Creek near Maynard, MN	474	1949-54
*05315200	Prairie Ravine near Marshall, MN	5.63	1959-64

"See footnotes at end of table."

DISCONTINUED GAGING STATIONS

Station number	Station name	Drainage area (mi ²)	Period of record
Minnesota River basin--Continued			
05315500	Redwood River near Green Valley, MN	436	1945-57
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	^a 11,200	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	^a 3,550	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	Glaisby 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	^a 5,120	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	^a 1,320	1909-14, 1930-71
05371500	Mississippi River at Wabasha, MN	^a 56,600	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	^a 1,320	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
05378220	Garvin Brook at Stockton, MN	---	1939-56 1982-83
05379000	Gilmore Creek at Winona, MN	8.95	1939-63
05380500	Mississippi River at Lamoile, MN	^a 60,000	1930-31

"See footnotes at end of table."

DISCONTINUED GAGING STATIONS

Station number	Station name	Drainage area (mi ²)	Period of record
Lower Mississippi River basin--Continued			
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
^b 05385000	Root River near Houston, MN	^a 1,270	1909-17, 1929, 1930-83
^b 05385500	South Fork Root River near Houston, MN	275	1953-83
05386000	Root River below South Fork near Houston, MN	^a 1,560	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.

^b Discharge measurements made to maintain a current rating.

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 mi² (3,735 km²).

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 hm³) of which 439,636 acre-ft (542 hm³) 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 hm³) capacity table then in use, July 30, 1905, elevation, 1,303.39 ft (397.273 m); minimum observed, 33,680 acre-ft (41.5 hm³) 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, 682,890 acre-ft (842 hm³) June 27, elevation, 1,298.71 ft (395.847 m); minimum, 577,090 acre-ft (712 hm³) Mar. 12, elevation, 1,297.10 ft (395.356 m).

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1,298.05	638,470	
Oct. 31	1,298.04	637,810	-660
Nov. 30	1,297.99	634,500	-3,310
Dec. 31	1,297.67	613,560	-20,940
CAL YR 1983			-12,340
Jan. 31	1,297.35	592,950	-20,610
Feb. 29	1,297.17	581,510	-11,440
Mar. 31	1,297.25	586,580	+5,070
Apr. 30	1,297.95	631,870	+45,290
May 31	1,298.14	644,440	+12,570
June 30	1,298.57	673,340	+28,900
July 31	1,298.20	658,440	-14,900
Aug. 31	1,298.10	641,780	-16,660
Sept. 30	1,298.01	635,820	-5,960
WTR YR 1984			-2,650

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 mi² (3,735 km²).

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).--100 years, 516 ft³/s (14.61 m³/s), 4.86 in/yr (123 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 4,370 ft³/s (124 m³/s) Aug. 6, 1905; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 986 ft³/s (27.9 m³/s) June 16; minimum daily, 101 ft³/s (2.86 m³/s) Apr. 28, 30, May 2-4, Sept. 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	353	644	835	822	825	825	201	102	102	980	102	102
2	353	644	833	822	825	823	201	101	102	978	102	102
3	353	644	833	823	825	825	201	101	102	978	102	102
4	353	643	832	825	826	825	201	101	102	978	102	102
5	353	643	832	826	825	825	201	102	102	978	102	102
6	354	643	832	828	823	823	201	102	102	976	102	102
7	354	644	830	828	823	823	201	102	102	975	102	102
8	354	644	832	828	823	823	201	102	204	973	102	102
9	354	644	832	828	823	823	202	102	307	973	102	102
10	354	644	830	828	823	823	202	102	409	876	102	102
11	354	643	830	826	823	823	202	102	508	877	102	102
12	354	643	830	826	825	823	202	102	607	877	102	102
13	354	643	830	826	825	753	202	102	704	877	102	102
14	354	643	830	826	825	705	203	102	798	781	102	102
15	453	643	830	826	825	695	203	102	900	784	102	102
16	453	643	830	826	825	612	204	102	986	784	102	102
17	453	643	830	828	825	552	202	102	985	686	102	102
18	550	643	829	828	825	479	202	102	985	590	102	102
19	550	643	828	826	825	430	202	102	983	494	102	102
20	550	643	828	825	825	372	202	102	983	395	102	102
21	550	645	828	825	825	325	202	102	981	395	102	102
22	550	741	828	823	825	275	202	102	981	400	102	101
23	645	741	828	823	825	200	202	102	981	402	102	102
24	645	741	828	823	825	201	202	102	983	303	102	102
25	645	741	828	825	825	201	202	102	983	303	102	102
26	645	740	828	825	825	201	152	102	981	203	102	102
27	644	739	826	825	825	201	108	102	981	203	102	102
28	644	739	826	825	825	201	101	102	981	203	102	102
29	645	739	826	825	825	201	102	102	980	204	102	102
30	644	740	826	825	---	201	101	102	980	204	102	102
31	644	---	822	825	---	201	---	102	---	153	102	---
TOTAL	14861	20173	25710	25590	23914	16890	5610	3159	19885	19783	3162	3059
MEAN	479	672	829	825	825	545	187	102	663	638	102	102
MAX	645	741	835	828	826	825	204	102	986	980	102	102
MIN	353	643	822	822	823	200	101	101	102	153	102	101
CFSM	.33	.47	.58	.57	.57	.38	.13	.07	.46	.44	.07	.07
IN.	.38	.52	.66	.66	.62	.44	.14	.08	.51	.51	.08	.08
AC-FT	29480	40010	51000	50760	47430	33500	11130	6270	39440	39240	6270	6070
CAL YR 1983	TOTAL	215096	MEAN 589	MAX 1200	MIN 105	CFSM .41	IN 5.55	AC-FT 426600				
WTR YR 1984	TOTAL	181796	MEAN 497	MAX 986	MIN 101	CFSM .35	IN 4.69	AC-FT 360600				

LOCATION.--Lat 46°57'24", long 94°40'26", in SE¼NW¼ sec.12, T.140 N., R.32 W., Hubbard County, Hydrologic Unit 07010102. Samples are collected near center of lake at the deepest point.

PERIOD OF RECORD.--Water years 1977 to current year.

REMARKS.--Some meteorological and phytoplankton data are available by contacting the District office.

DATE	TIME	SAMPLING DEPTH (M) (00098)	SPE- CIFIC CON- DUCT- ANCE	SPE- CIFIC CON- DUCT- ANCE	PH (STAND- ARD	PH LAB (STAND- ARD	TEMPER- ATURE (DEG C)	OXYGEN, DIS- SOLVED (MG/L)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	POTAS- SIUM, DIS- SOLVED (MG/L AS K)
			(UMHOS) (00095)	(UMHOS) (90095)	(UNITS) (00400)	(UNITS) (00403)	(00010)	(00300)	(00915)	(00925)	(00930)	(00935)
OCT												
08...	1400	.00	162	--	7.6	--	13.5	8.5	--	--	--	--
08...	1415	1.0	162	171	7.8	7.7	13.5	8.3	23	7.3	1.3	1.0
08...	1420	2.0	162	--	7.8	--	13.5	8.3	--	--	--	--
08...	1430	4.0	162	--	7.8	--	13.5	8.3	--	--	--	--
08...	1440	6.0	161	--	7.8	--	13.5	8.3	--	--	--	--
08...	1450	8.0	161	170	7.7	7.6	13.0	8.3	23	7.3	1.3	.90
08...	1500	--	--	--	--	--	--	--	--	--	--	--
28...	1430	.00	156	--	7.8	--	9.5	11.3	--	--	--	--
28...	1445	1.0	156	172	7.9	7.4	9.5	11.0	24	7.2	1.3	1.0
28...	1500	4.0	156	--	7.9	--	9.5	11.0	--	--	--	--
28...	1510	6.0	156	--	7.4	--	9.5	10.9	--	--	--	--
28...	1520	2.0	156	--	7.5	--	9.5	11.0	--	--	--	--
28...	1535	8.0	156	169	7.5	7.6	9.0	10.9	26	7.2	1.3	1.3
28...	1540	--	--	--	--	--	--	--	--	--	--	--
NOV												
13...	1500	.00	153	--	7.3	--	5.5	12.2	--	--	--	--
13...	1515	1.0	153	178	7.2	7.7	5.5	12.1	24	7.3	1.6	.90
13...	1520	2.0	153	--	7.2	--	5.5	12.0	--	--	--	--
13...	1530	4.0	152	--	7.1	--	5.5	>11.9	--	--	--	--
13...	1540	6.0	152	--	7.1	--	5.5	12.0	--	--	--	--
13...	1605	8.0	152	173	7.0	7.6	5.5	>11.9	24	7.3	1.5	.90
13...	1610	--	--	--	--	--	--	--	--	--	--	--
DEC												
10...	1300	.00	163	--	7.3	--	1.0	14.0	--	--	--	--
10...	1315	1.0	157	176	6.9	7.4	2.0	13.5	25	7.4	1.2	1.0
10...	1320	2.0	155	--	6.9	--	2.0	13.2	--	--	--	--
10...	1330	4.0	155	--	6.8	--	2.5	12.7	--	--	--	--
10...	1340	6.0	159	--	6.8	--	2.5	11.3	--	--	--	--
10...	1355	8.0	169	177	6.8	7.3	3.0	8.3	25	7.2	1.7	1.0
10...	1400	--	--	--	--	--	--	--	--	--	--	--
JAN												
14...	1300	.00	167	--	7.2	--	.5	13.7	--	--	--	--
14...	1315	1.0	167	187	7.2	7.6	2.0	13.0	27	8.0	1.5	1.1
14...	1320	2.0	165	--	7.2	--	2.5	12.2	--	--	--	--
14...	1330	4.0	168	--	7.2	--	2.5	9.9	--	--	--	--
14...	1340	6.0	172	--	7.1	--	3.5	7.9	--	--	--	--
14...	1350	8.0	181	193	7.1	7.3	4.0	2.5	27	7.5	1.5	1.0
14...	1400	--	--	--	--	--	--	--	--	--	--	--
FEB												
18...	1000	.00	110	--	7.3	--	1.0	14.3	--	--	--	--
18...	1015	1.0	169	186	7.2	7.4	1.5	11.6	24	7.7	1.5	1.1
18...	1020	2.0	170	--	7.2	--	3.0	10.4	--	--	--	--
18...	1030	4.0	171	--	7.							

LEECH LAKE RIVER BASIN

465724094402601 WILLIAMS LAKE NEAR AKELEY, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAMPLING DEPTH (M) (00098)	SPE-	SPE-	PH (STAND- ARD UNITS) (00400)	PH	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE-	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS-
			CIFIC CON- DUCT- ANCE LAB (UMHOS) (00095)	CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)		LAB (STAND- ARD UNITS) (00403)				SIUM, DIS- SOLVED (MG/L AS MG) (00925)		SIUM, DIS- SOLVED (MG/L AS K) (00935)
APR												
30...	1300	.00	176	--	8.2	--	8.0	11.6	--	--	--	--
30...	1315	1.0	177	179	8.2	7.8	8.0	11.5	26	7.0	1.3	1.0
30...	1320	2.0	176	--	8.2	--	8.0	11.5	--	--	--	--
30...	1330	4.0	176	--	8.2	--	8.0	11.6	--	--	--	--
30...	1340	6.0	176	--	8.2	--	8.0	11.9	--	--	--	--
30...	1355	8.0	175	176	8.2	7.8	8.0	12.1	26	7.1	1.4	1.0
30...	1400	--	--	--	--	--	--	--	--	--	--	--
MAY												
16...	1300	.00	173	--	8.6	--	13.0	12.0	--	--	--	--
16...	1315	1.0	172	174	8.6	8.3	13.0	11.9	24	6.9	1.3	1.0
16...	1320	2.0	173	--	8.6	--	13.0	11.9	--	--	--	--
16...	1330	4.0	172	--	8.6	--	12.5	12.0	--	--	--	--
16...	1340	6.0	171	--	8.6	--	10.0	11.8	--	--	--	--
16...	1355	8.0	171	174	8.5	8.2	10.0	11.3	24	6.9	1.3	1.3
16...	1400	--	--	--	--	--	--	--	--	--	--	--
31...	1100	.00	170	--	8.9	--	17.5	11.3	--	--	--	--
31...	1115	1.0	169	174	8.7	8.3	17.5	11.3	25	7.0	1.5	1.0
31...	1120	2.0	169	--	8.8	--	17.5	11.4	--	--	--	--
31...	1130	4.0	169	--	8.8	--	16.0	11.2	--	--	--	--
31...	1140	6.0	170	--	8.6	--	13.5	11.1	--	--	--	--
31...	1155	8.0	170	179	8.5	8.0	11.0	7.4	25	7.0	1.5	1.0
31...	1200	--	--	--	--	--	--	--	--	--	--	--
JUN												
15...	1500	.00	164	--	8.9	--	20.0	10.1	--	--	--	--
15...	1515	1.0	164	167	8.8	8.4	19.5	10.1	24	7.0	1.2	1.1
15...	1520	2.0	164	--	8.8	--	19.5	10.1	--	--	--	--
15...	1530	4.0	163	--	8.8	--	19.5	10.0	--	--	--	--
15...	1540	6.0	171	--	8.4	--	15.5	9.0	--	--	--	--
15...	1550	8.0	172	172	7.8	7.5	12.0	7.1	26	7.0	1.2	1.0
15...	1600	--	--	--	--	--	--	--	--	--	--	--
JUL												
05...	1200	.00	157	--	9.0	--	24.0	9.8	--	--	--	--
05...	1215	1.0	157	159	9.0	8.5	24.0	9.7	26	7.1	1.3	1.1
05...	1220	2.0	157	--	9.0	--	24.0	9.7	--	--	--	--
05...	1230	4.0	157	--	9.0	--	23.5	9.7	--	--	--	--
05...	1240	6.0	173	--	8.5	--	17.0	8.6	--	--	--	--
05...	1255	8.0	177	185	7.8	7.3	12.5	1.4	22	7.0	1.2	.90
05...	1300	--	--	--	--	--	--	--	--	--	--	--
25...	1200	.00	152	--	9.0	--	25.0	9.1	--	--	--	--
25...	1215	1.0	152	151	9.0	8.7	25.0	9.0	20	7.1	1.2	.80
25...	1220	2.0	151	--	9.1	--	24.5	9.1	--	--	--	--
25...	1233	4.0	153	--	9.1	--	24.0	8.7	--	--	--	--
25...	1240	6.0	177	--	8.3	--	19.0	6.7	--	--	--	--
25...	1255	8.0	183	183	7.5	7.3	13.0	.9	26	7.2	1.6	1.0
25...	1300	--	--	--	--	--	--	--	--	--	--	--
AUG												
07...	1200	.00	152	--	9.2	--	26.5	9.0	--	--	--	--
07...	1215	1.0	152	152	9.2	8.6	26.5	9.0	19	7.0	1.2	.90
07...	1220	2.0	150	--	9.2	--	25.5	9.6	--	--	--	--
07...	1230	4.0	153	--	9.1	--	25.0	8.8	--	--	--	--
07...	1240	6.0	184	--	8.5	--	19.5	6.9	--	--	--	--
07...	1255	8.0	189	188	7.5	7.2	14.0	2.6	26	7.2	1.2	1.0
07...	1300	--	--	--	--	--	--	--	--	--	--	--
27...	1200	.00	156	--	9.1	--	25.0	9.1	--	--	--	--
27...	1215	1.0	156	146	9.1	8.4	24.5	8.9	18	7.1	1.2	.90
27...	1220	2.0	155	--	9.1	--	24.0	9.0	--	--	--	--
27...	1230	4.0	155	--	9.0	--	23.5	8.8	--	--	--	--
27...	1240	6.0	159	--	9.0	--	22.5	7.9	--	--	--	--
27...	1255	8.0	197	183	7.5	7.2	15.0	.9	26	7.2	1.2	1.0
27...	1300	--	--	--	--	--	--	--	--	--	--	--
SEP												
12...	1300	.00	161	--	8.3	--	17.5	8.8	--	--	--	--
12...	1315	1.0	161	158	8.3	7.9	17.5	8.5	20	7.1	1.2	.90
12...	1320	2.0	161	--	8.3	--	17.5	8.4	--	--	--	--
12...	1330	4.0	161	--	8.3	--	17.5	8.2	--	--	--	--
12...	1340	6.0	161	--	8.3	--	17.5	8.2	--	--	--	--
12...	1355	8.0	175	158	8.2	7.9	17.0	4.2	20	7.1	1.2	.90
12...	1400	--	--	--	--	--	--	--	--	--	--	--
29...	1400	.00	166	--	8.3	--	13.5	9.7	--	--	--	--
29...	1415	1.0	165	165	8.2	7.7	13.5	9.7	21	7.2	1.4	1.0
29...	1420	2.0	165	--	8.2	--	13.5	9.6	--	--	--	--
29...	1430	4.0	165	--	8.2	--	13.0	9.7	--	--	--	--
29...	1440	6.0	164	--	8.2	--	13.0	9.8	--	--	--	--
29...	1455	8.0	163	164	8.2	7.7	13.0	9.8	21	7.2	1.3	1.0
29...	1500	--	--	--	--	--	--	--	--	--	--	--

LEECH LAKE RIVER BASIN

465724094402601 WILLIAMS LAKE NEAR AKELEY, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	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)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L) (00625)	NITRO- GEN, NO2+NO3 TOTAL (MG/L) (00630)	PHOS- PHORUS, TOTAL (MG/L) (00665)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
OCT												
08...		--	--	--	--	--	--	.034	--	--	--	--
08...	90	<1.0	.90	1.0	92	--	--	--	41	4	--	--
08...		--	--	--	--	--	--	.027	--	--	--	--
08...		--	--	--	--	--	--	.025	--	--	--	--
08...		--	--	--	--	--	--	.035	--	--	--	--
08...	89	1.0	.60	1.0	93	--	--	.023	41	3	--	--
08...		--	--	--	--	.70	<.10	.027	--	--	1.90	<.100
28...		--	--	--	--	--	--	.005	--	--	--	--
28...	91	<1.0	.90	.4	101	--	--	--	18	4	--	--
28...		--	--	--	--	--	--	.005	--	--	--	--
28...		--	--	--	--	--	--	.004	--	--	--	--
28...		--	--	--	--	--	--	.004	--	--	--	--
28...	91	1.0	.90	.4	100	--	--	--	18	5	--	--
28...		--	--	--	--	2.5	<.10	.004	--	--	1.80	<.100
NOV												
13...		--	--	--	--	--	--	.013	--	--	--	--
13...	93	<5.0	1.1	.1	102	--	--	--	18	3	--	--
13...		--	--	--	--	--	--	.011	--	--	--	--
13...		--	--	--	--	--	--	.010	--	--	--	--
13...		--	--	--	--	--	--	.012	--	--	--	--
13...	92	<5.0	1.4	.1	101	--	--	--	16	3	--	--
13...		--	--	--	--	2.3	<.10	.014	--	--	1.80	<.100
DEC												
10...		--	--	--	--	--	--	.017	--	--	--	--
10...	95	<1.0	.70	.0	108	--	--	--	8	3	--	--
10...		--	--	--	--	--	--	.023	--	--	--	--
10...		--	--	--	--	--	--	.017	--	--	--	--
10...		--	--	--	--	--	--	.019	--	--	--	--
10...	95	<1.0	.70	.2	108	--	--	.019	12	5	--	--
10...		--	--	--	--	.20	<.10	.017	--	--	.500	<.100
JAN												
14...		--	--	--	--	--	--	.025	--	--	--	--
14...	100	.0	.90	.0	113	--	--	--	6	1	--	--
14...		--	--	--	--	--	--	.021	--	--	--	--
14...		--	--	--	--	--	--	.016	--	--	--	--
14...		--	--	--	--	--	--	.016	--	--	--	--
14...	102	.0	.80	.5	114	--	--	.016	31	22	--	--
14...		--	--	--	--	.50	<.10	.020	--	--	.200	<.100
FEB												
18...		--	--	--	--	--	--	<.001	--	--	--	--
18...	99	5.5	.90	.1	115	--	--	--	9	1	--	--
18...		--	--	--	--	--	--	<.001	--	--	--	--
18...		--	--	--	--	--	--	<.001	--	--	--	--
18...		--	--	--	--	--	--	<.001	--	--	--	--
18...	101	6.1	.90	.8	122	--	--	<.001	46	30	--	--
18...		--	--	--	--	1.1	.10	<.001	--	--	.300	<.100
MAR												
17...		--	--	--	--	--	--	<.001	--	--	--	--
17...	104	.7	1.0	.2	126	--	--	--	16	1	--	--
17...		--	--	--	--	--	--	.010	--	--	--	--
17...		--	--	--	--	--	--	<.001	--	--	--	--
17...		--	--	--	--	--	--	<.001	--	--	--	--
17...	104	1.3	1.0	.9	127	--	--	<.001	21	6	--	--
17...		--	--	--	--	1.1	<.10	<.001	--	--	1.00	.400
APR												
12...		--	--	--	--	--	--	.022	--	--	--	--
12...	81	<.2	1.7	.3	130	--	--	--	9	<1	--	--
12...		--	--	--	--	--	--	.018	--	--	--	--
12...		--	--	--	--	--	--	--	--	--	--	--
12...		--	--	--	--	--	--	.024	--	--	--	--
12...	104	<.2	1.8	.6	129	--	--	.012	6	1	--	--
12...		--	--	--	--	.80	<.10	.010	--	--	3.40	.200
30...		--	--	--	--	--	--	.022	--	--	--	--
30...	94	1.0	.90	.3	104	--	--	--	5	2	--	--
30...		--	--	--	--	--	--	.009	--	--	--	--
30...		--	--	--	--	--	--	.011	--	--	--	--
30...		--	--	--	--	--	--	.011	--	--	--	--
30...	94	1.5	.70	.3	103	--	--	.008	7	2	--	--
30...		--	--	--	--	.40	<.10	.017	--	--	3.40	<.100
MAY												
16...		--	--	--	--	--	--	.007	--	--	--	--
16...	93	.8	.70	.2	125	--	--	--	9	4	--	--
16...		--	--	--	--	--	--	.011	--	--	--	--
16...		--	--	--	--	--	--	.010	--	--	--	--
16...		--	--	--	--	--	--	.018	--	--	--	--
16...	93	.8	.70	.2	125	--	--	.012	6	2	--	--
16...		--	--	--	--	1.3	<.10	.009	--	--	1.50	<.100

LEECH LAKE RIVER BASIN

465724094402601 WILLIAMS LAKE NEAR AKELEY, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	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)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
MAY												
31...	--	--	--	--	--	--	--	--	--	--	--	--
31...	91	1.0	1.0	.2	133	--	--	--	14	5	--	--
31...	--	--	--	--	--	--	--	.004	--	--	--	--
31...	--	--	--	--	--	--	--	.006	--	--	--	--
31...	--	--	--	--	170	--	--	.006	--	--	--	--
31...	92	.8	.60	.2	123	--	--	.011	9	3	--	--
31...	--	--	--	--	--	--	--	--	--	--	1.70	<.100
JUN												
15...	--	--	--	--	--	--	--	.004	--	--	--	--
15...	89	10	.60	.4	--	--	--	--	11	3	--	--
15...	--	--	--	--	--	--	--	.006	--	--	--	--
15...	--	--	--	--	--	--	--	.003	--	--	--	--
15...	--	--	--	--	--	--	--	.009	--	--	--	--
15...	94	.5	.70	.3	109	--	--	.005	14	24	--	--
15...	--	--	--	--	--	.90	<.10	.007	--	--	1.70	<.100
JUL												
05...	--	--	--	--	--	--	--	.019	--	--	--	--
05...	85	3.0	.70	.6	--	--	--	--	31	22	--	--
05...	--	--	--	--	--	--	--	.014	--	--	--	--
05...	--	--	--	--	--	--	--	.026	--	--	--	--
05...	--	--	--	--	--	--	--	.019	--	--	--	--
05...	94	.8	.90	.6	--	--	--	.030	9	<1	--	--
05...	--	--	--	--	--	.60	<.10	.024	--	--	3.80	<.100
25...	--	--	--	--	--	--	--	.003	--	--	--	--
25...	81	3.0	1.1	.9	--	--	--	--	10	<1	--	--
25...	--	--	--	--	--	--	--	.010	--	--	--	--
25...	--	--	--	--	--	--	--	.003	--	--	--	--
25...	--	--	--	--	--	--	--	.013	--	--	--	--
25...	98	2.6	1.1	.9	--	--	--	.020	19	2	--	--
25...	--	--	--	--	--	--	<.10	--	--	--	<.100	<.100
AUG												
07...	--	--	--	--	--	--	--	.058	--	--	--	--
07...	80	5.4	.70	1.0	--	--	--	--	10	1	--	--
07...	--	--	--	--	--	--	--	<.001	--	--	--	--
07...	--	--	--	--	--	--	--	.047	--	--	--	--
07...	--	--	--	--	--	--	--	.033	--	--	--	--
07...	97	2.9	.80	.9	--	--	--	.004	10	6	--	--
07...	--	--	--	1.0	--	.30	<.10	.047	--	--	2.00	<.100
27...	--	--	--	--	--	--	--	<.001	--	--	--	--
27...	78	.7	.70	1.0	--	--	--	--	13	1	--	--
27...	--	--	--	--	--	--	--	.019	--	--	--	--
27...	--	--	--	--	--	--	--	.005	--	--	--	--
27...	--	--	--	--	--	--	--	.002	--	--	--	--
27...	97	.9	.70	1.3	--	--	--	.016	26	5	--	--
27...	--	--	--	--	--	.50	<.10	.003	--	--	--	--
SEP												
12...	--	--	--	--	--	--	--	.007	--	--	--	--
12...	82	.7	.60	1.1	--	--	--	--	16	<1	--	--
12...	--	--	--	--	--	--	--	.029	--	--	--	--
12...	--	--	--	--	--	--	--	.002	--	--	--	--
12...	--	--	--	--	--	--	--	.006	--	--	--	--
12...	83	.8	.00	1.1	--	--	--	.010	17	1	--	--
12...	--	--	--	--	--	.70	<.10	.005	--	--	2.60	<.100
29...	--	--	--	--	--	--	--	<.001	--	--	--	--
29...	85	.9	.60	1.1	--	--	--	--	20	2	--	--
29...	--	--	--	--	--	--	--	.001	--	--	--	--
29...	--	--	--	--	--	--	--	.009	--	--	--	--
29...	--	--	--	--	--	--	--	.015	--	--	--	--
29...	85	.8	.60	1.1	--	--	--	.005	27	2	--	--
29...	--	--	--	--	--	.60	<.10	.010	--	--	2.50	<.100

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 mi² (3,012 km²).

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 hm³) of which 352,637 acre-ft (435 hm³) 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 hm³) capacity table then in use, June 30, 1916, elevation, 1,297.88 ft (395.594 m); minimum, 51,380 acre-ft (63.4 hm³) capacity table then in use, Dec. 8, 24, 1976, elevation, 1,292.69 ft (394.012 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 519,260 acre-ft (640 hm³) June 27, elevation, 1,294.76 ft (394.643 m); minimum, 328,460 acre-ft (405 hm³) Jan. 22, elevation, 1,293.07 ft (394.128 m).

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 to SEPTEMBER 1984

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1,294.33	467,510	
Oct. 31	1,294.08	438,730	-28,780
Nov. 30	1,293.82	409,760	-28,970
Dec. 31	1,293.21	343,460	-66,300
CAL YR 1983			-91,740
Jan. 31	1,293.33	356,370	+12,910
Feb. 29	1,293.30	353,130	-3,240
Mar. 31	1,293.29	352,060	-1,070
Apr. 30	1,294.04	434,210	+82,150
May 31	1,294.19	451,280	+17,070
June 30	1,294.59	498,460	+47,180
July 31	1,294.44	480,480	+17,980
Aug. 31	1,294.16	447,840	-32,640
Sept. 30	1,294.14	445,550	-2,290
WTR YR 1984			-21,960

LEECH LAKE RIVER BASIN

05206500 LEECH LAKE RIVER AT FEDERAL DAM, MN

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.

DRAINAGE AREA.--1,163 mi² (3,012 km²).

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.

REMARKS.--Discharge computed on basis of modified weir formula, the head being obtained from readings on tailwater gage and mean gage height from recording headwater gage. Flow completely regulated by Leech Lake (station 05206000).

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

AVERAGE DISCHARGE (unadjusted).--100 years, 365 ft³/s (10.34 m³/s), 4.26 in/yr (108 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,520 ft³/s (71.4 m³/s) June 7, 1957 (result of dam failure); no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 855 ft³/s (24.2 m³/s) Nov. 25; minimum daily, 87 ft³/s (2.46 m³/s) Sept. 21.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	187	798	760	665	700	800	559	108	108	638	100	92
2	187	798	741	684	720	800	559	106	117	638	100	92
3	191	798	741	684	720	800	559	107	117	637	100	95
4	191	798	741	684	720	800	559	107	117	637	103	95
5	200	798	741	700	660	800	506	107	117	625	103	95
6	191	798	760	680	620	800	450	106	117	613	103	95
7	187	798	760	700	680	800	353	117	117	613	103	95
8	191	798	760	680	700	800	245	107	132	613	107	100
9	191	798	741	680	720	800	200	107	127	613	107	95
10	191	798	741	700	720	800	200	106	123	401	103	95
11	191	798	741	640	740	720	200	113	127	401	103	95
12	191	798	741	700	740	760	200	113	127	401	103	92
13	191	798	741	700	760	780	200	107	132	401	103	100
14	191	798	741	680	760	800	204	113	198	401	103	95
15	280	798	741	680	800	800	204	107	295	401	103	95
16	320	798	722	660	800	800	204	108	177	380	100	95
17	305	798	722	660	800	800	204	103	198	401	100	95
18	405	798	722	660	800	800	208	117	207	380	100	95
19	510	798	703	660	800	800	154	117	305	380	100	92
20	613	798	703	660	800	800	102	113	413	374	103	95
21	708	817	703	660	800	750	102	117	413	305	103	87
22	798	836	703	640	800	690	102	117	442	305	100	95
23	798	798	703	660	800	651	103	123	458	305	100	92
24	798	779	703	660	800	598	103	123	458	177	103	87
25	798	855	684	660	800	598	104	117	458	177	100	95
26	798	741	665	660	800	559	100	117	458	177	100	92
27	798	760	722	660	800	559	102	113	458	168	100	92
28	798	760	665	680	800	559	108	115	550	102	100	95
29	760	760	684	680	800	559	107	113	638	102	100	92
30	760	760	665	680	---	559	108	113	638	107	100	92
31	760	---	665	680	---	559	---	113	---	103	92	---
TOTAL	13678	23826	22325	20877	21960	22501	7109	3470	8342	11976	3145	2817
MEAN	441	794	720	673	757	726	237	112	278	386	101	93.9
MAX	798	855	760	700	800	800	559	123	638	638	107	100
MIN	187	741	665	640	620	559	100	103	108	102	92	87
CFSM	.38	.68	.62	.58	.65	.62	.20	.10	.24	.33	.09	.08
IN.	.44	.76	.71	.67	.70	.72	.23	.11	.27	.38	.10	.09
AC-FT	27130	47260	44280	41410	43560	44630	14100	6880	16550	23750	6240	5590
CAL YR 1983	TOTAL	183259	MEAN	502	MAX	1150	MIN	104	CFSM	.43	IN	5.86
WTR YR 1984	TOTAL	162026	MEAN	443	MAX	855	MIN	87	CFSM	.38	IN	5.18
									AC-FT	363500		
									AC-FT	321400		

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 mi² (8,456 km²).

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 hm³) of which 52,483 acre-ft (64.7 hm³) 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 hm³) 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 hm³) 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, 77,210 acre-ft (95.2 hm³) June 8, elevation, 1,273.45 ft (388.148 m); minimum, 44,750 acre-ft (55.2 hm³) Dec. 3, elevation, 1,270.97 ft (387.392 m).

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1,273.07	72,060	
Oct. 31	1,272.56	65,230	-6,830
Nov. 30	1,271.08	46,120	-19,110
Dec. 31	1,271.11	46,500	+380
CAL YR 1983			-13,460
Jan. 31	1,271.11	46,500	0
Feb. 29	1,271.46	50,920	+4,420
Mar. 31	1,271.42	50,410	-510
Apr. 30	1,272.99	70,980	+20,570
May 31	1,273.08	72,200	+1,220
June 30	1,272.93	70,180	-2,020
July 31	1,273.09	72,330	+2,150
Aug. 31	1,273.20	73,820	+1,490
Sept. 30	1,272.87	69,370	-4,450
WTR YR 1984			-2,690

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 mi² (8,730 km²), 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.--101 years, 1,176 ft³/s (33.30 m³/s); median of yearly mean discharges, 1,060 ft³/s (30.0 m³/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft³/s (354 m³/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 ft³/s (127 m³/s); maximum daily, 5,250 ft³/s (149 m³/s) Sept. 5, 8, 1905; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,530 ft³/s (71.6 m³/s) June 11, gage height, 8.02 ft (2.444 m); minimum daily discharge, 149 ft³/s (4.22 m³/s) Apr. 29; minimum gage height, 2.54 ft (0.774 m) Apr. 29, Sept. 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	795	1470	1600	1600	1600	1750	1780	650	161	1320	750	223		
2	785	1480	1600	1600	1600	1750	1770	580	191	1390	700	210		
3	815	1630	1600	1600	1600	1800	1780	640	185	1520	765	210		
4	835	1540	1600	1600	1600	1800	1660	590	238	1490	680	225		
5	780	1590	1600	1600	1600	1850	1650	590	407	1540	745	223		
6	850	1550	1600	1600	1600	1850	1650	615	541	1540	655	211		
7	1080	1530	1600	1600	1600	1900	1710	1120	780	1670	625	211		
8	1170	1550	1600	1000	1630	1900	1760	1810	1240	1650	710	220		
9	1120	1540	1600	1500	1640	1900	1800	1930	1740	1550	630	225		
10	1140	1520	1650	1600	1640	1900	1820	1820	1940	1380	523	265		
11	1190	1520	1650	1600	1630	1950	1880	1420	1990	1380	433	301		
12	1190	1530	1650	1600	1620	1950	1880	1160	2060	1400	441	331		
13	1150	1510	1670	1600	1600	1950	1930	1090	2050	1440	336	328		
14	1140	1520	1650	1600	1600	1900	1900	1140	1900	1430	216	319		
15	1160	1490	1650	1600	1600	1900	1910	1200	1810	1430	208	305		
16	1180	1470	1600	1600	1600	1900	1920	1190	1890	1490	211	323		
17	1140	1480	1600	1600	1600	1900	1880	1150	1890	1440	231	294		
18	1180	1540	1600	1600	1600	1900	1860	1070	1820	1470	248	326		
19	1390	1640	1600	1600	1600	1900	1860	1050	1920	1440	208	315		
20	1720	1650	1550	1550	1600	1870	1760	1070	1920	1360	233	298		
21	1650	1820	1550	1550	1600	1860	1530	670	1870	1150	237	337		
22	1560	2110	1550	1550	1600	1800	1530	474	1830	1200	205	379		
23	1640	2140	1550	1550	1600	1790	1230	496	1920	1140	225	348		
24	1660	1930	1550	1600	1600	1780	715	555	1900	1190	235	364		
25	1560	1690	1550	1600	1650	1780	338	487	1840	1160	211	364		
26	1580	1650	1550	1600	1650	1790	177	570	1840	1150	197	352		
27	1540	1600	1550	1600	1650	1820	188	580	1810	1080	236	348		
28	1540	1600	1550	1600	1700	1830	229	575	1820	994	237	345		
29	1500	1600	1600	1600	1700	1820	149	546	1710	999	200	360		
30	1530	1600	1600	1600	---	1750	333	514	1310	805	241	341		
31	1500	---	1600	1600	---	1780	---	277	---	650	234	---		
TOTAL	39070	48490	49470	48700	46910	57320	42579	27629	44523	40848	12006	8901		
MEAN	1260	1616	1596	1571	1618	1849	1419	891	1484	1318	387	297		
MAX	1720	2140	1670	1600	1700	1950	1930	1930	2060	1670	765	379		
MIN	780	1470	1550	1000	1600	1750	149	277	161	650	197	210		
CFSM	.37	.48	.47	.47	.48	.55	.42	.26	.44	.39	.12	.09		
IN.	.43	.54	.55	.54	.52	.63	.47	.30	.49	.45	.13	.10		
AC-FT	77500	96180	98120	96600	93050	113700	84460	54800	88310	81020	23810	17660		
CAL YR 1983	TOTAL	516052	MEAN	1414	MAX	3070	MIN	182	CFSM	.42	IN	5.70	AC-FT	1024000
WTR YR 1984	TOTAL	466446	MEAN	1274	MAX	2140	MIN	149	CFSM	.38	IN	5.15	AC-FT	925200

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 mi² (6.5 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1982 to current year (discontinued).

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 poor.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 142 ft³/s (4.02 m³/s) Apr. 15, 1982, gage height, 5.72 ft (1.743 m), site then in use; no flow on many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32 ft³/s (0.91 m³/s) June 8, gage height, 5.06 ft (1.542 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.04	.00	.00	.00	.00	4.0	.08	.00	.40	.00	.00
2	3.0	.04	.00	.00	.00	.00	5.5	.04	.04	.28	.00	.00
3	5.8	.02	.00	.00	.00	.00	4.2	.01	.02	.25	.00	.00
4	1.2	.00	.00	.00	.00	.00	3.0	.01	.01	.23	.00	.00
5	2.4	.00	.00	.00	.00	.00	2.1	.01	.04	.15	.00	.00
6	1.3	.02	.00	.00	.00	.00	1.4	.01	.18	.08	.00	.00
7	1.1	.02	.00	.00	.00	.00	.89	2.5	1.3	.01	.00	.00
8	1.2	.06	.00	.00	.00	.00	.57	1.6	19	.00	.00	.00
9	.48	.02	.00	.00	.00	.00	.37	.37	6.1	.00	.01	.00
10	1.2	.01	.00	.00	.00	.00	.28	.19	12	.00	.00	.00
11	8.5	.00	.00	.00	.00	.00	.23	.56	5.2	.00	.00	.00
12	5.0	.00	.00	.00	.00	.00	.11	.11	11	.00	.00	.00
13	2.5	.00	.00	.00	.00	.00	.08	.06	11	.00	.00	.00
14	1.1	.00	.00	.00	.00	.00	.11	.04	2.8	.00	.00	.00
15	1.1	.00	.00	.00	.00	.00	.09	.01	1.5	.00	.00	.00
16	1.1	.00	.00	.00	.00	.00	.06	3.8	.89	.00	.00	.00
17	1.1	.00	.00	.00	.00	.00	.04	3.7	.67	.00	.00	.00
18	.80	.00	.00	.00	.00	.00	.03	1.6	.67	.00	.00	.00
19	.60	.00	.00	.00	.00	.00	.02	.31	.37	.00	.00	.00
20	.50	.00	.00	.00	.00	.00	.02	.19	.28	.00	.00	.00
21	.40	.00	.00	.00	.00	.00	.01	.17	.21	.00	.00	.00
22	.30	.00	.00	.00	.00	.00	.00	.28	.37	.00	.00	.00
23	.20	.00	.00	.00	.00	.00	.00	.21	.40	.00	.00	.00
24	.15	.00	.00	.00	.00	.00	.00	.20	.48	.00	.00	.00
25	.19	.00	.00	.00	.00	.00	.00	.07	.18	.00	.00	.00
26	.15	.00	.00	.00	.00	.00	.00	.03	.95	.00	.00	.00
27	.12	.00	.00	.00	.00	.00	.12	.03	4.3	.00	.00	.00
28	.17	.00	.00	.00	.00	1.0	.30	.00	.83	.00	.00	.00
29	.07	.00	.00	.00	.00	1.5	.07	.00	.62	.00	.00	.00
30	.05	.00	.00	.00	---	2.0	.12	.00	.48	.00	.00	.00
31	.05	---	.00	.00	---	3.0	---	.00	---	.00	.00	---
TOTAL	41.84	.23	.00	.00	.00	7.50	23.72	16.19	81.89	1.40	.01	.00
MEAN	1.35	.008	.000	.000	.000	.24	.79	.52	2.73	.045	.000	.000
MAX	8.5	.06	.00	.00	.00	3.0	5.5	3.8	19	.40	.01	.00
MIN	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CFSM	.54	.003	.000	.000	.000	.10	.32	.21	1.09	.02	.000	.000
IN.	.62	.00	.00	.00	.00	.11	.35	.24	1.22	.02	.00	.00
AC-FT	83	.5	.00	.00	.00	15	47	32	162	2.8	.02	.00
CAL YR 1983	TOTAL	83.10	MEAN .23	MAX 8.5	MIN .00	CFSM .09	IN 1.24	AC-FT 165				
WTR YR 1984	TOTAL	172.78	MEAN .47	MAX 19	MIN .00	CFSM .19	IN 2.57	AC-FT 343				

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05216820 INITIAL TAILINGS BASIN OUTFALL NR KEEWATIN, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

		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)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	CALCIUM TOTAL RECOV- ERABLE (MG/L AS CA) (00916)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927)	
JUN 08...	1230	26	230	269	6.9	7.5	18.0	18.0	43	12	12	24	
DATE		MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, TOTAL RECOV- ERABLE (MG/L AS NA) (00929)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937)	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)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 105 DEG. C, DIS- SOLVED (MG/L AS MG/L) (00515)	SOLIDS, RESIDUE AT 105 DEG. C, DIS- SOLVED (MG/L AS MG/L) (00500)	SOLIDS, VOL- TALE ON IGNI- TION, TOTAL (MG/L) (00505)
JUN 08...	23	3.3	3.3	1.9	1.8	131	9.8	1.1	12	151	151	75	
DATE		SOLIDS, VOL- TALE, DIS- SOLVED (MG/L AS B) (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, 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)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)
JUN 08...	72	<.10	<.10	.020	.020	1.2	1.2	.020	.020	.020	2	<100	<100
DATE		BORON, TOTAL RECOV- ERABLE (UG/L AS B) (01022)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
JUN 08...	30	20	1	1	1	<1	3	3	690	180	2	1	
DATE		MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PHENOLS TOTAL (UG/L) (32730)
JUN 08...	70	20	.1	.1	<1	<1	<1	<1	<1	20	20	7.8	3

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05216820 INITIAL TAILINGS BASIN OUTFALL NEAR KEEWATIN, MN - Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT						
03...	1820	--	13.0	--	2	62
APR						
02...	1150	0.67	8.5	350	77	96
MAY						
16...	1530	11	--	--	179	98
16...	1600	12	--	--	135	99
16...	1700	12	--	--	77	100
JUN						
07...	1145	1.3	25.0	420	28	100
07...	1150	--	24.0	440	10	81
08...	0315	10	--	--	96	99
08...	0330	12	--	--	79	99
08...	0345	14	--	--	94	100
08...	0400	15	--	--	83	99
08...	0415	17	--	--	52	98
08...	0430	19	--	--	103	97
08...	0445	22	--	--	12	96
08...	1000	29	--	--	18	98
08...	1045	28	--	--	7	93
08...	1115	27	--	--	13	98
08...	1118	27	18.0	230	31	99
08...	1145	26	--	--	33	96
08...	1245	25	--	--	13	84
08...	1345	24	--	--	4	97
08...	1840	17	--	--	10	93
08...	2040	14	--	--	10	97
08...	2240	12	--	--	4	93
10...	0430	11	--	--	36	98
10...	0530	15	--	--	23	98
10...	0630	16	--	--	10	93
10...	0830	16	--	--	5	92
10...	1030	17	--	--	5	89
10...	1230	16	--	--	3	96
10...	1530	15	--	--	4	86
10...	1830	12	--	--	2	88
12...	1700	9.7	--	--	408	92
12...	1800	26	--	--	76	92
13...	1045	11	--	--	4	90
13...	1145	10	18.0	330	5	93

SWAN RIVER BASIN

05216860 SWAN RIVER NEAR CALUMET, MN

LOCATION.--Lat 47°17'20", long 93°13'54", in NW¼SW¼ sec.35, T.56 N., R.23 W., Itasca County, Hydrologic Unit 07010103, on left bank 1.0 mi (1.6 km) downstream from Snowball Creek, 2.1 mi (3.4 km) downstream from bridge on U.S. Highway 65 at outlet of Swan Lake and 3.1 mi (5.0 km) southeast of Calumet.

DRAINAGE AREA.--114 mi² (295 km²).

PERIOD OF RECORD.--January 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,331.19 ft (405.747 m) National Geodetic Vertical Datum of 1929. Prior to June 5, 1964, reference point at present site and datum.

REMARKS.--Records fair. Natural flow of stream affected by continually changing iron-mining activities that include diversions for iron-ore processing, storage in tailing ponds and Swan Lake, and mine pit dewatering.

AVERAGE DISCHARGE.--20 years, 65.6 ft³/s (1.858 m³/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 773 ft³/s (21.9 m³/s) Apr. 15, 1969, gage height, 5.83 ft (1.777 m); maximum gage height, 5.96 ft (1.817 m) Apr. 23, 1979; minimum discharge, 0.38 ft³/s (0.011 m³/s) Oct. 14, 1976, gage height, 4.16 ft (1.268 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 300 ft³/s (8.50 m³/s) June 14, gage height, 5.42 ft (1.652 m); minimum, 5.1 ft³/s (0.14 m³/s) Sept. 3, 7, gage height, 4.47 ft (1.362 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	54	59	37	33	34	44	88	67	134	33	8.2
2	25	54	52	37	34	34	52	91	64	125	30	7.3
3	33	53	51	36	34	34	62	82	60	121	28	6.5
4	36	53	49	36	34	36	75	82	60	110	27	6.5
5	40	56	48	36	33	37	88	80	60	104	30	6.5
6	44	58	46	36	33	37	100	85	68	97	27	6.5
7	50	60	46	36	33	37	112	106	77	90	28	6.5
8	52	59	45	36	32	36	122	118	102	84	31	6.5
9	53	63	46	36	31	36	126	140	144	83	30	6.5
10	55	61	46	36	28	34	132	150	191	80	30	6.5
11	62	58	48	36	28	33	132	143	216	73	28	7.3
12	67	56	50	36	33	33	136	146	244	68	26	8.2
13	69	54	52	36	34	31	136	146	281	71	24	8.2
14	68	53	54	34	34	31	132	143	299	66	23	7.3
15	72	50	53	34	34	31	126	140	288	59	23	6.5
16	71	49	51	34	33	33	126	143	271	58	23	6.5
17	71	47	49	34	33	31	122	150	254	56	20	6.0
18	72	44	47	34	31	31	115	154	232	53	18	5.8
19	69	52	48	34	31	30	112	162	220	51	18	6.1
20	68	56	46	34	30	30	106	162	205	49	15	6.0
21	64	56	44	36	31	27	103	154	187	47	18	7.6
22	61	61	44	36	31	26	94	143	182	43	15	5.3
23	60	64	44	36	33	26	88	132	168	41	15	5.2
24	57	68	44	36	34	26	80	122	157	39	14	9.1
25	58	68	43	33	34	26	78	122	150	37	13	8.2
26	60	66	40	33	33	27	82	109	158	35	13	8.2
27	59	65	38	31	34	30	88	100	169	34	11	9.8
28	56	67	38	31	34	31	85	88	167	31	11	9.8
29	57	68	40	31	34	33	91	80	158	29	11	9.9
30	57	67	38	31	---	36	85	72	147	28	9.2	10
31	56	---	37	31	---	40	---	70	---	33	8.2	---
TOTAL	1745	1740	1436	1073	944	997	3030	3703	5046	2029	650.4	218.5
MEAN	56.3	58.0	46.3	34.6	32.6	32.2	101	119	168	65.5	21.0	7.28
MAX	72	68	59	37	34	40	136	162	299	134	33	10
MIN	23	44	37	31	28	26	44	70	60	28	8.2	5.2
CFSM	.49	.51	.41	.30	.29	.28	.89	1.04	1.47	.58	.18	.06
IN.	.57	.57	.47	.35	.31	.33	.99	1.21	1.65	.66	.21	.07
AC-FT	3460	3450	2850	2130	1870	1980	6010	7340	10010	4020	1290	433
CAL YR 1983	TOTAL	20953.0	MEAN	57.4	MAX	136	MIN	15	CFSM	.50	IN	6.84
WTR YR 1984	TOTAL	22611.9	MEAN	61.8	MAX	299	MIN	5.2	CFSM	.54	IN	7.38
									AC-FT	41560		
									AC-FT	44850		

SANDY RIVER BASIN

05218500 SANDY LAKE AT LIBBY, MN

LOCATION.--Lat $46^{\circ}47'20''$, long $93^{\circ}19'10''$, 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 mi² (1,090 km²).

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 hm³), of which 37,539 acre-ft (46.3 hm³) 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 hm³) capacity table then in use, May 19, 1950, elevation, 1,224.82 ft (373.325 m); minimum observed, 5,950 acre-ft (7.34 hm³) 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, 72,910 acre-ft (89.9 hm³) June 17, elevation, 1,217.29 ft (371.030 m); minimum, 43,610 acre-ft (53.8 hm³) Feb. 17, elevation, 1,214.03 ft (370.036 m).

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,216.26	62,950	
Oct. 31.....	1,215.40	55,130	-7,820
Nov. 30.....	1,214.50	47,430	-7,700
Dec. 31.....	1,214.20	44,980	-2,450
CAL YR 1983.....			-4,090
Jan. 31.....	1,214.25	45,380	+400
Feb. 29.....	1,214.33	46,040	+660
Mar. 31.....	1,214.51	47,520	+1,480
Apr. 30.....	1,216.38	64,080	+16,560
May 31.....	1,216.33	63,610	-470
June 30.....	1,216.25	62,950	-660
July 31.....	1,216.19	62,300	-650
Aug. 31.....	1,216.03	60,820	-1,480
Sept. 30.....	1,215.89	59,530	-1,290
WTR YR 1984.....			-3,420

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 mi² (1,090 km²).

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).--89 years (water years 1896-1984), 219 ft³/s (6.202 m³/s), 7.06 in/yr (179 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 3,740 ft³/s (106 m³/s) July 12, 1897; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1,690 ft³/s (47.9 m³/s) June 23; minimum daily, 20 ft³/s (0.57 m³/s) Apr. 5-10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	380	338	159	162	165	122	540	300	585	22	23
2	22	380	308	159	162	165	124	558	1130	292	23	23
3	22	385	285	159	162	168	132	630	752	316	23	23
4	22	385	270	159	160	168	20	623	500	324	23	23
5	21	380	255	159	159	168	20	623	265	324	23	23
6	182	375	255	159	159	168	20	630	273	84	23	23
7	175	370	255	159	152	168	20	630	268	85	23	23
8	400	370	255	159	162	177	20	984	570	87	23	23
9	388	370	270	159	162	183	20	852	1440	87	23	23
10	376	365	285	168	159	180	20	992	1120	44	23	23
11	376	370	293	177	159	168	490	896	1150	45	23	23
12	372	365	293	168	159	174	594	880	984	46	23	23
13	360	365	308	165	159	174	1180	880	1530	47	24	23
14	602	365	308	162	159	180	1080	496	943	47	24	23
15	588	360	315	162	416	152	1060	560	1140	48	24	23
16	588	360	315	162	392	174	1040	576	1160	48	24	23
17	588	360	315	159	360	174	770	576	1200	48	24	23
18	581	360	315	159	138	174	812	568	1220	48	24	23
19	574	360	315	159	153	177	641	568	1220	96	24	23
20	574	360	315	162	156	174	662	576	1230	96	24	23
21	567	335	330	162	156	174	340	592	1340	97	24	23
22	546	473	315	165	159	174	360	456	1350	98	24	23
23	525	413	330	165	159	174	370	468	1690	101	23	23
24	532	413	330	165	159	120	213	296	1370	52	23	23
25	525	383	330	165	159	120	224	312	1360	52	23	23
26	518	308	330	165	156	122	240	230	1440	21	23	23
27	518	308	338	165	156	122	262	233	1440	21	23	23
28	518	330	147	165	159	120	864	233	984	21	23	23
29	375	360	159	162	162	120	792	238	882	21	23	23
30	380	368	159	162	---	120	783	285	531	21	23	23
31	380	---	159	162	---	120	---	285	---	21	23	---
TOTAL	12217	11076	8795	5037	5275	4917	13295	17266	30782	3323	722	690
MEAN	394	369	284	162	182	159	443	557	1026	107	23.3	23.0
MAX	602	473	338	177	416	183	1180	992	1690	585	24	23
MIN	21	308	147	159	138	120	20	230	265	21	22	23
CFSM	.94	.88	.68	.39	.43	.38	1.05	1.32	2.44	.25	.06	.06
IN.	1.08	.98	.78	.45	.47	.43	1.17	1.53	2.72	.29	.06	.06
AC-FT	24230	21970	17440	9990	10460	9750	26370	34250	61060	6590	1430	1370
CAL YR 1983	TOTAL	109962	MEAN	301	MAX	1310	MIN	17	CFSM	.72	IN	9.72
WTR YR 1984	TOTAL	113395	MEAN	310	MAX	1690	MIN	20	CFSM	.74	IN	10.02
									AC-FT	218100		
									AC-FT	224900		

MISSISSIPPI RIVER MAIN STEM

05220500 MISSISSIPPI RIVER BELOW SANDY RIVER, NEAR LIBBY, MN

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.

DRAINAGE AREA.--5,060 mi² (13,110 km²), approximately.

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

REVISED 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 fair. Flow regulated by Winnibigoshish Lake (station 05201000), Leech Lake (station 05206000), Pokegama Lake (station 05210500), and Sandy Lake (station 05218500).

AVERAGE DISCHARGE.--54 years, 2,053 ft³/s (58.14 m³/s), 5.51 in/yr (140 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft³/s (453 m³/s) May 17, 1950, gage height, 20.02 ft (6.102 m); minimum, 83 ft³/s (2.35 m³/s) Nov. 16, 1936, gage height, 1.44 ft (0.439 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,390 ft³/s (153 m³/s) June 13, gage height, 11.62 ft (3.542 m); minimum daily, 336 ft³/s (9.52 m³/s) Sept. 5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1370	2600	2810	2200	2100	2300	2880	2170	1690	3530	1190	404		
2	1350	2600	2780	2200	2100	2320	2900	2280	1880	3380	1010	387		
3	1350	2600	2750	2200	2090	2350	2900	2420	1510	3270	998	358		
4	1420	2590	2710	2200	2080	2380	2940	2380	1230	3150	956	341		
5	1520	2560	2690	2200	2070	2410	3020	2360	1130	3010	989	336		
6	1630	2550	2690	2200	2060	2440	3070	2340	1240	2880	935	365		
7	1690	2550	2660	2200	2050	2470	3100	2610	1800	2780	972	457		
8	1860	2530	2660	2180	2040	2490	3100	3270	2990	2680	986	460		
9	2060	2530	2640	2100	2040	2490	3100	3810	3990	2600	1020	428		
10	2100	2520	2640	2000	2040	2500	3100	4120	4440	2530	1060	427		
11	2120	2500	2640	2050	2020	2500	3200	4210	4990	2480	1020	390		
12	2300	2470	2640	2100	2020	2500	3500	4190	5210	2420	879	402		
13	2410	2470	2610	2150	2020	2500	3500	3960	5300	2380	786	473		
14	2610	2460	2580	2150	2020	2500	3500	3540	5130	2330	772	551		
15	2620	2450	2580	2150	2200	2500	3500	3500	5090	2290	683	580		
16	2630	2430	2550	2150	2300	2500	3450	3420	5050	2250	551	561		
17	2660	2400	2510	2150	2300	2500	3300	3350	5010	2230	497	528		
18	2680	2400	2500	2150	2100	2500	3200	3260	4980	2190	469	520		
19	2670	2430	2500	2150	2100	2500	3150	3180	4970	2140	458	472		
20	2660	2640	2500	2120	2100	2500	3100	3090	4930	2080	463	460		
21	2790	2940	2490	2100	2130	2530	2800	2990	4920	2000	457	455		
22	2820	3080	2480	2100	2160	2550	2800	2890	5150	1980	444	445		
23	2830	3220	2450	2100	2190	2580	2800	2790	5330	1930	453	520		
24	2880	3340	2420	2100	2220	2600	2600	2680	5230	1860	435	622		
25	2900	3250	2400	2100	2250	2610	2590	2540	5120	1800	426	617		
26	2890	3100	2400	2100	2270	2630	2150	2430	5020	1740	440	615		
27	2860	3000	2350	2100	2290	2680	1880	2300	4810	1670	421	614		
28	2820	2910	2300	2100	2300	2720	2300	2150	4450	1600	404	605		
29	2650	2890	2200	2100	2300	2770	2410	1980	4060	1520	425	598		
30	2600	2850	2200	2100	---	2820	2340	1880	3720	1460	431	587		
31	2600	---	2200	2100	---	2870	---	1750	---	1350	397	---		
TOTAL	72350	80860	78530	66100	61960	78510	88180	89840	120370	71510	21427	14578		
MEAN	2334	2695	2533	2132	2137	2533	2939	2898	4012	2307	691	486		
MAX	2900	3340	2810	2200	2300	2870	3500	4210	5330	3530	1190	622		
MIN	1350	2400	2200	2000	2020	2300	1880	1750	1130	1350	397	336		
CFSM	.46	.53	.50	.42	.42	.50	.58	.57	.79	.46	.14	.10		
IN.	.53	.59	.58	.49	.46	.58	.65	.66	.88	.53	.16	.11		
AC-FT	143500	160400	155800	131100	122900	155700	174900	178200	238800	141800	42500	28920		
CAL YR 1983	TOTAL	854660	MEAN	2342	MAX	4470	MIN	1140	CFSM	.46	IN	6.28	AC-FT	1695000
WTR YR 1984	TOTAL	844215	MEAN	2307	MAX	5330	MIN	336	CFSM	.46	IN	6.21	AC-FT	1675000

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 mi² (15,900 km²), 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.--39 years, 2,905 ft³/s (82.27 m³/s), 6.43 in/yr (163 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s (566 m³/s) May 20, 1950, gage height, 22.49 ft (6.855 m), present datum; minimum, 151 ft³/s (4.28 m³/s) Sept. 1, 1961, gage height, 0.60 ft (0.183 m).

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 9,020 ft³/s (255 m³/s) June 13; minimum daily, 415 ft³/s (11.8 m³/s) Sept. 6. River gage; Maximum discharge, 5,300 ft³/s (150 m³/s) June 13, gage height, 13.27 ft (4.045 m); minimum daily, 415 ft³/s (11.8 m³/s) Sept. 6.
 Diversion gage: Maximum discharge, 3,820 ft³/s (108 m³/s) June 13, gage height, 13.10 ft (3.993 m), from graph based on gage readings; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1330	2770	2850	2460	2210	2710	3900	3010	2160	4860	1430	450		
2	1360	2710	2840	2440	2210	2700	4000	3110	2170	4370	1320	450		
3	1400	2660	2830	2430	2210	2690	4030	3230	2180	3820	1150	440		
4	1400	2580	2820	2420	2210	2680	4060	3350	2000	3560	1100	430		
5	1440	2540	2810	2400	2210	2670	4070	3370	1740	3350	1060	420		
6	1520	2590	2800	2390	2200	2660	4180	3530	1660	3170	1060	415		
7	1640	2600	2790	2380	2200	2650	4240	3850	2440	2990	1010	430		
8	1720	2610	2780	2360	2200	2640	4410	4370	4900	2880	1000	460		
9	1830	2620	2770	2350	2200	2630	4480	4760	5730	2810	1010	470		
10	2000	2620	2770	2350	2200	2620	4600	5610	7890	2710	1030	470		
11	2120	2620	2760	2330	2200	2610	4730	5900	8410	2600	1080	461		
12	2150	2650	2750	2330	2200	2610	5100	5970	8770	2490	1070	460		
13	2280	2630	2740	2320	2200	2600	5240	6040	9020	2390	1010	449		
14	2390	2610	2730	2310	2200	2600	5360	5790	8950	2300	911	472		
15	2690	2600	2720	2300	2250	2600	5410	5520	8580	2220	857	529		
16	2770	2550	2710	2300	2310	2600	5390	5040	8570	2170	791	585		
17	2790	2550	2700	2290	2360	2600	5370	4940	8440	2180	684	580		
18	2840	2520	2690	2290	2410	2600	5180	4910	8100	2120	607	561		
19	2890	2510	2680	2280	2450	2600	4940	4880	7900	2130	555	552		
20	2950	2580	2670	2270	2490	2600	4770	4740	7600	2110	528	528		
21	2950	2730	2660	2260	2520	2600	4620	4360	7310	2070	541	486		
22	2970	3070	2640	2260	2550	2650	4200	4210	7080	2040	537	473		
23	3080	3380	2620	2250	2580	2710	4080	4000	6960	1910	513	459		
24	3050	3340	2600	2250	2620	2770	3750	3800	6940	1770	504	521		
25	3100	3260	2580	2240	2640	2830	3590	3530	6770	1700	499	592		
26	3070	2940	2570	2240	2670	2950	3230	3380	6630	1650	483	624		
27	3080	2860	2540	2230	2690	3150	3020	3020	6530	1610	486	632		
28	3120	2890	2530	2230	2700	3350	3180	2880	6220	1500	480	651		
29	3000	2870	2510	2220	2710	3500	3320	2680	5770	1430	464	656		
30	2860	2860	2490	2220	---	3650	3320	2520	5440	1410	456	656		
31	2800	---	2470	2210	---	3800	---	2310	---	1410	450	---		
TOTAL	74590	82320	83420	71610	68800	86630	129770	128610	182860	75730	24676	15362		
MEAN	2406	2744	2691	2310	2372	2795	4326	4149	6095	2443	796	512		
MAX	3120	3380	2850	2460	2710	3800	5410	6040	9020	4860	1430	656		
MIN	1330	2510	2470	2210	2200	2600	3020	2310	1660	1410	450	415		
CFSM	.39	.45	.44	.38	.39	.46	.71	.68	.99	.40	.13	.08		
IN.	.45	.50	.51	.43	.42	.52	.79	.78	1.11	.46	.15	.09		
AC-FT	147900	163300	165500	142000	136500	171800	257400	255100	362700	150200	48940	30470		
CAL YR 1983	TOTAL	996740	MEAN	2731	MAX	5810	MIN	1290	CFSM	.45	IN	6.04	AC-FT	1977000
WTR YR 1984	TOTAL	1024378	MEAN	2799	MAX	9020	MIN	415	CFSM	.46	IN	6.21	AC-FT	2032000

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 mi² (1,456 km²).

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 hm³) of which 53,272 acre-ft (65.7 hm³) 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 hm³) capacity table then in use, July 10, 1916, elevation, 1,234.56 ft (376.294 m); minimum observed, 1,310 acre-ft (1.62 hm³) 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, 103,170 acre-ft (127 hm³) June 10, elevation, 1,229.52 ft (374.758 m); minimum, 73,270 acre-ft (90.3 hm³) Feb. 21, elevation, 1,227.28 ft (374.075 m).

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1,229.36	100,990	
Oct. 31	1,229.18	99,900	-1,090
Nov. 30	1,229.29	100,040	+140
Dec. 31	1,229.04	102,080	+2,040
CAL YR 1983			+8,780
Jan. 31	1,228.05	83,390	-18,690
Feb. 29	1,227.40	74,840	-8,550
Mar. 31	1,227.56	76,930	+2,090
Apr. 30	1,228.79	93,270	+16,340
May 31	1,229.18	98,540	+5,270
June 30	1,229.31	100,310	+1,770
July 31	1,229.15	98,130	-2,180
Aug. 31	1,229.01	96,240	-1,890
Sept. 30	1,229.03	96,510	+270
WTR YR 1984			-4,480

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 mi² (1,456 km²).

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).--98 years, 217 ft³/s (6.145 m³/s), 5.24 in/yr (133 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,250 ft³/s (63.7 m³/s) in June 1896 (does not include flow bypassing dam through crevasse); no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 780 ft³/s (22.1 m³/s) June 14, 15; minimum daily, 30 ft³/s (0.85 m³/s) Apr. 5-May 7, July 11-14, July 17-Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	100	175	175	360	400	200	80	30	80	200	30	30
2	100	175	175	360	450	200	80	30	80	142	30	30
3	100	175	175	360	490	200	80	30	80	100	30	30
4	165	175	175	360	490	200	51	30	80	100	30	30
5	175	175	175	360	490	200	30	30	80	100	30	30
6	175	175	175	360	490	200	30	30	80	100	30	30
7	175	175	175	360	490	200	30	30	80	100	30	30
8	175	175	175	360	490	200	30	71	80	136	30	30
9	175	175	175	360	490	200	30	217	238	153	30	30
10	175	175	175	360	490	200	30	300	440	59	30	30
11	175	175	175	360	428	200	30	300	500	30	30	30
12	175	175	175	360	390	200	30	300	500	30	30	30
13	175	175	175	360	390	200	30	300	605	30	30	30
14	175	175	235	360	390	200	30	300	780	30	30	30
15	175	175	240	360	390	200	30	300	780	85	30	30
16	175	175	240	360	390	200	30	300	745	64	30	30
17	175	175	240	360	390	200	30	300	620	30	30	30
18	175	175	240	360	390	200	30	300	620	30	30	30
19	175	175	240	360	390	200	30	335	620	30	30	30
20	175	175	240	360	390	200	30	360	620	30	30	30
21	175	175	240	360	390	154	30	360	520	30	30	30
22	175	175	240	360	279	150	30	360	410	30	30	30
23	175	175	240	360	200	150	30	360	410	30	30	30
24	175	175	240	360	200	150	30	360	410	30	30	30
25	175	175	240	360	200	150	30	360	410	30	30	30
26	175	175	240	360	200	150	30	360	288	30	30	30
27	175	175	240	360	200	80	30	360	200	30	30	30
28	175	175	345	383	200	80	30	360	200	30	30	30
29	175	175	360	400	200	80	30	273	200	30	30	30
30	175	175	360	400	---	80	30	210	200	30	30	30
31	175	---	360	400	---	80	---	210	---	30	30	---
TOTAL	5190	5250	7055	11303	10777	5304	1071	7466	10956	1909	930	900
MEAN	167	175	228	365	372	171	35.7	241	365	61.6	30.0	30.0
MAX	175	175	360	400	490	200	80	360	780	200	30	30
MIN	100	175	175	360	200	80	30	30	80	30	30	30
CFSM	.30	.31	.41	.65	.66	.30	.06	.43	.65	.11	.05	.05
IN.	.34	.35	.47	.75	.71	.35	.07	.49	.73	.13	.06	.06
AC-FT	10290	10410	13990	22420	21380	10520	2120	14810	21730	3790	1840	1790
CAL YR 1983	TOTAL	74632	MEAN 204	MAX 1000	MIN 30	CFSM .36	IN 4.94	AC-FT 148000				
WTR YR 1984	TOTAL	68111	MEAN 186	MAX 780	MIN 30	CFSM .33	IN 4.51	AC-FT 135100				

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 mi² (1,119 km²).

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.--13 years, 145 ft³/s (4.106 m³/s), 4.56 in/yr (116 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,270 ft³/s (92.6 m³/s) July 22, 1972, gage height, 9.37 ft (2.856 m); minimum daily, 0.84 ft³/s (0.02 m³/s) Jan. 12-18, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 640 ft³/s (18.1 m³/s) June 24, gage height, 5.15 ft (1.570 m) minimum discharge, 47 ft³/s (1.33 m³/s) Nov. 24; gage height, 1.40 ft (0.427 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	57	69	50	52	122	418	238	125	349	157	125
2	53	55	66	50	54	120	351	218	123	310	152	126
3	51	55	63	50	54	114	295	206	116	287	149	125
4	50	55	61	50	52	105	266	202	116	260	148	123
5	50	54	59	50	51	103	247	217	129	245	216	115
6	48	53	58	50	50	101	231	220	151	236	196	108
7	49	53	56	50	50	103	216	359	167	220	174	107
8	48	52	55	50	50	97	202	420	192	209	174	107
9	48	55	54	50	50	97	190	464	237	222	174	103
10	49	57	53	50	50	97	184	496	367	274	172	102
11	55	57	52	50	50	97	188	477	437	266	165	98
12	57	58	52	50	50	95	251	414	477	257	160	103
13	58	54	51	50	50	92	326	360	524	243	155	105
14	58	64	51	50	50	90	375	327	564	226	148	99
15	58	61	51	50	51	87	402	304	570	214	143	94
16	58	59	50	50	53	84	392	287	529	209	136	91
17	59	58	50	50	65	84	363	268	465	209	130	88
18	60	60	50	50	75	81	334	251	414	199	126	85
19	68	69	50	50	85	81	301	231	376	189	123	81
20	70	130	50	50	100	80	271	215	349	180	119	77
21	70	159	50	50	100	73	248	209	342	171	136	75
22	70	146	50	50	110	73	229	214	388	176	127	74
23	69	97	50	50	130	94	216	205	472	177	123	78
24	69	52	50	50	145	130	201	193	623	174	122	121
25	68	71	50	50	145	170	195	183	616	177	127	111
26	68	101	50	50	144	245	195	173	608	192	124	101
27	63	89	50	50	140	347	212	163	601	193	134	94
28	60	78	50	50	135	354	224	152	546	181	127	88
29	57	74	50	50	129	371	238	145	473	169	122	84
30	57	71	50	50	---	382	250	136	408	163	121	80
31	57	---	50	50	---	396	---	129	---	162	122	---
TOTAL	1812	2154	1651	1550	2320	4565	8011	8076	11505	6739	4502	2968
MEAN	58.5	71.8	53.3	50.0	80.0	147	267	261	384	217	145	98.9
MAX	70	159	69	50	145	396	418	496	623	349	216	126
MIN	48	52	50	50	50	73	184	129	116	162	119	74
CFSM	.14	.17	.12	.12	.19	.34	.62	.60	.89	.50	.34	.23
IN.	.16	.19	.14	.13	.20	.39	.69	.70	.99	.58	.39	.26
AC-FT	3590	4270	3270	3070	4600	9050	15890	16020	22820	13370	8930	5890
CAL YR 1983	TOTAL	43751	MEAN 120	MAX 500	MIN 48	CFSM .28	IN 3.77	AC-FT	86780			
WTR YR 1984	TOTAL	55853	MEAN 153	MAX 623	MIN 48	CFSM .35	IN 4.81	AC-FT	110800			

CROW WING RIVER BASIN

05246500 GULL LAKE NEAR BRAINERD, MN

LOCATION.--Lat $46^{\circ}24'40''$, long $94^{\circ}21'26''$, in $N\frac{1}{2}$ 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 mi² (743 km²).

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 hm³). 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 hm³) capacity table then in use, June 30, 1914, elevation, 1,195.05 ft (364.251 m); minimum observed, 22,250 acre-ft (27.4 hm³) capacity table then in use, Mar. 20, 1924, elevation, 1,190.75 ft (362.941 m).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 64,290 acre-ft (79.3 hm³) June 11, 17, elevation, 1,194.23 ft (364.001 m); minimum, 45,500 acre-ft (56.1 hm³) Feb. 28, elevation, 1,192.78 ft (363.559 m).

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1,193.67	57,000	
Oct. 31.....	1,193.59	55,960	-1,040
Nov. 30.....	1,193.74	57,910	+1,950
Dec. 31.....	1,193.71	57,520	-390
CAL YR 1983			+1,360
Jan. 31.....	1,193.12	49,880	-7,640
Feb. 29.....	1,192.78	45,500	-4,380
Mar. 31.....	1,193.02	48,590	+3,090
Apr. 30.....	1,193.92	60,250	+11,660
May 31.....	1,193.90	59,990	-260
June 30.....	1,193.85	59,340	-650
July 31.....	1,193.76	58,170	-1,170
Aug. 31.....	1,193.60	56,090	-2,080
Sept. 30.....	1,193.51	54,920	-1,170
WTR YR 1984			-2,080

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 mi² (743 km²).

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).--73 years, 108 ft³/s (3.059 m³/s), 5.11 in/yr (130 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,120 ft³/s (31.7 m³/s) May 15, 1938; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 513 ft³/s (14.5 m³/s) June 16, 17; minimum daily, 17 ft³/s (0.48 m³/s) Apr. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	72	74	114	204	196	122	18	47	94	20	19
2	23	72	74	114	204	196	124	18	47	94	20	19
3	23	72	74	116	204	108	60	18	47	94	20	19
4	23	72	74	216	202	108	60	18	47	20	20	19
5	23	72	74	216	202	108	60	18	47	20	20	19
6	23	72	74	216	202	108	60	18	48	20	20	19
7	23	72	74	216	202	108	31	18	98	20	20	19
8	23	72	74	216	202	108	31	325	99	20	20	19
9	23	72	74	216	202	108	32	315	236	20	20	19
10	23	72	74	216	202	108	32	318	240	20	20	19
11	23	72	74	216	202	108	32	318	324	20	19	19
12	22	72	74	216	202	108	32	367	450	20	19	19
13	22	72	74	216	202	108	32	367	495	20	19	19
14	22	72	116	216	202	108	32	367	484	20	19	19
15	72	72	116	216	202	108	32	367	467	20	19	18
16	72	72	116	216	202	108	33	360	513	20	19	18
17	72	72	116	216	202	108	33	228	513	20	19	18
18	72	72	116	210	202	108	33	228	506	20	19	18
19	72	72	116	210	202	108	33	228	506	20	19	18
20	72	73	116	210	202	108	33	228	506	20	19	18
21	72	74	114	210	202	108	33	228	502	20	19	18
22	72	74	114	210	202	108	33	97	502	18	19	18
23	72	74	114	210	202	108	33	97	475	20	19	18
24	72	73	114	210	200	108	33	97	475	20	19	18
25	72	72	114	210	200	108	33	97	475	20	19	18
26	72	72	114	210	200	108	17	97	220	20	19	18
27	72	72	114	210	200	108	18	97	216	20	19	18
28	72	74	114	210	196	108	18	96	94	20	19	18
29	72	74	114	210	196	108	18	96	94	20	19	18
30	72	74	114	210	---	108	18	47	94	20	19	18
31	72	---	114	210	---	120	---	47	---	20	19	---
TOTAL	1543	2174	3028	6308	5844	3536	1191	5238	8867	840	599	554
MEAN	49.8	72.5	97.7	203	202	114	39.7	169	296	27.1	19.3	18.5
MAX	72	74	116	216	204	196	124	367	513	94	20	19
MIN	22	72	74	114	196	108	17	18	47	18	19	18
CFSM	.17	.25	.34	.71	.70	.40	.14	.59	1.03	.09	.07	.06
IN.	.20	.28	.39	.82	.76	.46	.15	.68	1.15	.11	.08	.07
AC-FT	3060	4310	6010	12510	11590	7010	2360	10390	17590	1670	1190	1100
CAL YR 1983	TOTAL	44297	MEAN 121	MAX 615	MIN 19	CFSM .42	IN 5.74	AC-FT	87860			
WTR YR 1984	TOTAL	39722	MEAN 109	MAX 513	MIN 17	CFSM .38	IN 5.15	AC-FT	78790			

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.--16 years, 1,260 ft³/s (35.68 m³/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 16,600 ft³/s (470 m³/s) Apr. 12, 13, 1969; minimum daily, 60 ft³/s (1.70 m³/s) Aug. 10, 11, 13, 14, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum daily discharge since 1924, 18,300 ft³/s (518 m³/s) Apr. 14, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 3,940 ft³/s (112 m³/s) May 9; minimum daily, 356 ft³/s (10.1 m³/s) Sept. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	634	890	611	423	635	1690	2980	1960	1210	2220	600	398
2	624	810	859	598	749	1640	2750	1860	885	1930	533	398
3	541	788	945	513	769	1610	2640	1880	755	2230	573	421
4	423	798	944	448	787	1510	2630	1830	1030	2200	491	541
5	449	781	944	636	790	1250	2600	1800	1430	2220	537	397
6	689	782	839	554	792	1160	2570	1800	1530	1650	597	398
7	637	790	788	555	769	933	2500	2230	1600	1360	404	398
8	635	814	698	555	751	1150	2970	3300	2040	1190	541	398
9	657	709	586	680	788	1210	2650	3940	2070	1250	601	398
10	655	653	762	665	859	1000	1520	2650	2980	1260	485	440
11	688	687	744	689	907	928	1510	2740	3080	1130	484	543
12	688	670	606	602	906	1140	2290	3150	3320	916	444	397
13	688	727	606	545	887	687	2640	3030	3520	870	397	570
14	689	804	619	658	887	972	2610	2810	3740	911	524	528
15	689	645	663	793	887	1010	2580	2600	3780	855	618	423
16	889	619	688	566	1320	847	2480	2640	3780	1090	397	430
17	943	639	687	515	1090	829	2450	2430	3780	965	380	437
18	868	656	618	729	1000	1140	2400	2160	3640	685	400	393
19	814	783	619	679	1170	932	2420	2060	3550	761	400	423
20	816	912	619	656	1390	951	2410	2010	3450	792	399	415
21	836	1210	646	656	1530	1020	2350	1750	3320	602	433	374
22	893	1460	589	582	1310	955	2080	2000	3400	564	588	405
23	892	1100	534	658	1530	1090	1840	1750	3640	615	396	394
24	794	468	418	656	1620	1200	1770	1480	3750	544	399	356
25	662	369	419	578	1620	1630	1720	1410	3630	574	644	442
26	658	517	419	422	1710	2150	1660	1410	3320	641	405	544
27	832	740	420	423	1680	2060	1840	1380	3110	682	399	552
28	878	941	422	481	1660	3090	2030	1230	2890	663	456	575
29	886	940	423	657	1690	3440	2070	1100	2600	488	446	485
30	805	750	422	656	---	2920	2050	1080	2370	858	397	397
31	832	---	423	537	---	3150	---	1140	---	573	398	---
TOTAL	22684	23452	19580	18365	32483	45294	69010	64610	83200	33289	14766	13270
MEAN	732	782	632	592	1120	1461	2300	2084	2773	1074	476	442
MAX	943	1460	945	793	1710	3440	2980	3940	3780	2230	644	575
MIN	423	369	418	422	635	687	1510	1080	755	488	380	356
CFSM	.22	.24	.19	.18	.34	.44	.70	.63	.84	.33	.14	.13
IN.	.26	.26	.22	.21	.37	.51	.78	.73	.94	.38	.17	.15
AC-FT	44990	46520	38840	36430	64430	89840	136900	128200	165000	66030	29290	26320
CAL YR 1983	TOTAL	479109	MEAN	1313	MAX	4310	MIN	362	CFSM	.40	IN	5.40
WTR YR 1984	TOTAL	440003	MEAN	1202	MAX	3940	MIN	356	CFSM	.36	IN	4.96
									AC-FT	950300		
									AC-FT	872700		

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 mi² (30,000 km²), 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.--60 years, 4,516 ft³/s (127.9 m³/s), 5.29 in/yr (134 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 37,700 ft³/s (1,070 m³/s) Apr. 16, 1965; minimum daily, 254 ft³/s (7.19 m³/s) Nov. 25, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 17,200 ft³/s (487 m³/s) June 13, 14; minimum daily, 640 ft³/s (18.1 m³/s) Sept. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	2310	4340	3650	4900	4520	6090	9260	6750	4710	9260	2440	1210		
2	2570	4520	3820	4710	4340	5480	8700	6520	4340	7940	2700	1040		
3	2700	3820	3820	4710	4520	5680	7700	6300	3650	8190	2310	1120		
4	2570	3990	3650	4520	4710	5880	9260	6300	3990	6980	2440	1120		
5	2700	4160	4340	4710	4520	5480	8980	6520	4340	6300	2060	1300		
6	2570	4340	4710	4520	4520	4710	8440	6520	4340	6090	2180	1210		
7	2580	3990	4340	4340	4520	5090	8440	7460	4520	5480	2180	1210		
8	2700	4160	4340	4710	4710	4160	8440	9260	5880	5090	1940	1120		
9	2700	4340	4710	4520	4520	5480	9260	11700	8190	4900	1820	1120		
10	3000	4160	4900	4900	4710	4900	7460	11700	12300	4900	2180	1120		
11	3820	4160	4900	4900	4900	4520	7460	9850	14700	4710	1940	1390		
12	3820	4160	4900	4710	4340	4900	8190	12300	16500	4520	1940	1590		
13	3820	4160	4900	4340	4710	4520	9560	11700	17200	4340	1590	1300		
14	3990	4340	4900	4520	4710	4340	9850	11700	17200	3990	1940	2060		
15	3820	4160	4900	4710	4520	4710	10400	11100	16900	3650	1940	4160		
16	4340	4160	4900	4900	4710	4340	10400	9850	16900	3820	1820	3000		
17	4340	4160	4900	5090	4900	4160	10400	9850	16500	3990	1390	1120		
18	4710	3650	4900	4710	4900	4520	10200	9260	15800	3820	1480	1480		
19	4900	4160	4340	4340	5090	4520	9260	8980	14700	3160	1480	1120		
20	4710	4900	4520	4900	5480	4340	8980	8700	15400	3650	1300	1390		
21	4520	4900	5480	4900	5480	4340	8980	8440	14000	3650	1300	1210		
22	4340	5090	5280	4900	5680	4520	8190	7700	14000	3320	1300	957		
23	4900	5880	5480	4520	5880	4520	7460	7700	14000	3320	1590	1300		
24	4900	4900	5480	4520	5880	5090	6980	6980	14000	3320	1120	1300		
25	4710	3650	5280	4340	6090	5090	6090	6750	13700	2700	1390	640		
26	4340	3320	5090	4340	5880	6300	6520	6300	13000	2700	1700	716		
27	4710	3820	5090	4340	5880	6980	6300	5880	12300	2700	1390	716		
28	4710	3990	5280	4340	5880	7460	6750	5280	11700	2850	1040	795		
29	4710	4160	5280	4340	5880	8980	6520	5480	11100	2440	1480	1210		
30	4710	3480	5280	4520	---	8440	6980	4900	9850	2310	1300	716		
31	4520	---	4900	4520	---	8190	---	4710	---	2440	957	---		
TOTAL	119740	127020	148260	143240	146380	167730	251410	252440	345710	136530	53637	39740		
MEAN	3863	4234	4783	4621	5048	5411	8380	8143	11520	4404	1730	1325		
MAX	4900	5880	5480	5090	6090	8980	10400	12300	17200	9260	2700	4160		
MIN	2310	3320	3650	4340	4340	4160	6090	4710	3650	2310	957	640		
CFSM	.33	.37	.41	.40	.44	.47	.72	.70	.99	.38	.15	.11		
IN.	.38	.41	.48	.46	.47	.54	.81	.81	1.11	.44	.17	.13		
AC-FT	237500	251900	294100	284100	290300	332700	498700	500700	685700	270800	106400	78820		
CAL YR 1983	TOTAL	1918100	MEAN	5255	MAX	13000	MIN	1940	CFSM	.45	IN	6.15	AC-FT	3805000
WTR YR 1984	TOTAL	1931837	MEAN	5278	MAX	17200	MIN	640	CFSM	.46	IN	6.20	AC-FT	3832000

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.

REMARKS.--Letter K indicates non-ideal colony count.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 , 1983												
19...	1000	--	4310	285	292	8.0	7.7	8.0	7.0	1.6	740	12.0
DEC												
20...	1300	4520	--	150	311	7.7	7.4	-29.0	.5	2.0	731	10.0
FEB , 1984												
23...	0950	5880	--	285	326	6.8	7.4	2.5	.5	5.0	722	9.6
APR												
19...	1100	--	8960	240	238	7.6	7.9	16.0	10.0	4.0	730	13.2
JUN												
26...	1200	--	12700	300	254	8.1	7.0	25.0	22.0	6.5	716	6.6
AUG												
24...	1130	--	1110	330	317	7.3	8.1	26.5	22.5	4.5	736	6.7

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 , 1983											
19...	102	150	K440	38	13	5.5	1.6	145	8.7	4.1	.10
DEC											
20...	72	160	53	44	12	6.3	1.8	152	9.1	4.7	.10
FEB , 1984											
23...	70	600	400	41	14	5.5	1.8	159	7.4	4.5	.10
APR											
19...	122	110	71	32	9.7	3.8	1.6	116	7.8	3.9	<.10
JUN											
26...	81	110	1400	34	10	3.7	1.2	122	6.0	4.0	.10
AUG											
24...	80	K9	59	39	15	6.5	1.4	157	10	5.5	.10

MISSISSIPPI RIVER MAIN STEM

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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- PENDEDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT , 1983											
19...	9.4	171	.25	.080	.50	.040	.010	.020	6	70	43
DEC											
20...	11	211	.25	.090	3.4	.020	.020	<.010	2	24	91
FEB , 1984											
23...	11	210	.36	.210	.40	.020	<.010	.020	1	16	80
APR											
19...	8.2	170	.11	.030	.60	<.010	<.010	<.010	10	242	98
JUN											
26...	9.4	176	.18	.020	1.6	.040	.030	.020	15	514	98
AUG											
24...	9.5	203	<.10	.050	1.2	.040	<.010	.020	--	--	--

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 , 1984											
23...	0950	<10	1	53	<.5	<1	<1	<3	<1	140	3
APR											
19...	1100	<10	1	43	<.5	<1	<1	<3	1	210	1
JUN											
26...	1200	20	2	51	<.5	<1	<1	<3	2	220	6
AUG											
24...	1130	--	3	55	<.5	<1	<1	<3	1	9	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)
FEB , 1984										
23...	11	57	.2	<10	<1	<1	<1	83	<6	7
APR										
19...	<4	34	.1	<10	2	<1	<1	62	<6	5
JUN										
26...	9	27	.1	<10	1	<1	3	71	<6	25
AUG										
24...	11	11	.5	<10	1	<1	<1	91	<6	19

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 1984 (discontinued).

GAGE.--Water-stage recorder.

REMARKS.--Records good except those for periods of no gage height record, Oct. 14-31, Mar 1-22, and Apr. 29 to May 14, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,420 ft³/s (40.2 m³/s) June 15, 16, 1984, gage height, 10.84 ft (3.304 m), minimum discharge, 2.1 ft³/s (0.059 m³/s) Sept. 23, 1984; minimum gage height, 3.38 ft (1.030 m) Nov. 12, 1982.

EXTREMES FOR CURRENT PERIOD.--Maximum discharge, 1,420 ft³/s (40.2 m³/s) June 15-16, gage height, 10.84 ft (3.304 m); minimum discharge, 2.1 ft³/s (0.059 m³/s) Sept. 23, gage height, 3.84 ft (1.170 m); minimum gage height, 3.78 ft (1.152 m) Oct. 9, 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	131				590	281	805	162	108	22	12
2	21	---				547	299	805	168	106	22	9.3
3	21	---				500	306	680	168	108	21	9.6
4	20	---				435	310	540	168	104	21	9.3
5	19	---				375	313	425	178	107	21	9.9
6	18	---				320	289	333	190	115	21	11
7	18	---				270	247	258	193	127	26	12
8	19	---				235	225	206	210	138	30	12
9	16	---				200	211	165	243	151	29	13
10	17	---				178	206	133	308	164	27	12
11	26	---				155	202	112	446	164	26	13
12	25	---				138	202	93	815	135	24	16
13	25	---				122	173	80	1130	103	23	16
14	58	---				108	133	69	1300	79	22	14
15	137	---				97	110	59	1410	62	22	11
16	176	---				87	98	50	1410	49	21	9.9
17	169	---				79	90	51	1230	44	20	10
18	168	---				73	85	53	1100	38	18	11
19	165	---				73	89	54	886	34	18	11
20	158	---				74	127	55	678	33	17	13
21	148	---				78	191	57	471	30	19	14
22	153	---				82	210	67	326	28	20	6.6
23	118	---				87	212	85	259	30	20	2.5
24	80	---				94	179	104	203	29	19	3.0
25	54	---				95	146	123	162	28	20	3.1
26	36	---				79	154	133	133	28	20	3.0
27	25	---				61	252	142	114	28	21	4.2
28	64	---				55	371	148	99	27	21	5.9
29	148	---				115	525	151	99	26	22	7.4
30	174	---				175	700	152	106	26	22	9.8
31	168	---				234	---	157	---	25	19	---
TOTAL	2464	---				5811	6936	6345	14365	2274	674	294.5
MEAN	79.5	---				187	231	205	479	73.4	21.7	9.82
MAX	176	---				590	700	805	1410	164	30	16
MIN	16	---				55	85	50	99	25	17	2.5
CFSM	.53	---				1.24	1.53	1.36	3.17	.49	.14	.07
IN.	.61	---				1.43	1.71	1.56	3.54	.56	.17	.07
AC-FT	4890	---				11530	13760	12590	28490	4510	1340	584

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 mi² (1,593 km²).

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.--56 years (water years 1912-17, 1935-84), 264 ft³/s (7.476 m³/s), 5.83 in/yr (148 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,360 ft³/s (208 m³/s) Apr. 16, 1965, gage height, 10.86 ft (3.310 m); minimum, 3.6 ft³/s (0.102 m³/s) July 31, 1934.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,980 ft³/s (141 m³/s) June 16, gage height, 9.87 ft (3.008 m); minimum, 143 ft³/s (4.05 m³/s) Sept. 22, 23, gage height, 1.02 ft (0.311 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	232	462	331	285	227	1400	954	1430	300	523	208	170
2	233	472	330	280	227	1780	959	1570	300	484	210	170
3	241	480	329	275	227	1450	961	1740	295	463	215	170
4	254	465	327	272	227	1280	971	1720	290	452	216	172
5	267	424	327	270	227	1030	965	1580	290	443	224	166
6	271	374	327	268	227	956	935	1330	310	421	219	161
7	275	339	327	263	227	888	889	1230	350	399	235	160
8	267	323	327	260	227	775	823	1110	400	386	262	165
9	257	329	327	255	227	703	746	1010	439	381	259	165
10	258	342	327	252	230	662	677	958	520	403	254	160
11	323	344	327	250	239	614	621	992	700	434	253	156
12	355	340	327	248	246	564	608	958	2300	453	239	174
13	363	342	327	245	250	516	617	917	2470	468	223	210
14	374	351	326	241	255	475	616	826	3050	469	209	209
15	413	355	325	240	270	449	613	729	4380	442	201	202
16	489	352	324	239	280	434	617	646	4940	398	191	193
17	534	355	323	238	290	415	609	574	4720	364	184	184
18	552	367	322	237	310	379	564	512	4120	323	178	176
19	564	394	321	236	328	363	517	469	3440	292	169	171
20	603	437	320	235	350	352	482	430	2810	268	164	164
21	627	446	318	232	400	340	461	403	2360	251	175	157
22	631	446	316	229	450	345	445	404	2040	237	183	148
23	646	437	314	227	500	345	438	405	1790	233	182	144
24	668	382	312	227	570	377	438	401	1510	234	181	184
25	678	375	310	227	640	450	435	399	1260	227	188	226
26	658	365	300	227	740	525	500	384	1060	222	191	231
27	600	356	298	227	850	626	604	351	909	217	198	249
28	522	350	296	227	1000	704	605	340	790	211	201	281
29	474	342	294	227	1140	781	654	325	676	203	191	315
30	466	335	292	227	---	850	1010	310	583	195	182	327
31	459	---	290	227	---	921	---	300	---	198	173	---
TOTAL	13554	11481	9861	7593	11381	21749	20334	24753	49402	10694	6358	5760
MEAN	437	383	318	245	392	702	678	798	1647	345	205	192
MAX	678	480	331	285	1140	1780	1010	1740	4940	523	262	327
MIN	232	323	290	227	227	340	435	300	290	195	164	144
CFSM	.71	.62	.52	.40	.64	1.14	1.10	1.30	2.68	.56	.33	.31
IN.	.82	.69	.60	.46	.69	1.32	1.23	1.50	2.99	.65	.38	.35
AC-FT	26880	22770	19560	15060	22570	43140	40330	49100	97990	21210	12610	11420
CAL YR 1983	TOTAL	162710	MEAN 446	MAX 2690	MIN 128	CFSM .73	IN 9.84	AC-FT 322700				
WTR YR 1984	TOTAL	192920	MEAN 527	MAX 4940	MIN 144	CFSM .86	IN 11.67	AC-FT 382100				

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 mi² (464 km²), 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.--35 years, 58.5 ft³/s (1.657 m³/s), 4.44 in/yr (133 mm/yr); median of yearly mean discharges, 45 ft³/s (1.27 m³/s), 3.41 in/yr (87 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 509 ft³/s (14.4 m³/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, 387 ft³/s (11.0 m³/s) June 23; maximum gage height, 5.49 ft (1.673 m) June 23, 24; minimum discharge, 48 ft³/s (1.36 m³/s) Sept. 21, gage height, 2.80 ft (0.853 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	149	147	167	118	91	140	190	253	134	337	108	59
2	148	147	168	117	91	141	192	243	130	330	103	59
3	143	143	168	115	90	143	192	235	124	330	98	58
4	138	140	164	114	94	149	196	239	121	322	96	57
5	135	144	164	112	97	161	198	240	129	317	104	55
6	133	157	164	110	98	160	206	240	187	300	100	53
7	131	156	164	110	98	159	209	289	205	284	96	54
8	129	155	164	110	96	166	214	292	257	272	93	55
9	126	161	164	110	94	161	221	268	261	263	89	55
10	131	162	164	110	92	161	227	248	297	258	84	54
11	155	157	160	110	89	163	235	239	299	249	80	53
12	156	152	160	110	91	161	255	236	344	240	76	57
13	154	152	159	108	93	162	274	233	328	229	74	58
14	154	154	159	106	95	164	267	228	308	219	73	57
15	151	154	160	104	99	167	266	221	317	212	70	55
16	151	151	158	102	104	159	268	210	335	203	68	54
17	150	148	156	100	110	161	278	207	337	200	67	53
18	157	147	154	99	112	162	274	207	334	189	65	53
19	182	154	150	98	117	164	269	204	327	180	63	53
20	184	180	148	98	119	165	264	198	328	172	61	53
21	180	189	142	97	123	164	255	198	342	161	68	51
22	175	182	138	97	132	166	248	201	362	152	66	51
23	170	173	134	96	137	168	242	198	386	151	62	53
24	166	185	130	92	139	187	239	193	382	146	59	81
25	164	200	126	88	141	201	242	189	374	139	68	81
26	162	166	124	89	140	200	243	183	373	135	68	77
27	158	159	122	90	139	199	246	173	369	130	66	74
28	156	165	121	90	138	196	260	164	364	124	66	73
29	152	171	120	91	139	192	268	154	355	119	65	72
30	149	171	120	91	---	189	262	147	346	114	63	72
31	147	---	118	91	---	189	---	140	---	111	61	---
TOTAL	4736	4822	4610	3173	3198	5220	7200	6670	8755	6588	2380	1790
MEAN	153	161	149	102	110	168	240	215	292	213	76.8	59.7
MAX	184	200	168	118	141	201	278	292	386	337	108	81
MIN	126	140	118	88	89	140	190	140	121	111	59	51
CFSM	.86	.90	.83	.57	.62	.94	1.34	1.20	1.63	1.19	.43	.33
IN.	.98	1.00	.96	.66	.66	1.08	1.50	1.39	1.82	1.37	.49	.37
AC-FT	9390	9560	9140	6290	6340	10350	14280	13230	17370	13070	4720	3550
CAL YR 1983	TOTAL	52032	MEAN 143	MAX 485	MIN 45	CFSM .80	IN 10.81	AC-FT	103200			
WTR YR 1984	TOTAL	59142	MEAN 162	MAX 386	MIN 51	CFSM .91	IN 12.29	AC-FT	117300			

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 mi² (6,530 km²), 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.--59 years (water years 1910-17, 1931, 1935-84), 687 ft³/s (19.46 m³/s), 3.70 in/yr (94 mm/yr); median of yearly mean discharges, 516 ft³/s (14.6 m³/s), 2.78 in/yr (71 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,400 ft³/s (634 m³/s) Apr. 16, 1965, gage height, 19.27 ft (5.874 m) from floodmark; minimum, 1.8 ft³/s (0.051 m³/s) Nov. 15, 1936, gage height, 1.05 ft (0.320 m), caused by ice jam upstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,620 ft³/s (216 m³/s) June 22, gage height, 11.72 ft (3.572 m); minimum discharge, 303 ft³/s (8.58 m³/s) Sept. 23-24, gage height, 2.66 ft (0.811 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN VALUES										
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	SEP
1	536	1300	1210	850	560	2430	6430	3540	1850	5280	1060
2	550	1300	1250	835	555	2580	6750	3700	1750	4950	1020
3	610	1280	1300	820	550	2800	6830	3910	1660	4640	975
4	689	1250	1350	790	540	2770	6740	4150	1580	4340	970
5	737	1210	1400	785	530	2800	6520	4390	1580	4060	1160
6	744	1170	1430	770	520	3000	6230	4480	1550	3810	1060
7	749	1140	1450	750	515	2910	5940	4600	1570	3570	1220
8	751	1080	1440	735	510	2800	5670	4610	1710	3350	1330
9	734	1070	1400	720	495	2740	5390	4540	1820	3160	1380
10	738	1090	1360	710	485	2700	5120	4460	2140	3060	1370
11	832	1090	1310	700	480	2500	4860	4320	2420	2960	1340
12	922	1070	1290	690	490	2400	4690	4170	2980	2890	1290
13	977	1050	1260	680	500	2400	4580	4070	3500	2780	1230
14	1000	1050	1230	670	520	2330	4510	3960	4020	2630	1180
15	1040	1060	1200	660	550	2200	4500	3850	4610	2490	1120
16	1100	1070	1180	655	580	2300	4510	3730	5210	2410	1070
17	1140	1070	1160	650	620	2250	4520	3590	5810	2330	1010
18	1160	1070	1140	640	690	2200	4570	3460	6410	2200	941
19	1170	1100	1120	630	780	2200	4590	3330	6890	2080	875
20	1190	1180	1100	620	900	2200	4490	3210	7230	1960	799
21	1210	1290	1070	615	1050	2190	4280	3080	7430	1850	750
22	1230	1390	1040	610	1250	2190	4070	2980	7550	1750	710
23	1240	1460	1010	600	1500	2190	3860	2830	7600	1680	666
24	1260	1460	990	590	1750	2180	3670	2710	7500	1590	620
25	1280	1450	970	585	1950	2370	3470	2600	7310	1510	615
26	1300	1380	960	580	2100	2740	3380	2460	7030	1430	616
27	1330	1310	951	575	2200	3010	3330	2350	6680	1360	632
28	1340	1250	910	570	2250	3420	3240	2240	6330	1290	626
29	1350	1180	890	570	2260	4320	3190	2140	5970	1230	597
30	1340	1200	870	565	---	5300	3380	2040	5620	1160	563
31	1320	---	860	565	---	5930	---	1950	---	1110	528
TOTAL	31569	36070	36101	20785	27680	86350	143310	107450	135310	80910	29323
MEAN	1018	1202	1165	670	954	2785	4777	3466	4510	2610	946
MAX	1350	1460	1450	850	2260	5930	6830	4610	7600	5280	1380
MIN	536	1050	860	565	480	2180	3190	1950	1550	1110	528
CFSM	.40	.48	.46	.27	.38	1.11	1.90	1.38	1.79	1.04	.38
IN.	.47	.53	.53	.31	.41	1.27	2.12	1.59	2.00	1.19	.43
AC-FT	62620	71540	71610	41230	54900	171300	284300	213100	268400	160500	58160

CAL YR 1983 TOTAL 651808 MEAN 1786 MAX 6060 MIN 405 CFSM .71 IN 9.62 AC-FT 1293000
WTR YR 1984 TOTAL 747562 MEAN 2043 MAX 7600 MIN 308 CFSM .81 IN 11.04 AC-FT 1483000

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, 1,252.62 ft (381.799 m) from recorded range in stage, occurred sometime during period May 31 to July 31, affected by wind action and seiche action; maximum daily recorded, 1,251.85 ft (381.564 m) May 16, but may have been more during period of no gage-height record May 31 to July 31; minimum, 1,250.89 ft (381.271 m), from recorded range in stage, occurred sometime during the period Oct. 20 to Dec. 20, affected by wind action and seiche action; minimum daily recorded, 1,251.04 ft (381.317 m) Sept. 23, but may have been less during period of no gage-height record Oct. 20 to Dec. 19.

MONTHEND ELEVATION, IN FEET NGVD, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

Oct. 19	1,251.33	Feb. 29	1,251.29	May 30	1,251.73
Dec. 31	1,251.35	Mar. 31	1,251.41	Aug. 1	1,251.77
Jan. 31	1,251.30	Apr. 18	1,251.53	Sept.30	1,251.16

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 mi² (3,520 km²), 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--52 years (water years 1931, 1934-84), 612 ft³/s (17.33 m³/s), 6.11 in/yr (155 mm/yr).

EXTREMES FOR PERIOD OF RECORD--Maximum discharge, 10,100 ft³/s (286 m³/s) Apr. 20, 1965, Apr. 13, 1969; maximum gage height, 11.63 ft (3.545 m) Apr. 13, 1969; minimum discharge, 29 ft³/s (0.82 m³/s) Aug. 18, 1934, gage height, 1.91 ft (0.582 m).

EXTREMES FOR CURRENT YEAR--Maximum discharge, 8,120 ft³/s (230 m³/s) June 18, gage height, 10.38 ft (3.164 m); minimum, 278 ft³/s (7.87 m³/s) Sept. 24, gage height, 2.68 ft (0.817 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	383	776	960	501	470	1650	2210	2000	862	1950	642	345
2	400	733	955	500	465	1900	2410	2370	828	1710	634	351
3	430	689	940	500	460	1900	2550	2680	780	1530	625	359
4	475	649	920	500	457	1700	2590	2910	753	1390	614	350
5	522	623	900	500	453	1580	2560	3050	807	1290	600	338
6	542	601	880	500	450	1450	2500	3050	884	1260	589	341
7	538	576	860	500	449	1330	2420	3020	971	1260	594	336
8	521	563	840	500	448	1250	2340	2850	1130	1240	583	336
9	494	570	820	500	447	1150	2230	2690	1270	1180	564	329
10	486	585	790	500	446	1100	2100	2490	1500	1240	541	318
11	593	595	770	499	450	1020	1950	2370	1730	1260	522	309
12	696	610	750	498	460	970	1830	2370	2430	1200	501	345
13	799	631	725	497	480	910	1730	2460	3430	1190	482	401
14	934	644	700	496	500	850	1640	2440	4880	1240	466	417
15	1060	648	680	495	540	800	1590	2340	6180	1240	454	430
16	1140	648	660	494	580	750	1600	2170	7390	1160	441	420
17	1180	648	645	493	636	700	1660	2000	8010	1060	422	382
18	1150	648	630	492	680	660	1720	1830	8030	965	412	365
19	1090	664	610	491	740	630	1740	1670	7680	906	402	341
20	1040	712	590	490	830	610	1660	1510	6890	870	385	319
21	1020	766	575	489	900	600	1500	1380	5990	830	396	299
22	1070	822	565	488	1000	610	1330	1330	5110	800	401	283
23	1160	941	545	487	1070	647	1180	1290	4360	770	391	282
24	1240	980	530	486	1150	689	1060	1280	3770	740	387	336
25	1290	1000	520	485	1250	760	970	1290	3340	710	383	401
26	1280	870	512	483	1300	897	933	1280	3010	684	376	433
27	1210	700	507	481	1370	1110	1040	1220	2770	665	394	623
28	1110	524	505	479	1420	1370	1210	1130	2600	641	393	821
29	997	727	502	477	1480	1590	1390	1040	2400	625	380	919
30	904	935	502	475	---	1780	1680	969	2200	627	366	926
31	829	---	501	473	---	1990	---	903	---	641	354	---
TOTAL	26583	21078	21389	15249	21381	34953	53323	61382	101985	32874	14694	12455
MEAN	858	703	690	492	737	1128	1777	1980	3400	1060	474	415
MAX	1290	1000	960	501	1480	1990	2590	3050	8030	1950	642	926
MIN	383	524	501	473	446	600	933	903	753	625	354	282
CFSM	.63	.52	.51	.36	.54	.83	1.31	1.46	2.50	.78	.35	.31
IN.	.73	.58	.59	.42	.58	.96	1.46	1.68	2.79	.90	.40	.34
AC-FT	52730	41810	42430	30250	42410	69330	105800	121800	202300	65210	29150	24700
CAL YR 1983	TOTAL	338976	MEAN	929	MAX	5890	MIN	307	CFSM	.68	IN	9.27
WTR YR 1984	TOTAL	417346	MEAN	1140	MAX	8030	MIN	282	CFSM	.84	IN	11.42
									AC-FT	672400		
									AC-FT	827800		

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 mi² (220 km²).

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.--6 years, 29.8 ft³/s (0.844 m³/s), 4.77 in/yr (121 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 414 ft³/s (11.7 m³/s) Apr.3, 1982, gage height, 9.23 ft (2.813 m); minimum daily, 1.3 ft³/s (0.037 m³/s) Feb. 5-20, 1982; minimum gage height, 2.86 ft (0.872 m) Feb. 24, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 341 ft³/s (9.66 m³/s) Feb.25, gage height, 8.65 ft (2.637 m); minimum, 2.7 ft³/s (0.076 m³/s) Sept. 5, 11, gage height, 3.42 ft (1.042 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42	21	48	21	14	249	218	85	27	46	4.1	3.1
2	26	21	50	20	13	209	200	98	24	42	4.1	3.1
3	19	20	48	19	12	186	180	107	22	37	3.9	3.0
4	15	29	47	18	11	139	160	122	22	33	3.7	3.0
5	13	22	46	17	11	130	142	144	29	29	3.9	2.8
6	10	19	43	17	10	104	126	149	32	24	3.7	2.8
7	9.0	17	41	17	9.8	100	112	191	37	22	6.7	2.9
8	8.6	15	41	17	9.5	90	100	234	54	20	9.1	3.0
9	7.9	17	40	17	9.3	80	91	251	60	19	18	2.9
10	7.3	21	38	17	9.0	70	82	266	78	20	12	2.8
11	12	21	37	17	8.7	63	76	256	92	20	8.2	2.8
12	13	21	37	17	11	58	76	230	106	19	5.8	4.6
13	14	21	37	17	14	54	77	206	121	17	4.9	4.7
14	14	23	36	17	17	50	76	187	133	16	4.3	5.0
15	14	26	36	17	21	46	73	160	149	15	4.0	4.6
16	16	24	36	17	27	46	70	140	153	14	3.8	4.2
17	17	24	35	17	35	43	67	125	163	13	4.3	3.7
18	17	25	35	17	46	41	64	110	194	11	4.2	3.7
19	18	30	35	17	65	40	60	95	181	11	3.7	4.2
20	22	42	34	17	119	38	57	85	166	9.5	3.6	4.3
21	26	47	33	17	162	38	54	76	149	8.5	3.8	5.5
22	29	47	32	17	202	39	50	71	137	8.0	3.6	5.6
23	29	47	30	17	243	40	47	63	131	7.8	3.4	5.8
24	44	47	29	17	297	51	44	57	116	7.0	3.4	13
25	37	47	28	17	315	68	42	53	101	6.5	3.6	28
26	32	46	27	17	315	94	42	48	89	6.4	3.7	19
27	27	45	26	17	317	138	49	44	78	5.8	3.8	13
28	24	44	25	17	265	179	52	41	67	5.2	3.6	9.6
29	22	44	24	17	286	212	52	37	58	4.8	3.6	9.1
30	21	45	23	16	---	224	64	33	51	4.4	3.2	10
31	21	---	22	15	---	228	---	30	---	4.4	3.1	---
TOTAL	626.8	918	1099	534	2874.3	3147	2603	3794	2820	506.3	154.8	189.8
MEAN	20.2	30.6	35.5	17.2	99.1	102	86.8	122	94.0	16.3	4.99	6.33
MAX	44	47	50	21	317	249	218	266	194	46	18	28
MIN	7.3	15	22	15	8.7	38	42	30	22	4.4	3.1	2.8
CFSM	.24	.36	.42	.20	1.17	1.20	1.02	1.44	1.11	.19	.06	.07
IN.	.27	.40	.48	.23	1.26	1.38	1.14	1.66	1.24	.22	.07	.08
AC-FT	1240	1820	2180	1060	5700	6240	5160	7530	5590	1000	307	376
CAL YR 1983	TOTAL	16761.7	MEAN	45.9	MAX	397	MIN	3.9	CFSM	.54	IN	7.34
WTR YR 1984	TOTAL	19267.0	MEAN	52.6	MAX	317	MIN	2.8	CFSM	.62	IN	8.44
	AC-FT	33250							AC-FT	28220		

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 mi² (49,500 km²), 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 km³). Diurnal regulation caused by dam above station.

AVERAGE DISCHARGE.--53 years, 7,728 ft³/s (218.9 m³/s), 5.49 in/yr (139 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 91,000 ft³/s (2,580 m³/s) Apr. 17, 1965, gage height, 19.53 ft (5.953 m); minimum, 529 ft³/s (15.0 m³/s) Aug. 29, 1976, gage height, 0.04 ft (0.012 m), result of regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 46,600 ft³/s (1,320 m³/s) June 17, gage height, 12.52 ft (3.816 m); maximum gage height, 13.34 ft (4.066 m) Dec. 12, (backwater from ice); minimum discharge, 2,250 ft³/s (71.4 m³/s) Sept. 23, gage height, 1.55 ft (0.472 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5130	9430	9030	8260	6820	16500	21500	18000	9610	21500	5920	3330
2	5260	9160	7990	8080	7060	16500	23100	18200	9390	20000	6230	3330
3	5540	8850	7800	7930	6800	16000	23300	18100	8950	18500	5790	3220
4	5700	8690	7980	7710	6600	16900	22500	18600	7930	17900	5610	3200
5	5750	8140	8470	7800	6020	13800	23000	19000	8710	16400	5530	3170
6	5500	8210	8410	8210	5570	14400	22800	18800	9420	15100	5950	3300
7	6150	8260	9100	7590	5740	12800	21600	19200	9810	14500	6210	3240
8	6460	8370	8490	7730	5800	11000	21100	20300	11600	13700	6190	3130
9	5070	7930	8300	7660	4840	11200	20500	21700	13500	13000	5830	3080
10	5540	8310	8530	7690	5250	10500	20600	23600	17700	13600	5820	2880
11	6800	8560	8210	7170	6020	11200	18400	23200	23100	13200	5490	2940
12	7570	8260	10100	7180	5700	10800	18200	21500	29200	12600	5360	3400
13	7890	8110	8750	7520	6040	10500	18800	23400	35200	12000	5540	3950
14	7870	8600	9770	7840	6740	10400	19900	22500	38800	11600	5410	3560
15	8370	8290	9710	7400	7470	10800	19700	21700	42800	10900	4940	3530
16	8180	8370	8330	7190	8500	10300	20100	21000	44500	10600	4730	5710
17	9840	8410	7460	7230	8680	10100	20000	19400	45600	9960	4600	5530
18	8900	8460	7090	6930	9450	10100	19800	18900	45000	10100	4460	3860
19	9670	7800	7320	6800	10500	9900	19300	17600	43300	9510	4050	3790
20	9990	8160	7850	6960	10300	10400	18800	16600	40800	9190	3620	3330
21	10500	10400	8660	6680	11300	10200	18500	16000	38800	8650	3860	3060
22	9890	10600	8800	7020	12300	9940	17400	15900	36800	8190	3590	3160
23	10100	11000	8360	7340	13200	10300	16800	14800	35100	8420	3630	2990
24	10500	10500	8260	7210	13600	10900	15000	14700	33000	7760	3480	3430
25	11500	9850	8280	7260	14700	12800	14900	14100	31400	7700	3670	4260
26	10500	8780	8780	6670	14700	14000	15100	13100	30100	7100	3570	4580
27	10300	8510	8740	7000	15200	16400	14900	12700	28300	7040	3700	4630
28	10600	10000	8480	6800	15900	16900	14600	11900	26700	6660	4130	5160
29	9580	8730	8110	6820	16500	18400	15900	11200	24900	6240	3550	5600
30	9250	8910	8130	6420	---	20100	16600	10900	23500	6100	3080	5290
31	9840	---	8200	6660	---	21200	---	9960	---	6040	3230	---
TOTAL	253740	265650	261490	226760	267300	405240	572700	546560	803520	353760	146770	113640
MEAN	8185	8855	8435	7315	9217	13070	19090	17630	26780	11410	4735	3788
MAX	11500	11000	10100	8260	16500	21200	23300	23600	45600	21500	6230	5710
MIN	5070	7800	7090	6420	4840	9900	14600	9960	7930	6040	3080	2880
CFSM	.43	.46	.44	.38	.48	.68	1.00	.92	1.40	.60	.25	.20
IN.	.49	.52	.51	.44	.52	.79	1.12	1.06	1.56	.69	.29	.22
AC-FT	503300	526900	518700	449800	530200	803800	1136000	1084000	1594000	701700	291100	225400
CAL YR 1983	TOTAL	3922670	MEAN	10750	MAX	30800	MIN	4360	CFSM	.56	IN	7.64
WTR YR 1984	TOTAL	4217130	MEAN	11520	MAX	45600	MIN	2880	CFSM	.60	IN	8.21
									AC-FT		7781000	
									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 mi² (50,800 km²), approximately.

PERIOD OF RECORD.--Water years 1963-1967, 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 occasionally for the winter period.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES (water years 1976-77, 1979-80, 1982-84): 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, 1982, and 1984.

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, 29.0° Aug. 6, 15, 16; minimum daily, 0.0°C Mar. 14.

SEDIMENT CONCENTRATION: Maximum daily mean, 144 mg/L Mar. 31; minimum daily mean, 1 mg/L Nov. 16.

SEDIMENT LOADS: Maximum daily, 11,300 tons (10,300 tonnes) June 17; minimum daily, 23 tons (21 tonnes) Nov. 16.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	10.0				---	---	9.0	22.0	25.0	27.0	20.0
2	21.0	11.0				---	---	10.0	20.0	25.0	26.0	---
3	18.0	9.0				---	---	12.0	23.0	26.0	27.0	18.0
4	17.0	8.0				---	7.0	12.0	---	25.0	26.0	19.0
5	17.0	7.0				---	8.0	12.0	22.0	25.0	27.0	21.0
6	16.0	9.0				---	9.0	13.0	24.0	23.0	29.0	19.0
7	14.0	9.0				---	9.0	12.0	---	23.0	27.0	19.0
8	---	---				---	9.0	10.0	22.0	23.0	26.0	17.0
9	14.0	---				---	9.0	13.0	22.0	25.0	---	17.0
10	12.0	4.0				---	8.0	14.0	20.0	23.0	26.0	19.0
11	12.0	4.0				---	7.5	15.0	---	25.0	23.0	19.0
12	11.0	4.0				---	8.0	14.0	20.0	26.0	27.0	19.0
13	10.0	---				---	8.0	13.0	20.0	27.0	27.0	---
14	11.0	4.0				.0	7.0	---	---	---	28.0	18.0
15	10.0	4.0				---	9.0	---	19.5	25.0	29.0	---
16	10.0	4.0				---	10.0	---	19.0	23.0	29.0	---
17	11.0	---				---	11.0	---	20.0	22.0	28.0	18.0
18	11.0	5.0				---	11.0	18.0	21.0	24.0	26.0	20.0
19	10.0	5.0				---	12.0	18.0	---	25.0	27.0	22.0
20	10.0	5.0				---	11.0	20.0	22.0	26.0	26.0	21.0
21	10.0	4.0				---	12.0	18.0	22.0	24.0	26.0	21.0
22	10.0	2.0				---	11.0	19.0	22.0	27.0	21.0	---
23	10.0	---				---	12.0	19.0	21.0	26.0	24.0	17.0
24	10.0	---				---	13.0	---	22.0	26.0	23.0	15.0
25	10.0	---				---	13.0	---	23.0	25.0	21.0	11.0
26	---	---				---	15.0	---	23.0	24.0	23.0	12.0
27	11.0	---				---	13.0	---	23.0	26.0	26.0	12.0
28	---	---				---	10.0	16.0	24.0	24.0	27.0	10.0
29	9.0	---				---	9.0	18.0	24.0	26.0	26.0	---
30	10.0	---				---	8.0	19.0	24.0	26.0	25.0	13.0
31	9.0	---				---	---	21.0	---	26.0	24.0	---

MISSISSIPPI RIVER MAIN STEM

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

RADIOCHEMICAL ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	TRITIUM IN WATER MOLE- CULES (TU) (07012)	TRITIUM WATER MOLE- CULES COUNT ERROR (TU) (07013)
OCT 04...	13:15	38.8	1.7
DEC 21...	13:00	41.6	1.8
MAR 14...	12:46	38.3	1.8
APR 11...	08:48	35.4	1.4
JUL 26...	10:37	39.0	1.5

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 11...	18700	58
JUN 15...	41000	57

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	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)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
OCT 04...	5600	3	1	2	32	77	95	98	100	--
APR 11...	18700	3	--	2	35	73	87	93	98	100

MISSISSIPPI RIVER MAIN STEM

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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	9	125	6	153	5	122	5	112	5	92	40	1780
2	9	128	7	173	5	108	5	109	5	95	40	1780
3	8	120	8	191	5	105	5	107	5	92	40	1730
4	8	123	6	141	5	108	5	104	5	89	38	1730
5	9	140	5	110	5	114	5	105	5	81	36	1340
6	10	148	5	111	5	114	5	111	5	75	34	1320
7	12	199	5	112	5	123	5	102	5	77	32	1110
8	12	209	4	90	5	115	5	104	5	78	30	891
9	11	151	4	86	5	112	5	103	5	65	28	847
10	7	105	4	90	5	115	5	104	5	71	26	737
11	9	165	4	92	5	111	5	97	7	114	24	726
12	13	266	3	67	5	136	5	97	9	139	23	671
13	12	256	3	66	5	118	5	102	11	179	22	624
14	10	212	4	93	5	132	5	106	13	237	22	618
15	9	203	2	45	5	131	5	100	15	303	22	642
16	10	221	1	23	5	112	5	97	17	390	22	612
17	25	664	2	45	5	101	5	98	19	445	22	600
18	23	553	3	69	5	96	5	94	21	536	22	600
19	22	574	4	84	5	99	5	92	23	652	22	588
20	24	647	4	88	5	106	5	94	25	695	22	618
21	36	1020	5	140	5	117	5	90	27	824	22	606
22	30	801	5	143	5	119	5	95	29	963	22	590
23	22	600	5	148	5	113	5	99	31	1100	22	612
24	18	510	5	142	5	112	5	97	33	1210	22	647
25	20	621	5	133	5	112	5	98	35	1390	31	1070
26	20	567	5	119	5	119	5	90	37	1470	64	2420
27	15	417	5	115	5	118	5	94	38	1560	42	1860
28	11	315	5	135	5	114	5	92	38	1630	70	3190
29	9	233	5	118	5	109	5	92	39	1740	107	5320
30	9	225	5	120	5	110	5	87	---	---	129	7000
31	9	239	---	---	5	111	5	90	---	---	144	8240
TOTAL	---	10757	---	3242	---	3532	---	3062	---	16392	---	51119
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	142	8240	36	1750	39	1010	50	2900	18	288	20	180
2	115	7170	32	1570	37	938	60	3240	18	303	20	180
3	88	5540	29	1420	34	822	56	2800	18	281	20	174
4	70	4250	26	1310	33	707	42	2030	18	273	20	173
5	59	3660	22	1130	29	682	28	1240	18	269	20	171
6	49	3020	20	1020	30	763	24	978	18	289	20	178
7	42	2450	31	1610	37	980	24	940	18	302	20	175
8	36	2050	31	1700	55	1720	23	851	19	318	20	169
9	31	1720	26	1520	54	1970	22	772	19	299	19	158
10	26	1450	23	1470	54	2580	22	808	19	299	17	132
11	24	1190	23	1440	58	3620	21	748	19	282	16	127
12	19	934	24	1390	67	5280	21	714	19	275	16	147
13	26	1320	25	1580	77	7320	21	680	19	284	16	171
14	23	1240	26	1580	85	8900	20	626	19	278	16	154
15	18	957	27	1580	86	9940	20	589	19	253	16	152
16	19	1030	29	1640	91	10900	20	572	19	243	16	247
17	20	1080	30	1570	92	11300	20	538	19	236	16	239
18	22	1180	32	1630	87	10600	20	545	19	229	17	177
19	23	1200	32	1520	81	9470	20	514	19	208	22	225
20	24	1220	34	1520	71	7820	20	496	19	186	28	252
21	24	1200	34	1470	62	6500	21	490	19	198	28	231
22	24	1130	35	1500	56	5560	21	464	19	184	27	230
23	22	998	35	1400	52	4930	18	409	20	196	26	210
24	21	850	36	1430	47	4190	18	377	20	188	25	232
25	22	885	36	1370	39	3310	18	374	20	198	22	253
26	27	1100	37	1310	36	2930	18	345	20	193	17	210
27	28	1130	38	1300	33	2520	18	342	20	200	15	188
28	27	1060	39	1250	32	2310	18	324	20	223	15	209
29	36	1550	39	1180	30	2020	18	303	20	192	15	227
30	40	1790	40	1180	30	1900	18	296	20	166	15	214
31	---	---	40	1080	---	---	18	294	20	174	---	---
TOTAL	---	62594	---	44420	---	133492	---	26599	---	7507	---	5785
TOTAL LOAD FOR YEAR:			4217130		TONS							

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, 1983-84): Maximum, 473 microsiemens Sept. 30, 1981; minimum, 202 microsiemens Nov. 12, 17, 1982.

pH (water year 1981-84): Maximum, 8.7 units Apr. 16, 18-20, 1981; minimum, 6.8 units June 17, 1984.

WATER TEMPERATURES: (water year 1981-84): Maximum, 29.5°C July 6, 1981; Aug. 7, 1983; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN (water year 1981-84): Maximum, 17.6 mg/L Mar. 7, 8, 1981; minimum, 2.9 mg/L July 27, 1981.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 409 microsiemens Feb. 12; minimum, 297 microsiemens Apr. 3, 4.

pH: Maximum, 8.6 units July 29, 30, Aug. 20, 21, 23, 24; minimum, 6.8 units June 17

WATER TEMPERATURES: Maximum, 26.0°C Aug. 6; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN: Maximum, 15.5 mg/L Mar. 6, 19; minimum, 4.3 mg/L June 16, July 11.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG.C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	342	340	341	343	342	342	348	342	343	369	362	366
2	359	340	352	351	340	344	351	343	348	368	360	364
3	358	352	355	348	343	347	353	350	351	372	362	369
4	353	350	352	343	340	341	353	348	350	379	372	377
5	352	350	351	343	341	342	350	343	348	379	378	378
6	350	348	349	343	342	343	351	350	350	380	373	376
7	349	342	344	343	340	342	351	350	351	373	372	373
8	343	340	341	343	340	342	351	348	350	379	373	377
9	340	319	323	344	340	342	351	349	350	373	373	373
10	352	342	351	345	341	343	353	351	352	378	373	373
11	353	342	347	346	342	344	353	352	352	379	373	377
12	352	343	347	348	344	346	353	350	351	380	379	379
13	352	342	347	350	346	348	353	348	350	380	378	379
14	350	341	346	352	340	346	355	353	354	378	372	375
15	350	340	345	352	351	351	358	352	355	373	372	373
16	347	339	343	353	351	352	363	360	362	379	373	377
17	347	341	344	353	351	353	367	364	366	379	378	379
18	346	342	344	353	352	352	368	366	367	379	378	379
19	344	340	342	358	353	354	370	369	370	381	379	380
20	343	338	340	359	340	348	373	371	372	381	380	380
21	343	338	340	359	340	343	373	370	371	382	380	381
22	343	338	340	358	350	352	372	368	370	382	380	381
23	342	341	342	351	350	351	368	363	366	381	379	380
24	341	338	339	351	340	345	369	368	369	379	373	377
25	341	338	339	343	341	342	369	368	369	378	373	377
26	343	341	342	343	340	342	369	363	368	380	373	376
27	344	340	342	352	341	347	368	362	363	380	373	376
28	343	342	340	351	341	345	362	360	361	378	373	374
29	343	340	342	343	342	343	361	360	360	378	373	373
30	342	341	342	350	343	346	361	360	360	379	373	377
31	343	342	342	---	---	---	363	360	361	379	378	378
MONTH	359	319	344	359	340	346	373	342	358	382	360	376

MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	378	373	377	---	---	---	---	---	---	309	304	306
2	380	378	379	366	356	358	363	358	361	313	306	309
3	378	373	373	367	360	364	361	297	323	315	310	313
4	380	378	379	372	367	369	303	297	299	315	310	312
5	379	373	378	373	370	371	304	298	301	318	310	313
6	383	379	382	378	371	374	307	301	303	321	315	317
7	383	379	380	383	375	378	308	304	305	322	313	316
8	379	372	374	390	382	385	308	304	306	315	312	313
9	389	371	380	390	383	386	308	304	306	317	312	314
10	378	371	372	393	388	390	308	305	307	323	316	319
11	389	370	380	393	390	390	310	307	308	327	323	325
12	409	382	393	393	389	390	309	306	307	328	324	326
13	389	380	383	393	391	392	308	306	307	325	321	323
14	383	381	382	396	390	392	308	304	305	325	318	321
15	381	377	378	399	391	393	310	304	307	330	325	327
16	377	373	375	393	389	391	317	309	312	329	324	327
17	375	373	373	393	388	390	318	312	314	336	328	332
18	374	367	371	394	390	391	316	311	313	339	334	336
19	372	367	370	394	388	390	319	313	315	345	337	341
20	---	---	---	392	388	390	323	316	319	350	341	345
21	---	---	---	394	387	389	321	317	319	349	344	347
22	---	---	---	391	388	389	320	316	318	346	341	344
23	---	---	---	389	383	386	322	316	318	351	343	347
24	---	---	---	386	382	383	333	321	326	351	344	347
25	---	---	---	383	377	381	332	327	329	345	341	343
26	---	---	---	379	374	376	333	327	330	344	338	341
27	---	---	---	380	372	376	337	325	331	348	341	344
28	---	---	---	372	368	370	330	320	323	349	346	347
29	---	---	---	369	360	363	322	314	318	351	348	349
30	---	---	---	362	357	359	314	306	308	353	349	351
31	---	---	---	364	360	361	---	---	---	363	350	356
MONTH	---	---	---	---	---	---	---	---	---	363	304	331
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	366	363	365	372	365	368	398	386	392	379	374	377
2	366	362	364	375	370	372	398	389	394	374	367	370
3	369	361	365	381	374	377	395	386	390	375	369	372
4	370	334	362	382	377	380	396	385	390	376	362	371
5	368	336	357	383	378	380	397	386	393	373	365	368
6	374	368	372	384	377	380	403	394	398	370	364	367
7	370	339	355	378	374	375	397	316	341	367	354	363
8	341	340	341	377	374	375	345	325	334	364	358	361
9	343	341	342	383	375	380	345	336	340	361	358	359
10	344	342	343	384	372	378	345	335	340	362	357	359
11	346	342	344	382	372	376	351	339	345	387	358	374
12	341	325	332	387	381	384	348	339	345	384	327	367
13	324	320	322	393	388	390	350	340	345	384	376	379
14	322	315	318	393	373	389	354	343	348	379	375	377
15	314	309	311	388	381	384	360	349	355	380	372	375
16	309	306	307	382	370	380	364	354	360	372	365	370
17	307	305	306	383	379	381	363	360	361	366	359	362
18	311	306	308	386	379	382	363	354	359	389	357	376
19	316	310	313	392	384	389	360	354	357	396	387	392
20	326	316	320	395	390	393	398	355	383	402	395	398
21	336	326	331	404	392	398	394	372	389	401	397	399
22	343	336	340	402	396	399	389	384	386	401	385	397
23	349	340	345	400	377	395	387	379	382	398	392	396
24	353	346	350	396	389	393	381	376	379	395	325	359
25	358	352	355	399	392	396	381	368	378	380	369	373
26	364	359	361	406	393	399	380	360	375	374	362	367
27	364	359	362	401	392	397	385	374	380	368	361	366
28	366	362	364	406	396	400	393	374	386	371	366	369
29	366	363	365	405	390	398	390	384	388	369	360	366
30	368	363	366	402	395	398	388	381	385	361	350	356
31	---	---	---	397	384	392	383	379	381	---	---	---
MONTH	374	305	343	406	365	386	403	316	370	402	325	373

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.1	8.0	8.0	7.8	7.7	7.7	---	---	---	7.7	7.5	7.6
2	8.4	8.0	8.1	8.2	7.5	7.8	---	---	---	7.8	7.4	7.6
3	8.4	8.1	8.2	8.2	7.8	8.0	7.8	7.8	7.8	7.5	7.4	7.5
4	8.2	8.0	8.0	7.8	7.4	7.6	7.8	7.5	7.7	7.5	7.4	7.4
5	8.2	8.0	8.1	7.6	7.4	7.5	7.5	7.5	7.5	7.5	7.4	7.4
6	8.1	8.0	8.0	7.6	7.4	7.5	7.6	7.4	7.5	7.4	7.4	7.4
7	8.1	8.0	8.0	7.4	7.4	7.4	7.5	7.0	7.4	7.5	7.4	7.4
8	8.2	8.0	8.1	8.2	7.4	7.8	7.6	7.4	7.5	7.4	7.4	7.4
9	8.2	8.0	8.1	8.1	7.9	8.0	7.5	7.4	7.4	7.4	7.4	7.4
10	8.2	7.8	7.9	8.0	8.0	8.0	7.4	7.4	7.4	7.4	7.4	7.4
11	8.1	7.8	7.9	8.2	8.1	8.2	7.4	7.4	7.4	7.4	7.4	7.4
12	8.1	8.0	8.0	8.2	8.1	8.1	7.4	7.4	7.4	7.6	7.4	7.4
13	8.1	8.1	8.1	8.2	8.1	8.2	7.5	7.4	7.5	7.6	7.4	7.5
14	8.1	7.9	8.1	8.4	8.2	8.3	7.5	7.5	7.5	7.6	7.5	7.6
15	8.1	8.1	8.1	8.4	8.2	8.3	7.5	7.5	7.5	7.6	7.4	7.6
16	8.1	7.4	7.8	8.5	8.4	8.4	7.5	7.5	7.5	7.6	7.5	7.5
17	8.1	7.6	8.0	8.5	8.4	8.4	7.5	7.4	7.5	7.5	7.5	7.5
18	8.1	8.0	8.1	8.5	8.4	8.4	7.4	7.4	7.4	7.5	7.4	7.4
19	8.1	7.9	7.9	8.5	8.4	8.5	7.6	7.4	7.6	7.5	7.3	7.4
20	7.9	7.0	7.4	8.4	8.2	8.3	7.5	7.5	7.5	7.3	7.3	7.3
21	7.5	7.2	7.4	8.2	8.1	8.1	7.5	7.4	7.5	7.3	7.3	7.3
22	7.5	7.4	7.5	8.2	8.0	8.1	7.4	7.4	7.4	7.3	7.3	7.3
23	7.8	7.4	7.6	8.1	8.0	8.0	7.4	7.1	7.2	7.3	7.3	7.3
24	7.6	7.4	7.5	8.0	7.8	7.9	7.1	7.1	7.1	7.3	7.3	7.3
25	7.8	7.4	7.5	---	---	---	7.2	7.0	7.1	7.3	7.3	7.3
26	7.6	7.4	7.4	---	---	---	7.2	7.0	7.1	7.4	7.3	7.3
27	7.8	7.7	7.7	---	---	---	7.5	7.5	7.5	7.3	7.3	7.3
28	7.7	7.7	7.7	---	---	---	7.6	7.4	7.5	7.3	7.3	7.3
29	7.6	7.5	7.6	---	---	---	7.6	7.5	7.6	7.3	7.3	7.3
30	7.6	7.6	7.6	---	---	---	7.7	7.7	7.7	7.3	7.3	7.3
31	7.8	7.7	7.7	---	---	---	7.9	7.8	7.8	7.3	7.3	7.3
MONTH	8.4	7.0	7.8	---	---	---	---	---	---	7.8	7.3	7.4
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.3	7.3	7.3	---	---	---	---	---	---	---	---	---
2	7.3	7.2	7.3	7.6	7.5	7.5	8.0	7.8	7.9	---	---	---
3	7.3	7.2	7.2	7.6	7.6	7.6	8.0	7.9	8.0	---	---	---
4	7.3	7.2	7.2	7.7	7.6	7.7	8.2	7.9	8.0	---	---	---
5	7.4	7.2	7.3	7.7	7.7	7.7	8.3	8.0	8.1	---	---	---
6	7.3	7.2	7.2	7.7	7.7	7.7	8.4	8.1	8.3	---	---	---
7	7.4	7.2	7.3	7.7	7.7	7.7	8.4	8.3	8.3	---	---	---
8	7.4	7.2	7.3	7.7	7.6	7.7	8.4	8.3	8.4	7.4	7.3	7.4
9	7.9	7.3	7.3	7.6	7.6	7.6	8.5	8.3	8.4	7.7	7.3	7.5
10	7.3	7.3	7.3	7.6	7.6	7.6	8.4	8.1	8.3	8.0	7.6	7.8
11	7.3	7.3	7.3	7.6	7.6	7.6	8.2	8.1	8.1	8.4	7.9	8.2
12	7.6	7.3	7.4	7.6	7.6	7.6	8.1	8.1	8.1	8.4	8.3	8.3
13	7.3	7.3	7.3	7.6	7.6	7.6	8.1	8.0	8.1	8.3	7.8	8.0
14	7.4	7.3	7.3	7.6	7.6	7.6	8.2	8.0	8.1	8.1	7.6	7.9
15	7.4	7.3	7.4	7.7	7.6	7.6	8.4	8.1	8.2	8.5	7.9	8.1
16	7.8	7.3	7.4	7.6	7.5	7.5	---	---	---	8.4	8.2	8.3
17	7.3	7.3	7.3	7.6	7.5	7.5	---	---	---	8.4	8.2	8.3
18	7.3	7.3	7.3	7.6	7.5	7.6	---	---	---	---	---	---
19	8.0	7.3	7.4	7.6	7.6	7.6	---	---	---	---	---	---
20	---	---	---	7.6	7.6	7.6	---	---	---	---	---	---
21	---	---	---	7.6	7.6	7.6	---	---	---	---	---	---
22	---	---	---	7.7	7.6	7.6	---	---	---	8.1	7.8	8.0
23	---	---	---	7.7	7.6	7.6	---	---	---	8.2	7.9	8.1
24	---	---	---	7.7	7.6	7.6	---	---	---	8.2	7.8	8.1
25	---	---	---	7.7	7.6	7.7	---	---	---	---	---	---
26	---	---	---	7.8	7.7	7.7	---	---	---	---	---	---
27	---	---	---	7.8	7.8	7.8	---	---	---	---	---	---
28	---	---	---	7.9	7.7	7.8	---	---	---	8.2	7.8	7.9
29	---	---	---	7.8	7.7	7.8	---	---	---	8.4	7.9	8.2
30	---	---	---	7.8	7.6	7.7	---	---	---	---	---	---
31	---	---	---	7.9	7.8	7.8	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	7.9	7.8	7.8	8.2	7.9	8.1	8.2	8.0	8.1
2	---	---	---	7.9	7.8	7.9	8.1	7.8	7.9	8.1	7.9	8.0
3	---	---	---	8.0	7.8	7.9	8.0	7.8	7.9	7.8	7.5	7.7
4	---	---	---	8.0	7.9	7.9	8.0	7.7	7.8	8.2	7.4	7.8
5	8.1	7.7	7.9	8.1	7.9	8.0	7.9	7.7	7.8	8.2	7.9	8.0
6	8.3	7.8	8.2	8.1	7.9	8.0	7.9	7.7	7.8	8.2	8.0	8.1
7	8.3	7.9	8.1	8.1	7.9	8.0	7.8	7.6	7.7	8.3	8.0	8.1
8	7.8	7.4	7.6	8.0	7.9	8.0	7.8	7.6	7.7	8.3	8.0	8.1
9	7.4	7.3	7.3	8.0	7.9	7.9	7.9	7.6	7.8	8.3	8.0	8.1
10	7.3	7.2	7.3	7.9	7.8	7.9	8.0	7.7	7.8	8.3	8.0	8.1
11	7.6	7.3	7.5	7.9	7.8	7.8	8.0	7.7	7.9	8.4	8.0	8.2
12	7.6	7.1	7.3	8.1	7.9	7.9	8.0	7.8	7.9	8.3	8.1	8.2
13	7.6	7.1	7.5	8.2	7.9	8.0	8.1	7.8	7.9	8.3	8.1	8.2
14	7.6	7.5	7.6	8.0	7.9	8.0	8.2	7.9	8.0	8.3	8.1	8.2
15	7.5	6.9	7.2	8.1	7.8	8.0	8.2	7.9	8.0	8.4	8.1	8.2
16	7.4	7.0	7.4	8.1	8.0	8.0	8.2	7.9	8.0	8.3	8.1	8.2
17	7.5	6.8	7.3	8.1	8.0	8.0	8.1	7.9	8.0	8.3	8.1	8.2
18	7.4	7.4	7.4	8.2	8.0	8.1	8.1	7.9	8.0	8.4	8.1	8.2
19	7.9	7.4	7.7	8.2	8.1	8.1	8.1	7.8	8.0	8.4	8.2	8.3
20	7.9	7.8	7.9	8.3	8.1	8.2	8.6	7.8	8.3	8.5	8.2	8.3
21	7.9	7.9	7.9	8.4	8.2	8.2	8.6	8.3	8.4	8.5	8.2	8.3
22	8.0	7.9	8.0	8.3	8.2	8.2	8.4	8.2	8.3	8.3	8.1	8.2
23	8.0	7.7	8.0	8.2	8.1	8.1	8.6	8.2	8.4	8.3	8.0	8.1
24	8.1	7.9	8.0	8.3	8.1	8.1	8.6	8.2	8.4	8.1	7.9	8.0
25	8.1	8.0	8.1	8.3	8.1	8.2	8.5	8.2	8.4	8.0	7.8	7.9
26	8.1	7.7	7.8	8.4	8.1	8.2	8.5	8.2	8.3	8.0	7.8	7.9
27	7.7	7.7	7.7	8.4	8.1	8.2	8.4	8.2	8.3	8.1	7.8	7.9
28	7.8	7.7	7.7	8.5	8.1	8.3	8.5	8.0	8.2	8.1	7.9	7.9
29	7.8	7.7	7.8	8.6	8.3	8.4	8.3	8.0	8.1	8.1	7.9	7.9
30	7.8	7.7	7.8	8.6	8.3	8.4	8.4	8.0	8.1	8.1	7.8	7.9
31	---	---	---	8.4	8.0	8.2	8.3	8.0	8.1	---	---	---
MONTH	---	---	---	8.6	7.8	8.1	8.6	7.6	8.0	8.5	7.4	8.1

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	15.5	15.0	15.5	7.0	6.0	7.0	.5	.0	.5	.5	.0	.5
2	16.0	15.5	15.5	8.0	7.0	7.5	1.0	.0	.5	1.0	.0	.5
3	17.0	15.5	16.0	8.0	7.0	7.5	.0	.0	.0	.5	.5	.5
4	16.0	14.5	15.0	8.0	6.0	6.5	1.0	.0	.0	.5	.5	.5
5	14.5	14.0	14.0	7.0	6.0	6.5	.0	.0	.0	.5	.5	.5
6	14.0	12.0	12.5	7.0	6.0	6.5	.0	.0	.0	.5	.5	.5
7	13.0	12.0	12.5	6.5	6.5	6.5	1.0	.0	.0	.5	.5	.5
8	12.5	12.0	12.0	8.0	6.5	7.0	1.0	.0	.0	.5	.5	.5
9	11.0	10.0	10.5	8.0	5.5	7.0	.0	.0	.0	.5	.5	.5
10	13.0	12.0	12.5	6.0	4.5	5.0	.0	.0	.0	.5	.5	.5
11	12.5	10.0	11.0	4.5	4.5	4.5	.0	.0	.0	.5	.5	.5
12	10.0	9.0	9.5	4.5	2.5	4.0	.0	.0	.0	.5	.0	.5
13	9.0	7.0	7.5	2.5	2.0	2.0	.5	.0	.5	.5	.5	.5
14	7.5	7.0	7.5	4.0	2.0	3.0	.5	.5	.5	.5	.5	.5
15	7.5	7.0	7.0	4.5	4.0	4.0	.5	.5	.5	.5	.0	.5
16	7.0	7.0	7.0	4.5	4.0	4.0	.5	.5	.5	.5	.5	.5
17	7.0	7.0	7.0	4.5	4.0	4.0	.5	.0	.5	.5	.5	.5
18	7.5	7.0	7.5	4.0	4.0	4.0	.5	.5	.5	.5	.0	.5
19	7.5	7.0	7.0	5.0	4.0	4.5	.5	.5	.5	.5	.5	.5
20	7.0	5.5	6.5	5.5	5.0	5.5	.5	.5	.5	.5	.0	.5
21	7.0	6.0	7.0	5.5	5.0	5.0	.5	.5	.5	.5	.0	.5
22	7.5	7.0	7.0	5.0	2.0	3.5	.5	.5	.5	.5	.0	.5
23	8.0	7.0	7.5	2.5	2.0	2.5	.5	.5	.5	.5	.0	.5
24	7.0	6.0	6.5	2.0	1.0	1.5	.5	.5	.5	.5	.0	.5
25	7.5	5.5	6.5	1.0	.0	.5	.5	.5	.5	.5	.5	.5
26	7.0	5.5	6.5	.0	.0	.0	.5	.5	.5	.5	.5	.5
27	7.5	7.0	7.0	.0	.0	.0	.5	.5	.5	.5	.5	.5
28	8.0	7.0	7.5	.0	.0	.0	.5	.5	.5	.5	.5	.5
29	8.0	7.5	7.5	.0	.0	.0	.5	.0	.5	.5	.5	.5
30	7.0	5.5	6.5	---	---	---	.5	.0	.5	.5	.5	.5
31	7.0	6.0	6.0	---	---	---	.5	.0	.5	.5	.5	.5
MONTH	17.0	5.5	9.5	---	---	---	1.0	.0	.5	1.0	.0	.5

MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.5	.5	.5	---	---	---	---	---	---	7.5	5.5	6.5
2	.5	.5	.5	.0	.0	.0	5.5	3.5	4.5	8.5	7.0	7.5
3	.5	.5	.5	.0	.0	.0	5.0	4.0	5.0	9.5	8.0	9.0
4	.5	.5	.5	.0	.0	.0	6.0	4.0	5.0	10.0	9.0	9.5
5	.5	.0	.5	.0	.0	.0	6.5	5.0	5.5	10.5	9.0	10.0
6	.5	.0	.5	.5	.0	.5	7.5	6.0	6.5	11.5	10.5	11.0
7	.5	.5	.5	.5	.0	.5	7.5	6.5	7.0	12.5	10.5	11.5
8	.5	.0	.0	.5	.5	.5	7.5	6.5	7.0	9.5	9.0	9.0
9	.0	.0	.0	.5	.5	.5	7.5	6.5	7.0	10.5	8.5	9.5
10	.0	.0	.0	.5	.5	.5	7.0	5.5	6.5	12.0	10.5	11.0
11	.0	.0	.0	.5	.5	.5	6.0	5.5	6.0	13.5	12.0	12.5
12	.0	.0	.0	.5	.5	.5	6.0	5.5	5.5	13.5	12.5	13.0
13	.0	.0	.0	.5	.5	.5	5.5	5.0	5.5	13.0	12.5	12.5
14	.0	.0	.0	.5	.5	.5	5.5	5.0	5.5	14.0	12.0	13.0
15	.0	.0	.0	.5	.5	.5	7.0	5.5	6.0	14.5	13.0	14.0
16	.0	.0	.0	1.0	.5	.5	8.5	6.5	7.5	14.5	13.5	14.0
17	.0	.0	.0	1.0	.5	.5	8.5	7.0	8.0	15.5	13.5	14.5
18	.0	.0	.0	.5	.0	.5	9.0	7.5	8.5	17.0	15.0	16.0
19	.0	.0	.0	.5	.0	.5	9.5	8.0	9.0	18.0	16.0	17.0
20	---	---	---	.5	.0	.5	11.0	9.0	10.0	18.5	16.5	17.5
21	---	---	---	.5	.5	.5	10.5	9.5	10.0	18.0	17.0	17.5
22	---	---	---	.5	.5	.5	10.0	9.0	9.5	17.0	15.0	16.0
23	---	---	---	.5	.5	.5	10.0	8.0	9.0	16.5	15.5	16.0
24	---	---	---	.5	.5	.5	11.0	9.5	10.5	16.5	15.5	16.0
25	---	---	---	.5	.5	.5	11.0	10.0	10.5	16.0	15.0	15.0
26	---	---	---	2.0	.5	.5	12.5	10.0	11.5	15.0	14.0	14.5
27	---	---	---	3.0	2.0	2.5	13.0	11.5	12.5	15.0	14.0	14.5
28	---	---	---	3.5	2.0	2.5	11.5	8.5	9.5	14.5	13.5	14.5
29	---	---	---	3.0	2.0	2.5	8.5	7.0	8.0	15.5	14.0	15.0
30	---	---	---	3.0	1.5	2.0	7.0	5.0	6.0	16.0	15.0	15.5
31	---	---	---	4.0	2.5	3.0	---	---	---	17.5	15.5	16.5
MONTH	---	---	---	---	---	---	---	---	---	18.5	5.5	13.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	18.5	17.5	18.0	23.0	22.0	22.5	25.5	23.0	24.0	18.0	16.5	17.0
2	19.0	18.0	18.5	23.5	22.0	22.5	25.0	24.0	24.5	16.0	15.0	15.5
3	19.0	18.0	18.5	24.0	22.5	23.5	25.0	23.5	24.0	15.5	15.0	15.5
4	19.0	17.5	18.5	24.0	23.0	23.5	25.0	23.5	24.0	17.0	14.5	16.0
5	19.0	17.0	18.0	23.5	22.5	23.0	25.0	23.5	24.0	17.5	14.5	15.5
6	21.0	19.0	20.0	23.0	21.5	22.0	26.0	24.0	25.0	15.5	14.5	15.0
7	21.0	20.0	20.5	21.5	20.5	21.5	25.0	22.0	23.5	16.0	14.0	15.0
8	20.0	19.5	19.5	21.5	20.5	21.0	23.5	21.5	22.0	15.5	13.5	14.5
9	19.5	19.0	19.5	22.5	21.0	21.5	23.5	22.0	22.5	14.5	13.5	14.0
10	19.0	19.0	19.0	22.5	21.5	22.0	22.5	21.5	22.0	15.0	13.0	14.0
11	18.5	17.0	18.0	23.0	21.0	22.0	22.5	21.0	21.5	15.5	12.5	14.0
12	18.5	16.5	17.5	24.0	22.5	23.5	22.5	20.5	21.5	15.5	13.0	14.0
13	19.5	18.0	18.5	25.0	23.5	24.0	23.0	21.0	22.0	16.0	14.0	15.0
14	19.5	18.5	19.0	25.0	23.5	24.5	24.0	21.5	22.5	15.0	13.5	14.5
15	18.5	18.0	18.0	24.0	23.0	23.5	25.0	22.5	23.5	14.5	12.5	13.5
16	18.0	17.5	17.5	23.0	22.0	22.5	25.0	23.0	24.0	13.5	12.0	12.5
17	18.5	17.5	18.0	22.0	21.0	21.5	24.5	23.0	23.5	14.0	12.0	13.0
18	19.5	18.0	19.0	22.0	20.5	21.5	24.0	22.5	23.0	15.0	12.5	13.5
19	19.5	19.0	19.0	23.0	21.5	22.5	24.0	22.0	22.5	16.5	13.5	14.5
20	20.0	18.5	19.0	23.5	22.5	23.0	22.5	20.5	21.5	17.0	14.5	15.5
21	20.0	19.5	20.0	24.5	23.0	23.5	22.5	20.0	21.0	17.0	14.5	15.5
22	20.5	19.5	20.0	25.0	23.5	24.0	20.5	19.0	19.5	15.0	14.0	15.0
23	20.5	20.0	20.0	25.0	23.5	24.5	20.0	17.5	18.5	14.5	13.0	13.5
24	20.5	19.5	20.0	24.5	23.0	23.5	19.5	17.0	18.0	13.0	9.0	10.0
25	21.0	20.0	20.5	24.5	23.5	23.5	19.5	17.5	18.5	11.5	8.5	9.5
26	22.0	21.0	21.5	25.0	23.5	24.0	19.0	18.0	18.5	10.0	7.5	8.5
27	21.5	20.5	21.0	24.5	23.0	23.5	21.0	18.0	19.5	10.0	8.0	9.0
28	22.0	21.0	21.5	24.5	23.0	23.5	22.5	19.0	21.0	11.0	9.0	10.0
29	22.5	21.5	22.0	24.5	23.0	23.5	23.0	21.5	22.0	10.5	8.5	9.5
30	22.5	21.5	22.0	24.5	22.5	23.5	21.5	19.5	21.0	10.5	8.5	9.5
31	---	---	---	24.0	22.5	23.0	20.0	18.0	19.0	---	---	---
MONTH	22.5	16.5	19.5	25.0	20.5	23.0	26.0	17.0	22.0	18.0	7.5	13.5

MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L. WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	8.3	7.0	7.9	10.4	9.8	10.1	13.1	11.8	12.4	---	---	---
2	8.8	7.8	8.2	11.2	10.0	10.5	14.0	12.2	13.3	---	---	---
3	9.1	8.0	8.4	11.1	10.0	10.4	14.1	13.0	13.6	13.2	12.1	12.7
4	9.9	8.0	9.0	11.0	10.0	10.5	14.0	13.0	13.5	13.2	12.4	12.9
5	10.4	9.6	9.7	11.2	10.8	11.0	13.8	12.8	13.3	13.2	12.2	12.9
6	10.9	10.0	10.3	11.0	10.2	10.6	14.4	13.9	14.1	13.2	12.4	12.9
7	10.4	10.0	10.1	11.6	10.8	11.1	14.2	12.8	13.9	13.2	12.8	13.0
8	10.9	10.0	10.3	11.1	9.9	10.4	13.2	12.8	13.0	13.6	12.2	13.0
9	11.7	10.9	11.1	10.4	10.0	10.1	13.2	12.2	12.9	14.0	13.0	13.8
10	---	---	---	11.6	10.0	10.8	13.1	12.1	12.9	14.0	13.0	13.6
11	10.8	9.3	10.0	11.1	10.8	10.9	13.2	12.2	12.9	14.4	12.9	14.0
12	11.8	10.4	10.5	11.6	10.0	10.6	13.1	12.0	12.7	14.4	13.6	14.1
13	12.4	11.8	12.1	12.0	11.2	11.8	14.2	12.0	13.2	14.8	14.0	14.3
14	12.9	12.2	12.6	12.2	11.0	11.6	14.2	13.0	13.8	14.4	13.8	14.2
15	13.0	12.8	13.0	12.1	11.1	11.8	14.1	12.8	13.6	14.3	13.6	14.0
16	13.0	12.8	12.9	12.2	11.6	11.9	14.3	13.0	13.8	14.3	13.6	14.0
17	13.1	12.8	13.0	12.1	11.0	11.5	14.3	13.8	14.1	14.2	13.8	14.1
18	13.2	12.2	12.9	12.0	11.0	11.5	14.4	14.0	14.2	14.3	13.2	13.7
19	12.9	12.8	12.8	11.2	10.2	10.8	14.4	14.0	14.2	14.0	12.8	13.5
20	13.2	12.8	13.0	10.8	10.0	10.2	14.4	14.0	14.2	13.8	12.9	13.1
21	13.2	12.8	12.9	10.4	10.0	10.1	14.4	12.8	13.5	13.2	12.8	12.9
22	13.1	12.2	12.8	11.2	10.2	10.9	14.0	12.4	13.3	13.1	12.8	12.9
23	13.0	12.3	12.8	11.6	10.8	11.0	13.2	12.2	12.9	13.8	12.8	13.2
24	13.0	12.8	12.9	11.8	10.8	11.3	12.9	12.0	12.4	14.4	12.8	13.7
25	13.0	11.0	12.0	12.8	10.9	11.7	13.2	12.1	12.7	14.2	13.9	14.0
26	11.9	11.8	11.8	13.0	11.7	12.1	13.1	12.2	12.4	14.6	13.8	14.0
27	12.0	10.0	10.8	13.0	11.8	12.1	12.3	12.1	12.2	14.8	13.6	14.4
28	10.4	10.0	10.1	12.4	11.6	12.0	12.3	12.0	12.1	14.5	13.3	13.7
29	10.2	9.8	9.9	12.1	11.6	11.9	13.1	12.0	12.4	13.8	12.8	13.1
30	10.4	9.7	10.0	12.1	11.0	11.7	13.2	12.8	13.0	12.8	11.7	12.2
31	10.2	10.0	10.1	---	---	---	---	---	---	10.5	10.1	10.4
MONTH	---	---	---	13.0	9.8	11.1	14.4	11.8	13.2	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	10.4	10.0	10.1	---	---	---	---	---	---	12.5	11.7	12.1
2	11.3	10.1	10.6	---	---	---	14.0	13.4	13.7	12.3	9.5	10.7
3	11.2	10.2	10.6	---	---	---	13.9	12.3	12.8	10.0	8.5	9.2
4	10.7	10.3	10.4	---	---	---	12.5	12.0	12.3	8.6	7.1	7.7
5	11.5	10.6	10.9	---	---	---	12.4	12.0	12.2	7.3	7.1	7.2
6	12.2	11.8	12.0	15.5	14.4	14.8	12.3	11.8	12.0	7.6	6.2	6.9
7	12.9	12.7	12.8	14.7	14.4	14.5	12.0	11.5	11.8	---	---	---
8	12.4	12.0	12.1	15.2	14.3	14.6	12.3	11.6	12.0	11.1	10.8	11.0
9	12.3	11.8	12.0	15.4	14.7	15.1	12.2	11.7	12.0	11.0	9.9	10.4
10	12.9	12.0	12.3	14.8	14.4	14.6	12.1	11.5	11.8	10.8	9.7	10.2
11	13.0	12.0	12.8	15.0	14.5	14.7	11.6	11.2	11.4	9.9	9.2	9.7
12	12.3	12.0	12.1	15.2	14.5	14.9	11.8	11.1	11.5	10.2	9.1	9.7
13	12.4	11.6	12.2	14.8	14.4	14.6	11.8	11.3	11.5	10.0	9.5	9.7
14	11.2	11.0	11.0	14.5	14.2	14.4	11.7	11.5	11.6	10.1	9.2	9.8
15	13.1	12.4	12.8	15.1	14.2	14.6	12.2	11.5	11.8	11.7	9.7	10.7
16	14.8	12.5	13.9	15.2	13.6	14.4	11.9	11.1	11.5	10.6	10.1	10.3
17	14.8	14.3	14.6	15.0	13.6	14.3	11.2	10.9	11.1	10.7	9.6	10.2
18	14.7	14.2	14.5	15.4	14.6	15.1	11.5	10.8	11.1	10.1	9.3	9.7
19	14.8	14.2	14.5	15.5	14.2	15.1	11.7	10.8	11.2	9.5	8.6	9.1
20	---	---	---	15.0	14.7	14.9	11.4	11.0	11.2	10.2	8.4	9.3
21	---	---	---	14.9	14.5	14.7	11.3	10.5	10.9	9.3	8.7	8.9
22	---	---	---	14.8	14.5	14.6	11.4	10.6	11.0	10.5	8.4	9.6
23	---	---	---	15.0	14.6	14.8	11.4	10.7	11.0	10.7	9.7	10.1
24	---	---	---	14.9	14.3	14.6	12.1	10.3	11.1	10.1	9.3	9.7
25	---	---	---	14.5	14.2	14.4	11.7	10.7	11.2	10.1	9.2	9.6
26	---	---	---	14.5	13.7	14.2	11.6	10.7	11.0	10.3	8.9	9.7
27	---	---	---	14.7	13.6	14.1	10.6	10.0	10.3	11.7	9.1	10.0
28	---	---	---	14.8	14.1	14.4	11.6	10.1	10.9	12.1	10.7	11.3
29	---	---	---	14.6	14.1	14.4	12.0	11.2	11.6	11.6	10.2	10.8
30	---	---	---	14.8	14.3	14.6	12.3	11.7	12.0	10.8	9.3	10.1
31	---	---	---	14.8	14.0	14.4	---	---	---	11.6	9.2	10.3
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

MISSISSIPPI RIVER MAIN STEM

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.6	9.3	9.8	8.2	6.6	7.6	9.8	6.9	8.3	8.7	6.3	6.9
2	10.8	8.8	9.6	8.2	7.6	7.9	9.7	6.6	7.9	10.4	6.2	8.0
3	11.7	8.7	10.1	8.6	7.3	8.0	10.0	7.0	8.2	---	---	---
4	10.3	8.3	9.4	8.5	7.8	8.1	8.4	6.3	7.3	9.8	7.3	8.6
5	9.5	8.5	9.0	9.0	7.7	8.4	9.7	6.0	7.9	9.0	6.8	7.8
6	8.5	7.3	8.1	8.8	8.1	8.5	9.0	6.7	7.9	8.8	6.5	7.6
7	---	---	---	8.8	8.1	8.3	8.1	6.4	7.0	10.2	7.5	8.3
8	---	---	---	8.2	7.5	7.9	8.6	6.6	7.4	10.4	7.3	8.5
9	---	---	---	7.7	4.4	6.3	10.1	6.3	7.9	11.6	7.4	9.0
10	---	---	---	5.7	4.5	5.1	9.2	7.3	8.1	10.8	8.0	9.2
11	---	---	---	6.4	4.3	5.0	8.9	6.9	7.8	13.1	7.9	10.1
12	8.9	8.2	8.5	7.7	5.5	6.3	8.5	6.4	7.3	11.1	9.1	9.8
13	8.4	6.1	7.5	7.4	6.0	6.4	10.6	6.1	8.2	11.5	8.8	9.9
14	9.0	5.6	8.0	6.8	5.0	5.9	10.7	7.1	8.6	10.8	8.5	9.6
15	8.7	4.8	7.1	9.1	5.3	6.9	10.4	6.6	8.0	11.3	8.5	9.6
16	5.1	4.3	4.6	8.8	7.9	8.4	10.7	6.5	7.9	11.4	9.2	10.3
17	9.0	4.7	7.4	8.8	8.0	8.4	9.5	6.7	7.8	11.3	9.4	10.2
18	8.0	6.3	6.8	8.9	7.9	8.4	8.6	5.9	7.1	14.3	8.7	10.9
19	8.2	7.9	8.0	8.3	7.4	7.7	10.9	5.1	7.3	13.2	9.1	10.9
20	8.0	7.5	7.8	8.2	6.9	7.6	11.3	7.3	8.8	14.7	8.7	10.8
21	8.2	7.1	7.7	7.6	6.0	6.8	10.7	7.2	8.2	13.9	8.2	10.2
22	7.9	6.0	7.2	8.2	5.7	6.9	8.9	6.7	7.7	10.6	7.7	8.7
23	5.9	4.9	5.3	7.1	6.4	6.9	11.3	6.5	8.9	13.8	7.7	10.0
24	8.2	5.2	7.3	8.1	7.0	7.3	11.3	7.2	9.0	12.7	6.3	9.8
25	8.1	6.5	6.7	8.4	8.3	8.4	8.8	6.1	7.5	13.7	6.2	10.6
26	8.1	7.0	7.6	7.8	6.5	7.1	9.6	5.8	7.4	13.8	10.9	12.2
27	7.9	7.3	7.6	7.2	5.9	6.5	9.8	6.7	8.1	14.9	10.5	12.0
28	7.9	7.1	7.6	7.2	5.9	6.5	10.3	6.5	7.9	14.1	11.2	12.2
29	8.0	7.2	7.6	10.0	5.7	7.7	9.7	6.3	7.7	13.1	11.3	11.9
30	7.5	6.8	7.2	9.4	7.0	8.1	10.8	5.9	7.6	14.4	10.9	12.2
31	---	---	---	11.1	6.9	9.9	9.5	6.6	7.6	---	---	---
MONTH	---	---	---	11.1	4.3	7.4	11.3	5.1	7.9	---	---	---

MINNESOTA RIVER BASIN

05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD

LOCATION.--Lat 45°17'32", long 96°29'14", in SE¼NW¼ 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 mi² (1,008 km²).

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 --53 years (water years 1932-84), 48.0 ft³/s (1.359 m³/s), 1.68 in/yr (43 mm/yr), 34,780 acre-ft/yr (42.9 hm³/yr); median of yearly mean discharges, 34 ft³/s (0.96 m³/s), 1.19 in/yr (30 mm/yr), 24,600 acre-ft/yr (30 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,870 ft³/s (195 m³/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 ft³/s (821 m³/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 200 ft³/s (5.66 m³/s) and maximum (*):

Date	Time	Discharge		Gage height		Date	Time	Discharge		Gage height	
		(ft ³ /s)	(m ³ /s)	(ft)	(m)			(ft ³ /s)	(m ³ /s)	(ft)	(m)
Feb. 17	1000	344	9.74	a5.06	1.542	Apr. 13	1630	784	22.2	6.26	1.908
Feb. 24	0700	549	15.5	a6.48	1.975	June 12	0930	268	7.59	4.21	1.283
Mar. 26	0300	1,420	40.2	7.50	2.286	June 16	1230	*4,850	137	*12.42	3.786

a Backwater from ice

Minimum discharge, 1.7 ft³/s (0.048 m³/s) Oct. 1; minimum gage height, 1.15 ft (0.351 m) Sept. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.8	4.0	6.0	4.3	5.4	95	546	98	10	111	12	4.4
2	2.1	3.8	5.9	4.4	5.4	75	422	80	9.5	96	11	4.4
3	2.1	4.1	5.9	4.7	5.4	70	352	72	8.5	92	14	4.7
4	2.3	4.7	5.8	4.9	5.4	50	337	68	8.1	84	15	4.8
5	2.2	4.9	5.6	5.2	5.4	47	319	69	9.0	76	15	4.3
6	2.3	4.8	5.4	5.3	5.4	46	306	81	12	67	16	4.1
7	2.2	4.8	5.4	5.4	5.4	40	271	97	19	58	16	4.2
8	2.3	4.7	5.4	5.4	5.4	37	258	145	60	52	28	4.9
9	2.4	5.9	5.3	5.4	5.4	27	243	139	200	46	19	4.7
10	2.7	6.0	5.2	5.4	6.0	24	237	107	229	41	15	4.8
11	3.4	6.0	5.2	5.4	7.4	24	223	82	218	38	13	4.7
12	3.0	6.1	5.1	5.4	10	24	338	67	264	33	11	5.3
13	2.9	6.2	5.0	5.4	19	25	711	58	210	29	9.3	5.1
14	3.0	6.1	5.0	5.4	28	25	658	51	149	28	8.9	4.6
15	3.9	5.8	5.0	5.4	38	25	469	47	490	26	7.5	4.4
16	4.5	5.8	4.8	5.4	114	26	315	45	3610	22	6.8	4.6
17	4.0	5.9	4.5	5.4	285	26	236	43	2340	22	7.1	4.1
18	4.6	6.0	4.2	5.5	240	26	192	40	1080	21	6.8	4.1
19	5.2	8.4	4.1	5.5	145	27	156	36	744	18	6.7	4.3
20	5.5	16	4.1	5.5	120	40	132	34	633	18	6.7	4.0
21	5.5	12	4.1	5.5	245	90	112	34	699	17	14	3.6
22	4.5	11	4.1	5.5	285	120	97	33	619	16	13	3.3
23	4.2	9.2	4.1	5.5	395	210	83	29	614	16	9.9	3.7
24	3.8	8.0	4.1	5.5	502	660	73	28	617	16	7.7	6.0
25	3.9	7.6	4.1	5.5	325	1280	66	24	574	16	7.1	6.8
26	3.6	7.1	4.1	5.5	230	1300	72	23	279	17	7.1	5.8
27	3.4	6.7	4.1	5.5	165	1120	98	20	200	17	6.4	8.4
28	3.5	6.5	4.1	5.5	120	836	153	17	157	16	5.7	8.9
29	3.7	6.3	4.1	5.5	105	798	156	16	139	15	4.9	6.0
30	3.7	6.1	4.1	5.5	---	694	127	14	124	14	4.4	5.0
31	3.6	---	4.1	5.5	---	576	---	12	---	13	4.4	---
TOTAL	105.8	200.5	148.0	165.2	3433.0	8463	7758	1709	14325.1	1151	329.4	148.0
MEAN	3.41	6.68	4.77	5.33	118	273	259	55.1	478	37.1	10.6	4.93
MAX	5.5	16	6.0	5.5	502	1300	711	145	3610	111	28	8.9
MIN	1.8	3.8	4.1	4.3	5.4	24	66	12	8.1	13	4.4	3.3
CFSM	.009	.02	.01	.01	.30	.70	.67	.14	1.23	.10	.03	.01
IN.	.01	.02	.01	.02	.33	.81	.74	.16	1.37	.11	.03	.01
AC-FT	210	398	294	328	6810	16790	15390	3390	28410	2280	653	294

CAL YR 1983	TOTAL	8572.85	MEAN	23.5	MAX	662	MIN	.95	CFSM	.06	IN	.82	AC-FT	17004
WTR YR 1984	TOTAL	37936.0	MEAN	104	MAX	3610	MIN	1.8	CFSM	.27	IN	3.63	AC-FT	75250

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, March to August 1984.

SUSPENDED-SEDIMENT DISCHARGE: October 1973 to September 1981, March to August 1982, March to August 1983, March to August 1984.

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, March to August 1984), 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 1984:

WATER TEMPERATURES: Maximum daily, 32.0° July 22, Aug. 13-15, 28; minimum daily, 0.0°C on Mar. 2, 11, and many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 640 mg/L June 15; minimum daily mean, 10 mg/L May 11.

SEDIMENT LOADS: Maximum daily, 5,320 tons (4,830 tonnes) June 16; minimum daily, 0.33 ton (0.30 tonne) Aug. 29.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	7.0	6.0	21.0	25.0	32.0	
2	---	---	.5	---	---	.0	8.5	10.0	22.0	28.0	26.0	
3	14.0	---	---	---	---	---	9.0	9.0	23.0	---	---	
4	---	---	---	---	---	---	---	10.0	20.0	28.0	---	
5	---	---	---	---	---	---	11.0	14.0	23.0	23.0	---	
6	---	---	---	---	---	---	---	16.0	22.0	---	---	
7	---	---	---	---	---	---	---	11.0	21.0	---	---	
8	---	---	---	---	---	---	---	8.0	22.0	24.0	29.0	
9	---	---	---	---	---	---	---	9.0	20.0	---	27.0	
10	---	---	---	---	---	---	7.0	12.0	19.0	28.0	26.0	
11	---	---	---	---	---	.0	---	13.0	17.0	30.0	27.0	
12	---	---	---	---	---	---	---	17.0	21.0	---	---	
13	---	---	---	---	---	---	---	16.0	21.0	30.0	32.0	
14	---	---	---	---	---	---	---	14.0	20.0	28.0	32.0	
15	---	---	---	---	---	---	---	17.0	20.0	---	32.0	
16	---	---	---	---	.0	---	---	19.0	21.0	---	28.0	
17	---	---	---	---	---	---	---	21.0	---	---	26.0	
18	---	---	---	---	---	---	---	17.0	---	28.0	29.0	
19	---	---	---	---	---	---	---	18.0	23.0	28.0	27.0	
20	---	---	---	---	---	---	12.0	20.0	25.0	---	---	
21	---	---	---	---	---	---	---	20.0	20.0	28.0	28.0	
22	---	---	---	---	---	1.0	---	15.0	21.0	32.0	25.0	
23	---	---	---	---	2.0	1.5	13.5	15.0	23.0	27.0	24.0	
24	---	---	---	---	---	---	13.0	19.0	25.0	26.0	24.0	
25	---	---	---	---	---	---	12.0	15.0	27.0	---	28.0	
26	---	---	---	---	---	3.0	13.5	16.0	25.0	---	29.0	
27	---	---	---	---	---	---	13.0	16.0	26.0	---	30.0	
28	---	---	---	---	---	---	7.0	20.0	27.0	25.0	32.0	
29	---	---	---	---	---	---	10.0	23.0	27.0	---	---	
30	---	---	---	.0	---	---	7.0	23.0	26.0	29.0	---	
31	---	---	---	---	---	6.0	---	25.0	---	31.0	22.0	
TOTAL	---	---	---	---	---	---	---	---	---	---	---	
MEAN	---	---	---	---	---	---	---	---	---	---	---	
MAX	---	---	---	---	---	---	---	25.0	27.0	32.0	32.0	
MIN	---	---	---	---	---	---	---	6.0	17.0	23.0	22.0	
WTR YR 1984				MAX	32.0		MIN	.0				

MINNESOTA RIVER BASIN

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

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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											47	12
2											53	11
3											74	14
4											95	13
5											111	14
6											122	15
7											131	14
8											143	14
9											151	11
10											151	9.8
11											155	10
12											151	9.8
13											150	10
14											148	10
15											149	10
16											142	10
17											142	10
18											140	9.8
19											141	10
20											174	19
21											174	42
22											190	62
23											165	94
24											254	453
25											280	968
26											257	902
27											232	702
28											178	402
29											162	349
30											150	281
31											152	236
TOTAL											---	4727.4
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	164	242	55	15	61	1.6	197	59	54	1.7		
2	111	126	49	11	56	1.4	183	47	89	2.6		
3	104	99	30	5.8	31	.71	168	42	86	3.3		
4	105	96	41	7.5	37	.81	158	36	77	3.1		
5	93	80	19	3.5	38	.92	169	35	81	3.3		
6	82	68	25	5.5	43	1.4	169	31	73	3.2		
7	75	55	33	8.6	68	3.5	163	26	75	3.2		
8	67	47	31	12	71	12	157	22	87	6.6		
9	59	39	34	13	28	15	130	16	63	3.2		
10	54	35	30	8.7	30	19	94	10	113	4.6		
11	62	37	10	2.2	20	12	113	12	116	4.1		
12	132	120	28	5.1	49	35	113	10	83	2.5		
13	120	230	39	6.1	51	29	83	6.5	48	1.2		
14	72	128	18	2.5	118	47	80	6.0	58	1.4		
15	54	68	25	3.2	640	962	86	6.0	40	.81		
16	51	43	24	2.9	550	5320	84	5.0	31	.57		
17	50	32	42	4.9	218	1440	83	4.9	24	.46		
18	48	25	67	7.2	126	376	82	4.6	25	.46		
19	43	18	84	8.2	72	145	88	4.3	27	.49		
20	36	13	63	5.8	116	198	95	4.6	48	.87		
21	45	14	69	6.3	257	485	100	4.6	63	2.4		
22	68	18	45	4.0	143	239	106	4.6	34	1.2		
23	93	21	65	5.1	83	138	70	3.0	51	1.4		
24	55	11	54	4.1	64	107	77	3.3	71	1.5		
25	57	10	60	3.9	51	79	78	3.4	76	1.5		
26	60	12	59	3.7	97	73	76	3.5	111	2.1		
27	64	17	58	3.1	119	64	73	3.4	85	1.5		
28	77	32	47	2.2	132	56	69	3.0	38	.58		
29	87	37	48	2.1	192	72	68	2.8	25	.33		
30	63	22	43	1.6	200	67	63	2.4	39	.46		
31	---	---	74	2.4	---	---	60	2.1	56	.67		
TOTAL	---	1795	---	177.2	---	10000.34	---	424.0	---	61.30		

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, 8.70 ft (2.652 m) Apr. 2, 3, 4; minimum observed, 6.10 ft (1.859 m) Nov. 3, 4.

GAGE HEIGHT, IN FEET, OCTOBER 1983 TO SEPTEMBER 1984

Oct. 31	6.25	Feb. 29	7.45	June 30	8.10
Nov. 30	6.40	Mar. 31	8.65	July 31	6.85
Dec. 30	6.62	Apr. 30	7.50	Aug. 31	6.60
Jan. 31	6.70	May 31	6.80	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 mi² (3,000 km²), 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 except those for winter period, which are fair. Some regulation by Big Stone Lake (station 05291500).

AVERAGE DISCHARGE.--46 years, 107 ft³/s (3.030 m³/s), 77,520 acre-ft/yr (95.6 hm³/yr); median of yearly mean discharges, 78 ft³/s (2.21 m³/s), 56,500 acre-ft/yr (70 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,060 ft³/s (86.7 m³/s) Apr. 13, 1952, gage height, 12.92 ft (3.938 m); no flow Dec. 13, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,570 ft³/s (44.5 m³/s) June 16, gage height, 10.42 ft (3.176 m); minimum, 0.12 ft³/s (0.003 m³/s) Sept. 6, 7, gage height, 0.91 ft (0.277 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	.80	8.6	1.5	1.9	370	814	462	3.4	873	3.0	.31
2	1.9	.78	3.0	1.7	2.1	360	857	422	1.8	833	2.5	.34
3	2.1	.82	2.5	1.8	2.3	350	909	432	2.3	820	3.4	.27
4	1.8	.75	2.4	1.8	2.5	370	957	434	5.5	771	4.6	.31
5	2.8	2.6	2.4	1.9	3.0	360	952	442	5.5	733	4.6	.20
6	2.6	5.2	2.3	2.1	3.0	350	928	439	9.8	675	5.0	.14
7	2.3	5.0	2.2	1.9	2.8	340	898	720	8.4	582	5.5	.20
8	1.8	5.2	2.1	1.7	2.8	320	885	654	11	565	5.5	.27
9	1.3	6.5	1.7	1.7	2.8	295	870	472	9.1	589	6.0	.18
10	1.3	3.7	1.6	1.4	3.0	290	843	443	13	595	6.6	.20
11	1.8	2.3	1.6	1.4	3.4	280	755	500	13	568	9.1	.18
12	1.4	1.2	1.8	1.4	4.2	265	848	386	14	512	4.6	.27
13	1.2	1.4	1.8	1.4	3.8	235	939	510	11	456	9.8	.38
14	1.0	3.6	1.8	1.4	3.0	175	966	283	12	462	16	.31
15	1.5	4.7	1.8	1.4	3.4	181	960	43	207	488	14	.31
16	1.2	4.3	1.8	1.4	4.2	166	919	7.4	1060	412	6.6	.27
17	1.0	3.9	1.8	1.4	12	156	862	10	978	420	2.7	.27
18	3.0	4.0	1.8	1.4	45	148	825	8.4	936	244	.57	.31
19	2.2	8.2	1.8	1.4	37	110	740	5.5	928	7.2	.41	.31
20	1.1	7.0	1.8	1.4	39	36	666	4.2	939	2.5	.53	.31
21	2.3	3.9	1.8	1.4	45	11	622	4.6	961	2.5	1.8	.22
22	3.7	3.4	1.8	1.4	68	12	604	2.8	979	3.8	.38	.31
23	3.1	4.0	1.8	1.4	190	85	554	1.3	1000	4.2	.47	1.3
24	3.4	2.9	1.8	1.4	320	310	580	1.8	952	3.4	1.0	3.0
25	2.9	4.6	1.8	1.5	365	558	509	3.4	906	3.4	1.1	1.8
26	1.9	11	1.8	1.4	365	543	509	1.9	946	3.8	1.3	.92
27	1.0	11	1.8	1.4	380	495	501	2.5	949	3.0	1.4	1.0
28	1.0	11	1.8	1.4	375	564	678	3.0	979	3.0	1.0	1.1
29	1.7	11	1.7	1.4	370	650	513	3.0	936	3.0	.92	1.0
30	1.7	11	1.7	1.8	---	758	679	2.8	888	3.0	1.8	1.0
31	.88	---	1.7	1.6	---	786	---	2.8	---	3.0	.27	---
TOTAL	58.88	145.75	66.1	47.6	2659.2	9929	23142	6707.4	14663.8	10643.8	122.45	16.99
MEAN	1.90	4.86	2.13	1.54	91.7	320	771	216	489	343	3.95	.57
MAX	3.7	11	8.6	2.1	380	786	966	720	1060	873	16	3.0
MIN	.88	.75	1.6	1.4	1.9	11	501	1.3	1.8	2.5	.27	.14
CFSM	.002	.004	.002	.001	.08	.28	.67	.19	.42	.30	.003	.000
IN.	.00	.00	.00	.00	.09	.32	.74	.22	.47	.34	.00	.00
AC-FT	117	289	131	94	5270	19690	45900	13300	29090	21110	243	34
CAL YR 1983	TOTAL	13438.62	MEAN	36.8	MAX	728	MIN	.75	CFSM	.03	IN	.43
WTR YR 1984	TOTAL	68202.97	MEAN	186	MAX	1060	MIN	.14	CFSM	.16	IN	2.19
									AC-FT	26660		
									AC-FT	135300		

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.--17.1 mi² (44.29 km²), revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February to November 1982, February to September 1983, and February to August 1984 (discontinued). Miscellaneous discharge measurements available for 1980 and 1981 water years.

GAGE.--Water-stage recorder 1982-84 and crest-stage gage 1980, 1982-84.

REMARKS.--Water-stage recorder operated only during open-water period. Records fair except those for period Feb. 9 to Mar. 22, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 656 ft³/s (18.58 m³/s) June 15, 1984, gage height, 18.16 ft (5.535 m); no flow on many days.

EXTREMES FOR CURRENT PERIOD.--October 1983, February to August 1984: Maximum discharge during period, 656 ft³/s (18.58 m³/s) June 15, gage height, 18.16 ft (5.535 m); no flow Aug. 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	.50	36	5.7	1.9	4.2	.14	
2					---	.50	36	5.5	1.7	4.2	.00	
3					---	.50	33	5.7	1.6	4.2	---	
4					---	.50	28	5.5	1.8	4.0	---	
5					---	.50	28	5.1	2.3	3.7	---	
6					---	.30	25	12	23	3.4	---	
7					---	.30	22	20	39	3.3	---	
8					---	.30	20	12	37	3.0	---	
9					.40	.30	20	8.6	17	2.7	---	
10					.40	.30	16	7.6	22	2.6	---	
11					.40	.30	19	6.2	17	2.5	---	
12					.40	.30	44	7.1	15	2.1	---	
13					.40	.50	45	11	11	1.8	---	
14					.40	.50	48	7.3	12	1.7	---	
15					1.0	.50	30	6.3	195	1.6	---	
16					1.5	.50	20	5.5	80	1.5	---	
17					.80	.50	16	4.8	50	1.5	---	
18					.50	.50	13	4.3	37	1.4	---	
19					.50	1.0	11	4.0	24	1.2	---	
20					.50	1.0	9.2	3.8	20	1.1	---	
21					1.5	2.0	8.1	3.7	16	.83	---	
22					3.0	6.0	7.6	3.8	19	.67	---	
23					6.0	19	6.8	3.4	22	.95	---	
24					3.0	84	6.6	3.1	14	1.1	---	
25					1.5	112	6.2	2.9	11	1.2	---	
26					1.0	62	7.6	2.7	10	1.4	---	
27					.50	38	12	2.7	7.1	1.2	---	
28					.50	30	9.2	2.9	6.0	.95	---	
29					.50	44	7.3	2.9	5.3	.72	---	
30					---	47	6.4	2.4	4.8	.44	---	
31					---	39	---	2.2	---	.28	---	
TOTAL					---	492.60	597.0	180.7	723.5	61.44	---	
MEAN					---	15.9	19.9	5.83	24.1	1.98	---	
MAX					---	112	48	20	195	4.2	---	
MIN					---	.30	6.2	2.2	1.6	.28	---	
CFSM					---	7.57	9.48	2.78	11.5	.94	---	
IN.					---	8.72	10.57	3.20	12.81	1.09	---	
AC-FT					---	977	1180	358	1440	122	---	

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.

WATER-DISCHARGE RECORDS

GAGE.-- Water-stage recorder 1982-83 and crest-stage gage 1982-84.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 528 ft³/s (14.95 m³/s) Jun. 15, 1984 gage height, 5.13 ft (1.563 m); no flow on many days.

EXTREMES FOR CURRENT PERIOD.-- March to August 1984: Maximum discharge during period, 528 ft³/s (14.95 m³/s) June 15, gage height, 5.13 ft (1.563 m); no flow on several days.

WATER-QUALITY RECORDS

PERIOD OF RECORD.-- Water years 1980, 1982-84 (discontinued).

PERIOD OF DAILY RECORD.--
SUSPENDED-SEDIMENT: March 1 to May 31, 1983.

INSTRUMENTATION.-- Automatic sampler May 1982 to September 1983.

REMARKS.-- Letter E indicates estimated value.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE LAB (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)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	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)
MAR 29...	1718	67	434	458	7.7	7.3	1.0	724	13.3	57	21	3.9
APR 18...	1400	11	572	--	7.9	--	11.5	725	9.8	--	--	--
26...	1320	7.0	713	--	8.2	--	10.0	754	9.8	--	--	--
MAY 09...	1630	11	760	--	8.4	--	10.5	725	--	--	--	--
JUN 06...	1858	33	744	--	7.8	--	20.5	712	7.4	--	--	--
08...	1000	45	540	--	7.7	--	16.5	720	7.7	--	--	--
14...	1445	12	758	--	7.8	--	17.5	728	7.3	--	--	--

[illegible]

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, March 1984 to August 1984.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1973 to September 1981, March 1982 to August 1982, March 1983 to August 1983, March 1984 to August 1984.

SUSPENDED-SEDIMENT DISCHARGE: October 1973 to September 1981, March 1982 to August 1982, March 1983 to August 1983, March 1984 to August 1984.

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 1984:

WATER TEMPERATURES: Maximum daily, 27.0°C July 29; minimum daily, 0.0°C on several days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 884 mg/L June 16; minimum daily mean, 20 mg/L May 12.

SEDIMENT LOADS: Maximum daily, 3,700 tons (3,360 tonnes) June 17; minimum daily, 0.77 ton (0.70 tonne) Aug. 12, 31.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---		---	---	---	---	6.0	11.0	20.0	23.0	24.0	
2	---		1.0	---	---	.5	7.5	10.0	16.0	22.0	24.0	
3	14.0		---	---	---	---	6.0	9.0	17.0	25.0	24.0	
4	---		---	---	---	---	5.0	10.0	19.0	23.0	24.0	
5	---		---	---	---	1.0	7.0	11.0	23.0	23.0	25.0	
6	---		---	---	---	1.0	8.0	13.0	21.0	21.0	25.0	
7	---		---	---	---	1.0	9.0	11.0	20.0	20.0	24.0	
8	---		---	---	---	---	8.5	9.0	19.0	23.0	23.0	
9	---		---	---	---	---	6.0	9.0	---	24.0	22.0	
10	---		---	---	---	---	7.0	12.0	17.0	24.0	21.0	
11	---		---	---	---	---	7.0	13.0	16.0	22.0	22.0	
12	---		---	---	---	---	7.0	14.0	17.0	24.0	24.0	
13	---		---	---	---	---	7.0	10.0	19.0	24.0	25.0	
14	---		---	---	---	---	8.0	13.0	19.0	25.0	25.0	
15	---		---	---	---	---	9.0	16.0	19.0	23.0	24.0	
16	---		---	---	---	---	11.0	17.0	20.0	24.0	22.0	
17	---		---	---	---	---	11.0	20.0	21.0	20.0	24.0	
18	---		---	---	---	---	10.0	17.0	23.0	20.0	22.0	
19	---		---	---	---	---	10.0	18.0	22.0	22.0	23.0	
20	---		---	---	---	---	12.0	18.0	22.0	22.0	22.0	
21	---		---	---	---	1.0	11.0	19.0	23.0	22.0	21.0	
22	---		---	---	---	1.0	12.0	16.0	23.0	24.0	19.0	
23	---		---	---	---	1.0	11.0	15.0	21.0	24.0	17.5	
24	---		---	---	2.0	1.0	11.0	18.0	23.0	23.0	19.0	
25	---		---	---	---	1.0	11.0	15.0	21.0	22.0	20.0	
26	---		---	---	---	1.5	11.5	12.0	24.0	20.0	22.0	
27	---		---	---	---	1.0	12.0	15.0	22.0	21.0	22.0	
28	---		---	---	---	1.0	8.0	13.0	22.0	22.0	23.0	
29	---		---	---	---	2.0	12.0	14.0	22.0	27.0	23.0	
30	---		---	.0	---	3.0	11.0	15.0	23.0	23.0	20.0	
31	---		---	---	---	5.0	---	17.0	---	24.0	18.0	
MEAN	---		---	---	---	---	9.0	14.0	---	23.0	22.5	
MAX	---		---	---	---	---	12.0	20.0	24.0	27.0	25.0	
MIN	---		---	---	---	---	5.0	9.0	16.0	20.0	17.5	

MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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											55	28
2											55	25
3											45	20
4											55	19
5											58	15
6											54	10
7											69	8.8
8											58	5.2
9											56	3.6
10											56	3.0
11											56	2.7
12											56	2.7
13											56	2.9
14											56	2.9
15											56	3.2
16											56	3.3
17											56	2.9
18											56	2.9
19											56	2.9
20											56	3.0
21											68	12
22											68	18
23											55	32
24											94	188
25											308	1350
26											322	1320
27											298	805
28											224	469
29											247	455
30											238	436
31											188	334
TOTAL											---	5586.0

	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	164	287	68	19	53	2.4	149	53	106	2.3		
2	133	187	58	14	41	1.5	151	46	95	2.0		
3	120	150	56	12	57	2.0	150	39	93	2.0		
4	114	130	60	12	70	2.1	147	35	79	1.7		
5	109	113	38	7.5	102	3.0	127	26	74	1.6		
6	108	111	30	5.9	93	3.5	123	21	84	1.8		
7	119	111	43	10	49	2.5	151	24	97	2.9		
8	94	81	63	19	108	38	174	27	89	2.6		
9	87	71	68	28	138	144	152	21	96	2.9		
10	74	56	67	27	90	113	144	16	71	1.9		
11	68	50	38	12	86	77	79	7.7	50	1.2		
12	59	51	20	5.5	70	57	135	12	36	.77		
13	181	314	27	6.2	72	52	152	12	64	1.3		
14	200	458	51	10	163	107	125	9.5	80	1.4		
15	157	341	68	14	504	638	73	5.1	85	1.5		
16	128	209	69	13	884	3860	123	7.6	86	1.3		
17	106	125	106	19	469	3700	139	8.3	97	1.5		
18	98	88	117	18	304	1340	149	8.0	91	1.4		
19	109	80	78	11	207	615	118	5.4	60	.79		
20	120	74	77	8.9	145	315	148	6.4	85	1.2		
21	86	44	105	11	123	218	155	5.9	163	3.4		
22	80	35	102	9.9	162	249	157	5.9	179	3.2		
23	89	33	65	5.8	292	483	156	5.9	60	1.0		
24	82	26	55	4.6	178	303	91	3.2	92	1.5		
25	87	24	88	6.9	125	177	110	3.6	72	1.2		
26	90	23	61	4.3	163	172	88	2.9	73	1.2		
27	77	20	89	6.0	170	133	80	2.6	85	1.4		
28	61	17	82	5.3	161	102	132	3.9	99	1.6		
29	77	25	59	3.3	152	78	108	2.8	82	1.4		
30	63	20	49	2.5	163	70	128	3.2	76	1.0		
31	---	---	78	3.8	---	---	108	2.7	70	.77		
TOTAL	---	3354	---	355.4	---	13058.0	---	432.6	---	51.73		

MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN--Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

[illegible]

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 mi² (2,344 km²), 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.--49 years (water years 1936-84), 105 ft³/s (2.974 m³/s), 1.58 in/yr (40 mm/yr), 76,070 acre-ft/yr (93.8 hm³/yr); median of yearly mean discharge, 93 ft³/s (2.63 m³/s), 1.40 in/yr (36 mm/yr), 67,400 acre-ft/yr (83 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,520 ft³/s (156 m³/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 ft³/s (5.66 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Mar. 27	1145	1280 36.2	7.63 2.326	Apr. 28	2400	376 10.6	5.87 1.789
Apr. 14	0800	996 28.2	7.07 2.155	May 8	1945	539 15.3	6.20 1.890
				June 25	0845	676 19.1	6.40 1.951

Minimum daily, 11 ft³/s (0.31 m³/s) Dec. 28 to Jan. 1; minimum gage height, 4.06 (1.237 m) Dec. 30, 31.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	22	42	32	11	21	131	739	333	162	459	84	102		
2	22	42	32	12	21	123	771	317	154	429	83	97		
3	22	42	32	13	21	110	747	306	147	405	88	93		
4	22	39	31	14	21	93	709	313	148	375	108	91		
5	23	41	29	15	19	82	657	316	156	352	105	89		
6	23	43	28	16	18	78	612	340	197	337	99	85		
7	28	44	26	17	18	80	594	404	204	311	98	84		
8	25	42	24	17	18	78	590	499	206	287	97	82		
9	25	44	23	18	18	79	587	516	226	267	102	79		
10	24	42	21	20	18	88	569	479	226	246	102	77		
11	24	50	20	18	18	95	546	439	229	228	99	75		
12	25	55	19	18	19	115	600	403	237	212	95	80		
13	27	52	18	18	20	109	774	381	255	196	92	76		
14	29	50	17	18	21	88	951	369	264	183	90	75		
15	33	50	16	18	22	71	870	359	293	172	89	73		
16	35	48	15	18	23	65	780	340	389	162	86	70		
17	35	47	15	18	24	66	704	319	524	158	85	67		
18	40	45	14	18	24	67	640	305	534	153	85	65		
19	41	50	14	18	24	66	574	291	505	143	81	62		
20	48	50	14	17	25	61	512	278	473	133	80	60		
21	54	64	14	18	27	62	453	274	471	125	89	58		
22	54	68	13	19	31	68	409	269	502	119	90	56		
23	50	48	13	22	38	93	376	260	539	117	96	61		
24	46	24	13	22	48	160	348	243	612	112	90	79		
25	44	40	12	21	58	362	320	228	649	111	91	84		
26	43	55	11	21	83	1080	310	217	617	109	143	81		
27	41	45	11	19	126	1200	322	209	576	105	127	75		
28	39	35	11	21	149	1040	349	199	551	100	128	70		
29	38	32	11	21	146	898	359	192	521	95	122	72		
30	41	32	11	21	---	843	337	180	489	90	110	71		
31	40	---	11	21	---	760	---	170	---	87	106	---		
TOTAL	1063	1361	571	558	1119	8311	17109	9748	11056	6378	3040	2289		
MEAN	34.3	45.4	18.4	18.0	38.6	268	570	314	369	206	98.1	76.3		
MAX	54	68	32	22	149	1200	951	516	649	459	143	102		
MIN	22	24	11	11	18	61	310	170	147	87	80	56		
CFSM	.04	.05	.02	.02	.04	.30	.63	.35	.41	.23	.11	.08		
IN.	.04	.06	.02	.02	.05	.34	.70	.40	.45	.26	.12	.09		
AC-FT	2110	2700	1130	1110	2220	16480	33940	19340	21930	12650	6030	4540		
CAL YR 1983	TOTAL	24369	MEAN	66.8	MAX	231	MIN	11	CFSM	.07	IN	1.00	AC-FT	48340
WTR YR 1984	TOTAL	62603	MEAN	171	MAX	1200	MIN	11	CFSM	.19	IN	2.57	AC-FT	124200

MINNESOTA RIVER BASIN

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 mi² (482 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to October 1982, February to November 1983, and February to November 1984 (discontinued).

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

REMARKS.--Records good except those for Oct. 1 to Nov. 2, Feb. 10 - 22, Mar. 3 - 24, and Mar. 25 - 28, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 941 ft³/s (26.6 m³/s) June 29, 1984, gage height, 5.91 ft (1.801 m); no flow on many days, in 1982 and 1983.

EXTREMES FOR CURRENT PERIOD.--October, November 1983 and February to November 1984: Maximum discharge during period, 941 ft³/s (26.6 m³/s) June 29, gage height, 5.91 ft (1.801 m); minimum, 0.35 ft³/s (0.010 m³/s) Sept. 22, gage height, 1.46 ft (0.445 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.50	.70			---	24	519	108	33	186	16	.85
2	.50	.70			---	29	467	104	31	168	21	.90
3	.50	---			---	29	407	100	27	160	19	.93
4	.50	---			---	25	385	96	27	148	19	1.0
5	.50	---			---	25	388	96	39	133	17	.99
6	.50	---			---	10	373	99	124	120	15	.95
7	.50	---			---	10	346	153	143	109	14	1.1
8	.50	---			---	5.0	336	140	188	98	13	1.2
9	.50	---			---	5.0	330	120	160	93	11	.99
10	.50	---			3.5	5.0	339	107	295	88	9.4	.97
11	.50	---			3.5	8.0	372	96	344	85	7.7	1.0
12	.50	---			3.5	5.0	540	87	548	81	6.5	1.3
13	.50	---			3.5	5.0	621	87	452	74	5.8	1.1
14	.60	---			4.0	6.0	569	82	403	73	5.0	1.1
15	.60	---			4.5	8.0	492	79	416	67	4.6	1.1
16	.60	---			5.0	6.0	422	75	414	62	4.2	.98
17	.60	---			6.0	5.0	372	73	431	57	5.7	.89
18	.60	---			7.0	5.0	320	70	519	54	5.8	.84
19	.60	---			9.0	5.0	287	65	543	49	4.3	.72
20	.60	---			15	9.0	253	62	779	47	3.7	.54
21	.60	---			9.0	13	222	59	739	44	4.5	.52
22	.60	---			9.0	20	194	58	682	41	5.5	.39
23	.60	---			15	40	171	52	609	39	4.5	.63
24	.70	---			26	37	153	48	508	34	3.4	1.2
25	.70	---			27	95	138	47	434	32	2.7	9.4
26	.70	---			17	108	137	43	377	30	2.4	6.7
27	.70	---			19	203	141	42	324	27	2.1	4.4
28	.70	---			23	105	145	43	284	24	1.8	3.0
29	.70	---			25	236	129	42	248	21	1.4	2.3
30	.70	---			---	325	122	38	214	18	1.1	2.8
31	.70	---			---	486	---	35	---	16	.93	---
TOTAL	18.10	---			---	1897.0	9690	2406	10335	2278	238.03	61.59
MEAN	.58	---			---	61.2	323	77.6	345	73.5	7.68	2.05
MAX	.70	---			---	486	621	153	779	186	21	12
MIN	.50	---			---	5.0	122	35	27	16	.93	.39
CFSM	.003	---			---	.33	1.74	.42	1.86	.40	.04	.01
IN.	.00	---			---	.38	1.94	.48	2.07	.46	.05	.01
AC-FT	36	---			---	3760	19220	4770	20500	4520	472	122

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
MEAN VALUES

[illegible]

MINNESOTA RIVER BASIN

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

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-84.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: March to April 1982, February to July 1983, and March to July 1984.

INSTRUMENTATION.-- Automatic sampler, since March 1982.

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 PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 566 mg/L July 31, 1983; minimum daily mean, 0 mg/L during periods of zero flow in 1982 and 1983.

SEDIMENT LOADS: Maximum daily, 995 tons (902 tonnes) June 20, 1984; minimum daily, 0.00 ton (0.00 tonne) during periods of zero flow in 1982 and 1983.

EXTREMES FOR CURRENT PERIOD.-- March to July 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 536 mg/L Mar. 31; minimum daily mean, 9 mg/L June 4.

SEDIMENT LOADS: Maximum daily during period, 995 tons (902 tonnes) June 20; minimum daily, 0.66 ton (0.66 tonne) June 4.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)
NOV									
02...	1000	--	.68	1470	--	7.6	--	10.0	731
FEB									
08...	1620	--	1.9	752	--	8.4	--	.0	724
10...	1243	--	3.5	1000	--	--	--	.0	730
MAR									
02...	1315	--	29	1030	1140	8.2	7.8	.0	--
28-31	1720	266	--	--	699	--	7.3	--	--
28...	1800	--	146	607	--	7.8	--	2.5	730
30...	1330	--	276	682	--	7.9	--	2.0	729
APR									
01-04	1720	266	--	--	699	--	7.3	--	--
04...	1200	--	378	698	--	7.8	--	6.0	728
06...	1400	--	363	728	--	7.2	--	7.5	725
11...	1400	--	328	725	--	--	--	--	--
11-19	1400	400	--	--	797	--	7.8	--	--
19...	0940	--	287	728	--	8.1	--	9.5	726
20-26	1615	178	--	--	--	--	--	--	--
26...	2000	--	138	766	--	8.0	--	12.0	754
MAY									
11...	1545	--	95	826	877	8.1	8.2	17.0	724
16...	1200	--	76	--	--	--	--	--	--
22...	1300	--	57	786	--	8.2	--	16.5	723
JUN									
05-15	1630	198	--	--	732	--	7.8	--	--
07...	1200	--	130	817	--	7.8	--	20.0	713
08...	1300	--	186	850	--	7.8	--	19.0	718
12...	2100	--	502	705	--	7.8	--	20.5	730
15...	1415	--	416	741	--	7.8	--	19.0	728
20-25	0730	672	--	--	--	--	--	--	--
JUL									
13...	0915	--	77	727	--	8.0	--	22.0	720
AUG									
09...	1140	--	12	884	--	8.3	--	21.5	730
SEP									
06...	0830	--	1.3	1140	--	--	--	14.5	720

MINNESOTA RIVER BASIN

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

[illegible]

MINNESOTA RIVER BASIN

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

WATER QUALITY DATA, WATER YEAR OTOBER 1983 TO SEPTEMBER 1984

DATE	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)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV									
02...	--	--	--	--	<.10	.30	.01	--	--
FEB									
08...	--	--	--	--	--	--	--	18	--
10...	--	--	--	--	--	--	--	13	--
MAR									
02...	9.6	.30	17	803	2.4	.80	.13	--	--
28-31	8.4	.20	13	468	2.0	3.4	.14	--	--
28...	--	--	--	--	--	--	--	278	--
30...	--	--	--	--	--	--	--	211	--
APR									
01-04	8.4	.20	13	468	2.0	3.4	.14	--	--
04...	--	--	--	--	--	--	--	287	--
06...	--	--	--	--	--	--	.25	337	--
11...	--	--	--	--	--	--	--	4	--
11-19	9.8	.20	13	616	1.8	1.3	.14	--	--
19...	--	--	--	--	--	--	--	190	--
20-26	--	--	--	--	.43	1.2	.12	--	--
26...	--	--	--	--	--	--	--	51	--
MAY									
11...	12	.30	2.5	761	.37	5.0	.03	40	--
16...	--	--	--	--	--	--	--	31	--
22...	--	--	--	--	--	--	--	31	--
JUN									
05-15	10	.30	12	571	1.9	2.1	.21	--	--
07...	--	--	--	--	--	--	--	151	--
08...	--	--	--	--	--	--	--	160	88
12...	--	--	--	--	--	--	--	246	--
15...	--	--	--	--	--	--	--	131	--
20-25	--	--	--	--	--	--	.23	--	--
JUL									
13...	--	--	--	--	--	--	--	94	--
AUG									
09...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	.02	--	--

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)	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)
MAR											
30...	1330	276	211	31	38	45	56	82	90	98	100
JUN											
20...	1800	796	610	38	42	46	56	80	89	94	100

MINNESOTA RIVER BASIN

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

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
JUN 08...	1300	3	6	14	33	50	59	68	78	89	100

SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
	MARCH		APRIL		MAY		JUNE		JULY	
1	---	---	472	661	20	5.8	23	2.0	98	49
2	---	---	345	435	16	4.5	21	1.8	94	43
3	---	---	310	341	18	4.9	18	1.3	89	38
4	---	---	285	296	24	6.2	9	.66	86	34
5	---	---	260	272	22	5.7	121	13	84	30
6	---	---	238	240	21	5.6	472	167	80	26
7	---	---	233	218	56	23	284	117	78	23
8	---	---	230	209	56	21	247	125	83	22
9	---	---	228	203	33	11	139	60	92	23
10	---	---	225	206	23	6.6	365	291	99	24
11	---	---	233	234	38	9.8	250	255	101	23
12	---	---	348	507	34	8.0	480	710	100	22
13	---	---	361	605	28	6.6	152	186	100	20
14	---	---	309	475	26	5.8	185	201	---	---
15	---	---	277	368	29	6.2	153	172	---	---
16	---	---	248	283	30	6.1	103	115	---	---
17	---	---	227	228	30	5.9	100	116	---	---
18	---	---	210	181	30	5.7	189	265	---	---
19	---	---	191	148	30	5.3	208	345	---	---
20	---	---	170	116	31	5.2	473	995	---	---
21	---	---	146	88	31	4.9	396	790	---	---
22	---	---	124	65	30	4.7	354	652	---	---
23	---	---	101	47	30	4.2	245	403	---	---
24	---	---	80	33	28	3.6	153	210	---	---
25	---	---	61	23	24	3.0	138	162	---	---
26	---	---	52	19	21	2.4	130	132	---	---
27	---	---	44	17	21	2.4	122	107	---	---
28	---	---	43	17	19	2.2	112	86	---	---
29	255	162	32	11	21	2.4	107	72	---	---
30	360	316	22	7.2	23	2.4	103	60	---	---
31	536	703	---	---	23	2.2	---	---	---	---
TOTAL	---	---	---	6553.2	---	193.3	---	6812.76	---	---

MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN

LOCATION.--Lat 44°49'00", long 96°25'10", 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 mi² (130 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to September 1982 (annual maximum). October 1982 to November 1983, and February to November 1984 (no winter record), (discontinued).

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

REMARKS.--Records fair except those below 5.0 ft³/s (0.14 m³/s), which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 471 ft³/s (13.34 m³/s) Mar. 29, 1984, gage-height, 18.38 ft (5.602 m); minimum observed discharge, 0.56 ft³/s (0.016 m³/s) Aug. 23, 1983, but may have been lower during periods of no gage-height record.

EXTREMES FOR CURRENT PERIOD.--October, November 1983, February to November 1984: Maximum discharge during period, 471 ft³/s (13.34 m³/s) Mar. 29, gage height, 18.38 ft (5.602 m); minimum daily discharge (estimated), 0.50 ft³/s (0.007 m³/s) March 10-17, but may have been less during other periods of no gage-height record, Aug. 9 to Sept. 23, 26 to Oct. 13.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	2.4			---	18	202	23	7.2	44	4.8	1.8
2	1.7	2.4			---	13	188	22	6.6	38	4.5	1.8
3	1.4	---			---	10	186	22	6.6	33	5.4	1.8
4	1.2	---			---	15	176	22	6.2	28	5.8	1.7
5	1.2	---			---	28	173	22	14	24	5.4	1.7
6	1.4	---			---	22	151	24	117	21	5.1	1.7
7	1.4	---			---	18	127	45	80	19	4.8	1.7
8	1.7	---			1.9	10	114	43	93	17	4.5	1.7
9	1.7	---			2.4	2.5	98	30	90	16	4.0	1.7
10	1.9	---			2.9	.50	78	24	224	15	3.8	1.7
11	1.9	---			2.9	.50	85	22	299	14	3.5	1.7
12	1.9	---			3.1	.50	191	20	350	13	3.3	1.7
13	2.2	---			2.9	.50	227	23	297	12	3.2	1.7
14	2.0	---			3.1	.50	214	21	289	9.7	3.0	1.7
15	2.4	---			3.4	.50	186	19	396	10	2.9	1.7
16	3.4	---			5.1	.50	159	17	308	9.0	2.8	1.7
17	2.9	---			6.6	.50	127	15	236	9.6	2.7	1.7
18	2.4	---			5.4	.50	93	14	202	7.2	2.6	1.7
19	2.9	---			12	.50	70	14	168	6.9	2.5	1.7
20	4.5	---			8.2	1.5	57	13	178	6.2	2.4	1.7
21	3.9	---			3.4	4.5	48	12	165	6.6	2.3	1.7
22	2.9	---			3.4	8.5	41	12	194	5.8	2.3	1.7
23	2.6	---			6.7	13	35	11	218	6.9	2.2	2.5
24	2.2	---			14	50	30	10	160	8.2	2.1	9.0
25	2.0	---			12	197	26	10	125	8.2	2.0	10
26	2.2	---			11	256	28	9.6	104	7.2	2.0	5.6
27	2.0	---			10	110	34	10	84	6.9	1.9	5.3
28	2.0	---			11	108	32	12	71	6.2	1.9	4.9
29	2.0	---			21	312	27	11	62	5.8	1.8	4.6
30	2.4	---			---	366	25	9.0	52	5.4	1.8	4.2
31	2.4	---			---	298	---	7.9	---	5.1	1.8	---
TOTAL	68.4	---			---	1866.00	3228	569.5	4602.6	424.9	99.1	83.8
MEAN	2.21	---			---	60.2	108	18.4	153	13.7	3.20	2.79
MAX	4.5	---			---	366	227	45	396	44	5.8	10
MIN	1.2	---			---	.50	25	7.9	6.2	5.1	1.8	1.7
CFSM	.04	---			---	1.20	2.16	.37	3.06	.27	.06	.06
IN.	.05	---			---	1.39	2.40	.42	3.42	.32	.07	.06
AC-FT	136	---			---	3700	6400	1130	9130	843	197	166

[illegible]

MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1982-84.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: February to June 1983, and February to July 1984.

INSTRUMENTATION.-- Automatic sampler since March 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 PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,260 mg/L, June 6, 1984; minimum daily mean, 13 mg/L, May 21, 22, 1983.

SEDIMENT LOADS: Maximum daily, 678 tons (615 tonnes) Mar. 29, 1984; minimum daily, 0.03 ton (0.03 tonne) Mar. 10-13, 1984 (discharge estimated).

EXTREMES FOR CURRENT PERIOD.--February to July 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 1,260 mg/L June 6; minimum daily mean, 14 mg/L June 4.

SEDIMENT LOADS: Maximum daily during period, 678 tons (615 tonnes) Mar. 29; minimum daily, 0.03 ton (0.03 tonne) Mar. 10-13 (discharge estimated).

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
NOV										
02...	1100	--	2.4	802	--	7.9	--	9.5	728	11.1
FEB										
08...	1620	--	1.9	752	--	8.4	--	.0	724	12.6
10...	1243	--	2.9	--	544	--	7.6	.0	725	--
MAR										
02...	1220	--	14	582	605	8.1	7.5	.0	725	11.6
28-31	1850	250	--	--	388	--	7.0	--	--	--
29...	1200	--	300	315	--	7.6	--	2.0	730	12.7
30...	1245	--	352	305	--	7.4	--	5.0	730	12.1
APR										
01-04	1850	250	--	--	388	--	7.0	--	--	--
04...	1530	--	174	421	--	7.8	--	10.0	730	8.7
06...	1500	--	146	458	436	7.9	7.6	9.0	722	10.7
11...	1530	--	88	597	--	8.3	--	7.0	713	11.5
19...	0940	--	74	668	--	8.2	--	10.0	724	10.1
MAY										
09...	1500	--	26	837	--	--	--	12.0	725	--
JUN										
05-07	2255	186	--	--	407	--	7.3	--	--	--
07...	1200	--	65	657	--	7.9	--	20.0	710	7.3
08...	1300	--	93	719	--	7.8	--	19.0	714	8.1
09-14	1730	502	--	--	620	--	7.4	--	--	--
14...	1800	--	305	566	--	7.7	--	18.5	725	8.0
15...	1415	--	405	518	--	7.5	--	18.0	725	8.8
JUL										
13...	1050	--	12	759	--	8.1	--	21.0	717	6.8
SEP										
05...	1800	--	1.7	729	--	8.1	--	17.5	720	10.4

MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

[illegible][illegible]

MINNESOTA RIVER BASIN

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	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)
MAR							
28...	1650	140	553	--	--	--	--
29...	1846	461	1060	--	--	--	--
30...	1245	352	501	26	30	32	39
MAY							
16...	1245	18	33	--	--	--	--
JUN							
14...	1800	305	522	28	35	--	48

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	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)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)	SED. SUSP. FALL DIAM. % FINER THAN 2.00 MM (70347)
MAR						
28...	--	--	--	--	--	--
29...	--	--	--	--	--	--
30...	61	68	76	90	100	--
MAY						
16...	--	--	--	--	--	--
JUN						
14...	62	66	68	76	95	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
APR											
04...	1530	1	1	5	22	48	68	79	87	91	100
JUN											
14...	1800	5	12	24	42	57	62	70	80	91	100

444410096251001 FLORIDA CREEK NEAR BURR, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY	
	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)
1	---	---	48	2.3	245	134	22	1.4	18	.35	29	3.4
2	---	---	25	.88	163	83	22	1.3	17	.30	29	3.0
3	---	---	24	.65	148	74	22	1.3	16	.29	30	2.7
4	---	---	34	1.4	143	68	22	1.3	14	.23	30	2.3
5	---	---	88	6.7	128	60	22	1.3	124	22	30	1.9
6	---	---	48	2.9	118	48	28	1.8	1260	589	30	1.7
7	---	---	26	1.3	108	37	65	7.9	257	65	30	1.5
8	18	.09	25	.68	101	31	24	2.8	355	89	38	1.7
9	15	.10	25	.17	94	25	18	1.5	325	79	63	2.7
10	16	.13	25	.03	88	19	22	1.4	577	388	92	3.7
11	15	.12	25	.03	95	22	23	1.4	220	178	109	4.1
12	15	.13	25	.03	304	163	24	1.3	260	246	118	4.1
13	15	.12	25	.03	196	120	24	1.5	133	107	120	3.9
14	15	.13	28	.04	134	77	27	1.5	318	273	---	---
15	16	.15	35	.05	106	53	28	1.4	400	428	---	---
16	17	.23	42	.06	100	43	30	1.4	218	181	---	---
17	18	.32	45	.06	93	32	30	1.2	180	115	---	---
18	20	.29	48	.06	86	22	30	1.1	148	81	---	---
19	58	1.9	50	.07	73	14	29	1.1	120	54	---	---
20	24	.53	55	.22	57	8.8	26	.91	110	53	---	---
21	20	.18	64	.78	48	6.2	22	.71	100	45	---	---
22	18	.17	74	1.7	39	4.3	19	.62	141	76	---	---
23	22	.40	83	2.9	38	3.6	21	.62	68	40	---	---
24	88	3.3	281	52	37	3.0	26	.70	62	27	---	---
25	76	2.5	835	460	37	2.6	27	.73	73	25	---	---
26	40	1.2	321	232	38	2.9	26	.67	97	27	---	---
27	50	1.4	59	19	44	4.0	26	.70	86	20	---	---
28	74	2.2	315	115	54	4.7	25	.81	52	10	---	---
29	95	5.4	805	678	37	2.7	23	.68	40	6.7	---	---
30	---	---	458	453	25	1.7	21	.51	34	4.8	---	---
31	---	---	405	326	---	---	20	.43	---	---	---	---
TOTAL	---	---	---	2358.04	---	1169.5	---	41.99	---	3230.67	---	---

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 mi² (2,546 km²).

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.--53 years (water years 1913, 1932, 1934-84), 125 ft³/s (3.540 m³/s), 1.73 in/yr (44 mm/yr), 90,560 acre-ft/yr (112 hm³/yr); median of yearly mean discharges, 108 ft³/s (3.06 m³/s), 1.49 in/yr (38 mm/yr), 78,200 acre-ft/yr (96 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,100 ft³/s (484 m³/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, 3,490 ft³/s (98.8 m³/s) June 18, gage height, 9.75 ft (2.972 m); minimum, no flow part of Sept. 2, 3; minimum gage height, 0.04 ft (0.012 m) Sept. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	2.0	10	67	10	11	780	2460	464	86	1140	75	.12		
2	2.7	10	65	10	12	700	2160	424	81	989	70	.00		
3	2.6	11	63	9.8	12	560	1900	388	71	855	67	.02		
4	2.6	12	61	9.8	12	450	1780	364	66	758	73	.05		
5	2.3	17	59	9.8	12	390	1650	343	74	664	78	.03		
6	1.6	14	56	9.8	11	385	1480	339	324	591	88	.08		
7	1.3	15	55	9.8	11	370	1350	409	510	520	93	.05		
8	.52	13	54	9.8	11	300	1260	454	1190	454	83	.08		
9	.52	19	53	9.8	11	270	1180	525	1460	409	71	.48		
10	.48	23	52	9.8	11	250	1120	543	1930	365	62	.90		
11	1.9	21	52	9.8	11	220	1100	483	2130	336	53	1.5		
12	1.9	20	51	9.8	12	195	1290	421	2180	314	42	2.7		
13	1.3	23	50	9.8	13	185	1540	432	2020	294	32	3.7		
14	2.2	27	48	9.8	14	175	1880	397	1980	265	26	5.6		
15	2.5	29	44	9.8	15	170	2120	381	2270	237	22	4.6		
16	4.0	32	42	9.8	18	150	2170	365	2700	218	20	6.0		
17	3.3	34	34	9.8	25	170	1980	330	2950	228	16	6.0		
18	4.1	40	29	9.8	25	170	1700	289	3430	176	12	5.6		
19	4.5	52	25	9.8	23	170	1430	258	3000	167	9.3	6.4		
20	4.3	71	22	9.8	24	175	1210	234	2600	158	11	5.3		
21	5.2	75	20	9.8	22	180	1030	220	2420	145	22	6.4		
22	7.6	86	18	9.8	14	225	883	196	2480	139	22	6.7		
23	12	94	17	9.8	21	380	779	178	2850	131	19	7.5		
24	12	98	15	10	175	815	683	165	2640	120	15	36		
25	13	85	14	10	385	1320	602	146	2500	113	11	36		
26	14	90	13	10	640	1710	546	128	2300	113	11	34		
27	15	88	12	10	810	2320	526	117	2050	108	7.1	62		
28	14	80	11	11	830	2640	518	108	1750	105	6.0	62		
29	14	82	11	11	860	2850	522	99	1500	96	3.2	54		
30	11	74	10	11	---	2710	500	95	1310	88	1.9	49		
31	9.0	---	10	11	---	2430	---	89	---	79	.90	---		
TOTAL	173.42	1345	1133	309.8	4051	23815	39349	9384	52852	10375	1122.40	402.81		
MEAN	5.59	44.8	36.5	9.99	140	768	1312	303	1762	335	36.2	13.4		
MAX	15	98	67	11	860	2850	2460	543	3430	1140	93	62		
MIN	.48	10	10	9.8	11	150	500	89	66	79	.90	.00		
CFSM	.006	.05	.04	.01	.14	.78	1.34	.31	1.79	.34	.04	.01		
IN.	.01	.05	.04	.01	.15	.90	1.49	.36	2.00	.39	.04	.02		
AC-FT	344	2670	2250	614	8040	47240	78050	18610	104800	20580	2230	799		
CAL YR 1983	TOTAL	43926.16	MEAN	120	MAX	871	MIN	.09	CFSM	.12	IN	1.66	AC-FT	87130
WTR YR 1984	TOTAL	144312.43	MEAN	394	MAX	3430	MIN	.00	CFSM	.40	IN	5.46	AC-FT	286200

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 mi² (10,500 km²), 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 mi² (5,310 km²) 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.--42 years, 635 ft³/s (17.98 m³/s), 460,100 acre-ft/yr (567 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,400 ft³/s (833 m³/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, 7,750 ft³/s (219 m³/s) June 24, gage height, 35.38 ft (10.784 m); minimum, 6.3 ft³/s (0.18 m³/s) Aug. 29, gage height, 20.18 ft (6.151 m), due to regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	198	551	600	165	237	1090	5340	3750	1100	4370	1100	361
2	197	550	580	165	246	1140	5340	3270	1070	4170	1090	361
3	200	550	565	135	267	1220	5090	2640	1030	4000	842	362
4	202	481	550	104	275	1230	5280	2300	988	3810	458	361
5	203	410	540	104	290	1270	5380	2220	987	3600	424	333
6	203	410	530	104	300	1440	5350	2170	1130	3390	411	358
7	205	411	520	104	305	1550	5180	2300	1370	3240	391	289
8	208	411	490	104	310	1520	5090	2390	1660	3140	392	159
9	212	404	450	106	317	1400	4940	2490	1840	3050	379	162
10	213	384	386	107	332	1210	4780	2480	2250	2960	473	128
11	213	355	370	109	331	1180	4680	2490	2810	2860	604	83
12	216	351	314	109	333	1170	4780	2450	3100	2760	604	84
13	219	343	221	110	332	1140	5190	2450	3390	2650	459	84
14	235	339	236	111	338	1130	6090	2390	3690	2550	236	86
15	250	330	345	111	341	1090	6830	2310	3990	2460	130	88
16	253	327	340	131	342	938	6940	2230	5050	2210	132	89
17	279	321	335	144	346	772	6960	2210	6210	1560	91	113
18	338	317	330	147	352	761	6790	2170	6560	1210	66	159
19	341	310	330	147	345	756	6120	2130	6720	1310	68	151
20	343	320	325	149	351	744	5470	2060	6700	1290	28	139
21	375	304	320	149	384	726	5220	1790	6590	1260	25	172
22	445	410	320	151	445	718	4920	1400	6570	1250	68	173
23	450	658	320	149	480	813	4610	1330	6920	1310	71	175
24	455	703	312	155	572	1070	4360	1300	7610	1340	71	185
25	450	689	312	174	709	1330	4180	1310	7700	1300	72	199
26	480	624	312	202	799	1480	4400	1260	7500	1280	74	213
27	549	610	249	216	846	1570	4670	1220	6800	1240	30	327
28	553	610	175	219	952	1570	4600	1190	5970	1200	11	515
29	554	610	175	221	1030	2290	4050	1150	5040	1160	59	511
30	552	611	170	227	---	3550	4060	1120	4520	1130	215	503
31	552	---	165	228	---	4780	---	1080	---	1110	361	---
TOTAL	10143	13704	11187	4557	12507	42648	156690	63050	126865	70170	9435	6923
MEAN	327	457	361	147	431	1376	5223	2034	4229	2264	304	231
MAX	554	703	600	228	1030	4780	6960	3750	7700	4370	1100	515
MIN	197	304	165	104	237	718	4050	1080	987	1110	11	83
CFSM	.08	.11	.09	.04	.11	.34	1.29	.50	1.04	.56	.08	.06
IN.	.09	.13	.10	.04	.11	.39	1.44	.58	1.17	.64	.09	.06
AC-FT	20120	27180	22190	9040	24810	84590	310800	125100	251600	139200	18710	13730
CAL YR 1983	TOTAL	189248	MEAN	518	MAX	1600	MIN	47	CFSM	.13	IN	1.74
WTR YR 1984	TOTAL	527879	MEAN	1442	MAX	7700	MIN	11	CFSM	.36	IN	4.85
									AC-FT	375400		
									AC-FT	1047000		

MINNESOTA RIVER BASIN

05304500 CHIPPEWA RIVER NEAR MILAN, MN

LOCATION.--Lat 45°06'39", long 95°47'57", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ 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 mi² (4,840 km²), 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.--47 years, 279 ft³/s (7.901 m³/s), 2.03 in/yr (52 mm/yr), 202,100 acre-ft/yr (249 hm³/yr); median of yearly mean discharges, 225 ft³/s (6.37 m³/s), 1.63 in/yr (41 mm/yr), 163,000 acre-ft/yr (201 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,400 ft³/s (323 m³/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 ft³/s (11.3 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Oct. 21	2130	460 13.0	2.85 0.869	Apr. 13	1930	3,060 86.7	7.29 2.222
Nov. 21	1100	739 20.9	3.38 1.030	May 8	0830	1,680 47.6	5.19 1.582
Nov. 25	2100	733 20.8	a5.07 1.545	June 15	1530	*4,770 135	9.42 2.871
Feb. 29	0745	1,160 32.9	a5.92 1.804	June 23	1915	3,290 93.2	7.56 2.304
Mar. 27	1800	3,300 93.5	a10.48 3.194	Aug. 26	1215	858 24.3	3.68 1.122
Mar. 28	0015	ice jam --	*a10.56 3.219	Sep. 25	1145	1,080 30.6	4.10 1.250
Mar. 29	1930	3,560 101	7.91 2.411				

a Backwater from ice.

Minimum discharge, 120 ft³/s (3.40 m³/s) Feb. 5-13; minimum gage height, 2.13 ft (0.649 m) Sept. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	270	362	395	182	134	1130	1880	1060	542	1440	384	385
2	297	350	390	182	133	1120	1770	1040	504	1350	385	359
3	299	340	380	182	128	1090	1670	1010	473	1290	381	338
4	299	336	365	180	123	1040	1560	994	461	1220	394	318
5	294	343	340	180	120	1020	1480	993	492	1160	403	305
6	289	340	310	180	120	900	1410	1010	1130	1110	393	296
7	282	336	280	180	120	740	1350	1270	2030	1060	383	287
8	275	329	270	180	120	715	1310	1650	2220	1000	374	285
9	267	332	268	178	120	690	1280	1510	2330	949	367	278
10	261	343	265	175	120	650	1250	1400	2170	901	357	268
11	271	350	260	170	120	610	1310	1320	2250	867	348	263
12	286	350	258	165	120	570	2200	1260	2920	826	336	265
13	292	354	258	160	120	530	2950	1220	3330	784	327	289
14	288	362	255	160	125	500	2830	1190	3100	745	316	286
15	300	373	250	155	135	490	2420	1150	3930	706	307	273
16	307	377	247	152	150	480	2150	1110	4110	682	297	263
17	310	377	244	150	175	465	1960	1060	3710	667	288	254
18	311	381	240	148	185	450	1810	1000	3360	635	302	248
19	335	406	240	148	190	440	1690	962	2920	606	300	242
20	387	562	235	145	210	445	1580	917	2410	576	282	235
21	446	728	230	144	260	450	1490	879	2140	551	295	222
22	457	712	225	143	325	620	1400	860	2540	521	302	216
23	442	674	220	142	660	1290	1320	814	3150	518	303	215
24	427	505	200	142	930	1500	1260	791	3170	583	298	456
25	418	520	190	140	1060	1690	1200	771	2730	540	373	1010
26	429	540	190	140	1130	1960	1160	729	2290	503	809	755
27	414	500	190	140	1120	2420	1160	700	1990	477	685	610
28	384	450	190	140	1120	2250	1190	670	1810	455	583	525
29	387	420	190	140	1130	2620	1160	634	1680	433	515	465
30	390	405	185	139	---	2130	1100	610	1550	417	451	432
31	373	---	185	138	---	1980	---	580	---	399	410	---
TOTAL	10487	12757	7945	4900	10503	32985	48300	31164	67442	23971	11948	10643
MEAN	338	425	256	158	362	1064	1610	1005	2248	773	385	355
MAX	457	728	395	182	1130	2620	2950	1650	4110	1440	809	1010
MIN	261	329	185	138	120	440	1100	580	461	399	282	215
CFSM	.18	.23	.14	.08	.19	.57	.86	.54	1.20	.41	.21	.19
IN.	.21	.25	.16	.10	.21	.66	.96	.62	1.34	.48	.24	.21
AC-FT	20800	25300	15760	9720	20830	65430	95800	61810	133800	47550	23700	21110
CAL YR 1983	TOTAL	137198	MEAN 376	MAX 1400	MIN 137	CFSM .20	IN 2.73	AC-FT	272100			
WTR YR 1984	TOTAL	273045	MEAN 746	MAX 4110	MIN 120	CFSM .40	IN 5.43	AC-FT	541600			

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 mi² (16,000 km²), 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.--63 years (water years 1910-17, 1930-84), 696 ft³/s (19.71 m³/s), 504,300 acre-ft/yr (622 hm³/yr); median of yearly mean discharges, 572 ft³/s (16.2 m³/s), 414,000 acre-ft/yr (510 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,100 ft³/s (994 m³/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, 8,510 ft³/s (241 m³/s) June 25, gage height, 15.68 ft (4.779 m); minimum daily discharge, 150 ft³/s (4.25 m³/s) Jan. 10; minimum gage height, 2.37 ft (0.722 m) Sept. 15, 16, 17 (result of regulation).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	261	597	570	220	280	1250	5040	4670	1350	5500	1510	561		
2	260	593	565	220	300	1310	6010	4490	1350	5370	1320	562		
3	258	588	555	220	330	1420	6220	4210	1300	5220	1220	561		
4	257	574	550	180	350	1490	6210	3530	1280	5080	771	560		
5	257	466	540	155	355	1640	6320	3110	1270	4910	676	549		
6	254	446	530	155	360	1720	6380	2920	1750	4730	642	468		
7	257	472	525	155	365	1800	6250	2970	2000	4540	619	457		
8	257	495	515	155	365	1790	6070	3020	2900	4330	604	359		
9	254	464	490	155	370	1730	5890	3200	2950	4130	587	343		
10	253	453	470	150	380	1530	5760	3240	3180	3870	591	341		
11	255	419	470	160	390	1430	5700	3230	3520	3670	740	251		
12	251	417	440	160	395	1420	5770	3190	4040	3500	757	231		
13	250	415	390	160	400	1410	6180	3160	4480	3350	717	182		
14	253	410	370	160	407	1400	6730	3120	4770	3240	636	174		
15	297	400	360	165	410	1360	7520	3050	5260	3110	547	172		
16	304	400	354	170	410	1280	7780	2960	6130	2960	510	172		
17	312	400	360	185	410	1080	7750	2880	7380	2530	472	172		
18	418	400	370	190	410	1050	7630	2860	7640	1990	392	233		
19	415	422	370	190	410	1050	7370	2770	7640	1930	389	257		
20	412	425	370	190	420	1050	6620	2710	7610	1910	382	245		
21	441	424	370	190	420	1050	6120	2570	7670	1830	303	241		
22	535	440	365	192	480	1060	5810	2090	7670	1780	323	264		
23	511	510	350	192	540	1180	5630	1940	7790	1770	360	269		
24	514	720	345	192	610	1590	5430	1860	8040	1830	371	318		
25	515	730	335	200	720	2130	5260	1790	8340	1800	376	301		
26	514	665	330	230	850	2570	5160	1750	8290	1770	387	310		
27	587	640	330	250	860	2680	5320	1700	7890	1720	524	333		
28	610	610	230	270	960	2690	5480	1660	7130	1680	530	628		
29	611	590	220	275	1120	3190	5430	1610	6320	1630	507	692		
30	606	580	220	275	---	3640	5190	1450	5710	1580	339	692		
31	602	---	220	280	---	4080	---	1400	---	1560	506	---		
TOTAL	11781	15165	12479	6041	14077	54070	184030	85110	152650	94820	18608	10898		
MEAN	380	506	403	195	485	1744	6134	2745	5088	3059	600	363		
MAX	611	730	570	280	1120	4080	7780	4670	8340	5500	1510	692		
MIN	250	400	220	150	280	1050	5040	1400	1270	1560	303	172		
CFSM	.06	.08	.07	.03	.08	.28	.99	.44	.82	.50	.10	.06		
IN.	.07	.09	.08	.04	.08	.33	1.11	.51	.92	.57	.11	.07		
AC-FT	23370	30080	24750	11980	27920	107200	365000	168800	302800	188100	36910	21620		
CAL YR 1983	TOTAL	244021	MEAN	669	MAX	2160	MIN	96	CFSM	.11	IN	1.47	AC-FT	484000
WTR YR 1984	TOTAL	659729	MEAN	1803	MAX	8340	MIN	150	CFSM	.29	IN	3.97	AC-FT	1309000

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 mi² (12.37 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January to November 1980, March to September 1981, March to October 1982, March to October 1983, and February to October 1984 (discontinued).

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

REMARKS.--Water-stage recorder operated only during open-water period. Records fair except those for Feb. 10 to Mar. 28, Apr. 12-19, May 15-22, June 5-7, and Oct. 1-18, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 331 ft³/s (9.374 m³/s) June 12, 1984, gage height, 31.32 ft (9.546 m); no flow on many days each year.

EXTREMES FOR CURRENT PERIOD.--October 1983, February to October 1984: Maximum discharge during period, 331 ft³/s (9.374 m³/s) June 12, gage height, 31.32 ft (9.546 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	4.0	9.9	2.4	.70	1.4	.00	.00
2	.00				---	3.4	9.7	2.3	.55	1.3	.00	.00
3	.00				---	2.7	8.2	2.3	.46	2.5	.12	.00
4	.00				---	3.0	6.1	2.2	.46	2.1	.30	.00
5	.00				---	2.0	6.0	2.7	1.0	1.3	.26	.00
6	.00				---	1.6	5.2	2.7	20	1.2	.24	.00
7	.00				---	1.6	4.4	11	9.0	1.0	.23	.00
8	.00				---	1.8	5.2	3.8	37	.81	.22	.00
9	.00				---	1.8	4.7	2.8	6.3	.71	.10	.00
10	.00				.00	1.6	4.0	2.7	41	.76	.00	.00
11	.00				.00	1.6	9.2	2.2	17	1.1	.00	.00
12	.00				.04	1.6	39	1.8	73	.70	.00	.00
13	.00				.08	1.5	33	4.1	5.5	.43	.00	.00
14	.00				.10	1.6	18	2.7	12	.38	.00	.00
15	.00				.20	4.0	8.9	2.3	12	.50	.00	.00
16	.00				.50	4.4	6.4	1.6	12	.33	.00	.00
17	.00				.50	4.8	4.9	1.0	12	.30	.00	.00
18	.00				.80	6.2	3.9	.84	6.6	.23	.00	.00
19	.00				1.0	7.6	2.7	.77	11	.20	.00	.00
20	.00				1.0	4.6	2.7	.72	53	.23	.00	.00
21	.00				1.5	3.0	2.7	.57	12	.14	.20	.00
22	.00				2.0	2.7	2.7	1.3	39	.05	.40	.00
23	.00				2.0	6.4	2.6	1.1	12	.00	.14	.00
24	.00				2.0	35	2.4	.93	3.4	.00	.05	7.3
25	.00				2.0	54	2.2	.93	3.0	.00	.00	2.5
26	.00				2.5	36	2.4	.87	2.9	.00	.00	1.7
27	.00				3.0	23	4.1	.93	2.9	.00	.00	.12
28	.00				3.5	19	3.3	1.7	2.8	.00	.00	.00
29	.00				4.0	18	2.6	1.3	2.4	.00	.00	.00
30	.00				---	9.7	2.8	1.0	1.8	.00	.00	.00
31	.00				---	9.7	---	.87	---	.00	.00	---
TOTAL	.00				---	277.9	219.9	64.43	412.77	17.67	2.26	11.62
MEAN	.000				---	8.96	7.33	2.08	13.8	.57	.07	.39
MAX	.00				---	54	39	11	73	2.5	.40	7.3
MIN	.00				---	1.5	2.2	.57	.46	.00	.00	.00
AC-FT	.00				---	551	436	128	819	35	4.5	23

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
MEAN VALUES

[illegible]

MINNESOTA RIVER BASIN

443636096095402 DILLON-SYLTIE IMPOUNDMENT INLET NEAR PORTER, MN--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980, 1982-84.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: March to July 1983 and March to July 1984.

INSTRUMENTATION.-- Automatic sampler since May 1982.

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, Mar. 29 to Apr. 6, 11-12, 27, May 13-16, June 7-24, and July 3, daily suspended-sediment concentrations were defined by samples from an automatic sampler; records are fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 869 mg/L June 22, 1984; minimum daily mean, 0 mg/L during periods of zero flow.

SEDIMENT LOADS: Maximum daily, 258 tons (234 tonnes), June 12, 1984; minimum daily, 0.00 ton (0.00 tonne) during periods of zero flow.

EXTREMES FOR CURRENT PERIOD.--March to July 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 869 mg/L June 22; minimum daily mean, 23 mg/L July 6.

SEDIMENT LOADS: Maximum daily during period, 258 tons (234 tonnes) June 12; minimum daily, 0.00 ton (0.00 tonne) on many days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)
MAR									
01...	1806	--	5.4	988	1010	7.8	7.8	.5	730
28...	1500	--	18	611	--	7.1	--	5.0	726
28-30	1500	13	--	--	693	--	7.3	--	--
30...	1720	--	7.4	885	--	7.9	--	5.0	729
APR									
06...	1200	--	5.1	920	--	7.9	--	9.0	728
11...	1200	--	6.3	1150	--	8.4	--	7.0	719
11-13	1200	44	--	--	991	--	7.7	--	--
19...	1650	--	2.7	--	--	--	--	--	--
MAY									
11...	1215	--	6.1	1010	--	8.0	--	15.0	725
13-14	1130	42	--	--	1010	--	8.2	--	--
22...	1135	--	1.3	1050	--	8.1	--	14.5	724
JUN									
07...	1430	--	2.6	1100	--	7.8	--	19.5	714
08...	1530	--	12	780	--	7.7	--	19.0	721
11-13	2300	73	--	--	537	--	7.0	--	--
12...	1400	--	30	590	--	7.6	--	21.0	726
15...	1615	--	8.8	980	--	7.8	--	20.0	729
21-21	0240	16	--	--	--	--	--	--	--

443636096095402 DILLON-SYLTIE IMPOUNDMENT INLET NEAR PORTER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	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)	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)	ALKI- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
MAR									
01...	11.1	--	--	140	49	15	4.0	257	310
28...	10.2	--	--	--	--	--	--	--	--
28-30	--	--	--	82	31	11	4.0	153	200
30...	9.9	--	--	--	--	--	--	--	--
APR									
06...	10.8	--	--	--	--	--	--	--	--
11...	11.2	--	--	--	--	--	--	--	--
11-13	--	--	--	120	49	19	5.3	180	350
19...	--	--	--	--	--	--	--	--	--
MAY									
11...	12.0	--	--	--	--	--	--	--	--
13-14	--	--	--	150	38	16	3.9	162	320
22...	10.4	--	--	--	--	--	--	--	--
JUN									
07...	7.5	K1000	K3200	--	--	--	--	--	--
08...	8.0	--	--	--	--	--	--	--	--
11-13	--	--	--	59	21	8.0	3.7	113	120
12...	6.9	--	--	--	--	--	--	--	--
15...	9.1	--	--	--	--	--	--	--	--
21-21	--	--	--	--	--	--	--	--	--

DATE	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)
MAR								
01...	6.8	.30	19	--	2.3	.50	.06	22
28...	--	--	--	--	--	--	--	188
28-30	5.0	.20	14	467	3.4	--	.18	--
30...	--	--	--	--	--	--	--	53
APR								
06...	--	--	--	--	--	--	--	81
11...	--	--	--	--	--	--	--	98
11-13	8.3	.30	15	746	3.7	3.5	.26	120
19	--	--	--	--	--	--	--	79
MAY								
11...	--	--	--	--	1.0	3.9	<.01	42
13-14	6.3	.30	7.5	696	2.0	1.5	.07	--
22...	--	--	--	--	--	--	--	90
JUN								
07...	--	--	--	--	--	--	.10	152
08...	--	--	--	--	--	--	.11	225
11-13	5.5	.20	12	394	4.3	5.5	.16	1400
12...	--	--	--	--	--	--	--	329
15...	--	--	--	--	--	--	.17	221
21-21	--	--	--	--	--	--	.10	--

MINNESOTA RIVER BASIN

443636096095402 DILLON-SYLTIE IMPOUNDMENT INLET NEAR PORTER, MN--Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	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)
JUN									
08...	1530	--	12	225	85	89	--	97	100
21...	0240	--	19	--	69	73	90	93	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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. 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)
JUN										
08...	1530	30	52	64	75	85	91	95	99	100

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
	MARCH		APRIL		MAY		JUNE		JULY	
1	---	---	131	3.5	49	.32	40	.08	48	.18
2	---	---	177	4.6	48	.30	36	.05	45	.16
3	---	---	139	3.1	47	.29	27	.03	97	.96
4	---	---	106	1.7	44	.26	27	.03	58	.33
5	---	---	138	2.2	41	.30	110	.30	33	.12
6	---	---	82	1.2	41	.32	660	36	23	.07
7	---	---	81	.96	182	6.1	225	5.5	---	---
8	---	---	81	1.1	75	.77	575	107	---	---
9	---	---	81	1.0	61	.46	148	6.0	---	---
10	---	---	81	.87	49	.36	858	111	---	---
11	---	---	107	2.9	43	.26	183	21	---	---
12	---	---	180	19	37	.18	800	258	---	---
13	---	---	159	14	99	1.4	125	1.9	---	---
14	---	---	147	7.1	63	.46	500	28	---	---
15	---	---	133	3.2	38	.24	392	15	---	---
16	---	---	122	2.1	83	.36	549	23	---	---
17	---	---	109	1.4	88	.24	451	16	---	---
18	---	---	97	1.0	90	.20	175	4.4	---	---
19	---	---	84	.61	91	.19	218	26	---	---
20	---	---	69	.50	92	.18	750	163	---	---
21	---	---	53	.39	92	.14	744	28	---	---
22	---	---	45	.33	91	.32	869	129	---	---
23	---	---	44	.31	91	.27	635	24	---	---
24	---	---	45	.29	83	.21	178	1.7	---	---
25	---	---	45	.27	70	.18	76	.62	---	---
26	---	---	45	.29	57	.13	56	.44	---	---
27	---	---	99	1.2	47	.12	52	.41	---	---
28	193	9.9	65	.58	68	.31	49	.37	---	---
29	151	7.7	50	.35	58	.20	49	.32	---	---
30	105	2.9	50	.38	48	.13	49	.24	---	---
31	193	5.1	---	---	43	.10	---	---	---	---
TOTAL	---	---	---	76.43	---	15.30	---	1007.39	---	---

MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTIE IMPOUNDMENT NEAR PORTER, MN

LOCATION.--Lat $44^{\circ}36'36''$, long $96^{\circ}09'54''$, 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 mi² (12.4 km²).

RESERVOIR-STAGE RECORDS

PERIOD OF RECORD.--May to November 1980, March to September 1981, March to October 1982, March to October 1983, and February to October 1984 (discontinued).

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

REMARKS.--Water-stage recorder operated only during open-water period. Records good. Artificial lake with concrete box drop structure into 36-inch corrugated metal culvert through earthen dam. Point of zero flow at outlet, gage height, 17.49 ft.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 20.24 ft (6.169 m) June 12, 1984; minimum recorded, 16.20 ft (4.938 m) Nov. 3, 1980.

EXTREMES FOR CURRENT PERIOD.--October 1983, March to October 18, 1984: Maximum gage height during period, 20.24 ft (6.169 m) June 12; minimum, 16.81 ft (5.005 m) Sept. 23.

MONTHEND GAGE HEIGHT, IN FEET, OCTOBER 1983, MARCH TO OCTOBER 1984

Oct. 1	16.55	May 31	17.79	Aug. 31	17.09
Mar. 31	18.26	June 30	17.90	Sept. 30	16.92
Apr. 27	18.01	July 31	17.38	Oct. 18	18.26

WATER-QUALITY RECORDS

REMARKS.--Letter E indicates estimated value.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	DEPTH TO BOT- TOM OF SAMPLE INTER- VAL (FT) (72016)	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)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE (DEG C) (00010)	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)	BARO- METRIC PRES- SURE (MM OF HG) (00025)
OCT											
31...	1127	--	6.4	--	--	988	--	8.0	--	1.30	--
MAR											
01...	1430	--	6.0	13.5	--	838	--	7.4	--	--	--
MAY											
22...	1105	--	6.0	12.8	--	1070	--	8.0	--	1.20	723
22...	1120	12.3	--	--	993	1070	8.0	8.0	17.5	--	723
JUN											
07...	1545	--	2.9	13.0	--	959	--	7.8	--	.60	--
07...	1558	12.0	--	--	938	939	7.6	7.9	20.5	--	712
JUL											
11...	1500	--	7.5	13.4	--	--	--	--	--	1.50	--
11...	1515	13.0	--	--	912	--	7.5	--	18.5	--	729
AUG											
08...	1101	--	--	--	--	825	--	8.0	--	1.10	725
08...	1112	12.0	4.6	12.6	--	888	--	7.7	--	--	725
SEP											
06...	0945	--	2.6	11.5	--	--	--	--	--	.50	--
06...	0955	11.0	--	--	860	--	8.1	--	17.5	--	725

[illegible]

MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTE IMPOUNDMENT NEAR PORTER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 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)	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 31...	733	<.10	<.01	.90	.16	.16	.05	7500	7.00	<.100
MAR 01...	589	2.2	.21	.80	.12	.11	.11	--	--	--
MAY 22...	851	.95	.09	2.0	.03	.01	<.01	310	<.100	<.100
22...	884	.96	.34	2.8	.02	<.01	<.01	--	--	--
JUN 07...	--	--	--	--	.06	--	--	260	1.60	<.100
07...	--	--	--	--	.08	--	--	--	--	--
JUL 11...	--	--	--	--	.03	--	--	300	12.0	<.100
11...	--	--	--	--	.09	--	--	--	--	--
AUG 08...	664	<.10	.64	1.4	.08	.03	.02	--	18.0	<.100
08...	636	.37	.05	.80	.05	.02	.01	340	--	--
SEP 06...	--	--	--	--	.04	--	--	600	4.40	<.100
06...	--	--	--	--	.03	--	--	--	--	--

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
OCT						
31...	1125	.50	8.0	11.3	8.3	947
31...	1128	6.00	8.0	11.2	8.3	954
31...	1132	9.00	8.0	11.1	8.3	954
31...	1136	11.3	8.0	11.0	8.2	954
MAR						
01...	1425	3.00	1.0	9.4	7.5	881
01...	1428	4.00	.5	9.5	7.5	849
01...	1433	5.00	1.5	5.9	7.3	1120
01...	1435	6.00	2.5	4.0	7.2	1260
01...	1438	7.00	3.5	3.5	7.0	1290
01...	1442	8.00	3.5	3.5	7.0	1280
01...	1445	10.0	3.5	3.4	7.0	1300
01...	1448	13.0	3.5	3.3	6.9	1300
MAY						
22...	1100	.50	17.5	8.5	8.1	986
22...	1103	3.00	17.5	8.2	8.1	986
22...	1106	6.00	17.5	8.2	8.1	991
22...	1115	9.00	17.5	8.2	8.0	993
22...	1118	12.0	17.5	8.2	8.0	993
22...	1120	12.3	17.5	8.2	8.0	993
JUN						
07...	1543	.50	20.5	6.7	7.8	932
07...	1548	3.00	20.5	6.3	7.7	935
07...	1552	6.00	20.5	6.3	7.7	937
07...	1554	9.00	20.5	6.1	7.7	937
07...	1558	12.0	20.5	5.7	7.6	938
JUL						
11...	1445	.50	25.5	6.7	8.3	842
11...	1458	3.00	25.5	6.7	8.0	845
11...	1501	6.00	23.5	5.1	7.9	859
11...	1503	7.00	22.0	4.6	7.9	846
11...	1504	8.00	22.0	4.6	7.9	844
11...	1506	9.00	21.5	4.3	7.8	861
11...	1508	10.0	21.0	4.0	7.3	863
11...	1511	11.0	20.0	3.7	7.4	867
11...	1513	12.0	19.5	2.4	7.5	895
11...	1515	13.0	18.5	2.2	7.5	912

MINNESOTA RIVER BASIN

443636096095400 DILLON-SYLTE IMPOUNDMENT NEAR PORTER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
AUG						
08...	1055	.50	26.0	10.4	7.9	835
08...	1058	3.00	25.5	10.4	7.9	837
08...	1102	6.00	25.5	10.3	7.9	837
08...	1105	9.00	23.5	5.2	7.6	884
08...	1108	10.0	22.5	5.1	7.6	890
SEP						
06...	0943	.50	17.5	17.0	7.4	890
06...	0946	3.00	17.5	17.2	7.7	896
06...	0949	6.00	17.5	15.7	8.1	881
06...	0952	9.00	17.5	14.5	8.2	869
06...	0955	11.0	17.5	13.3	8.1	860

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 mi² (12.4 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January to November 1980, March to September 1981, March to October 1982, March to October 1983, and February to October 1984 (discontinued).

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, Oct. 1 - 13, 1983, Feb. 10-29, Apr. 28 to May 10, and Oct. 1-5, 1984, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 154 ft³/s (4.36 m³/s) June 12, 1984, gage height, 20.24 ft (6.169 m); no flow on many days each year.

EXTREMES FOR CURRENT PERIOD.--October 1983, February 10 to October 18, 1984: Maximum discharge during period, 154 ft³/s (4.36 m³/s) June 12, gage height, 20.24 ft (6.169 m); no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	4.0	12	2.4	.29	1.2	.00	.00
2	.00				---	3.4	12	2.3	.21	1.1	.00	.00
3	.00				---	2.7	11	2.2	.15	1.5	.00	.00
4	.00				---	3.0	7.9	2.2	.15	3.6	.00	.00
5	.00				---	2.0	7.6	2.7	.50	2.0	.00	.00
6	.00				---	1.6	6.7	2.7	17	1.2	.00	.00
7	.00				---	1.6	5.6	11	11	1.0	.00	.00
8	.00				---	1.8	5.9	3.8	43	.81	.00	.00
9	.00				---	1.8	6.2	2.8	8.6	.64	.00	.00
10	.00				.00	1.6	5.1	2.7	43	.61	.00	.00
11	.00				.00	1.6	7.3	1.5	17	.85	.00	.00
12	.00				.00	1.6	33	1.4	88	.68	.00	.00
13	.00				.08	1.5	33	2.7	11	.35	.00	.00
14	.00				.10	1.6	18	4.0	10	.22	.00	.00
15	.00				.20	4.0	8.9	2.5	19	.20	.00	.00
16	.00				.50	4.4	6.4	1.6	14	.18	.00	.00
17	.00				.50	4.8	4.9	.97	17	.13	.00	.00
18	.00				.80	6.2	3.9	.84	14	.11	.00	.00
19	.00				1.0	7.6	3.4	.77	8.2	.10	.00	.00
20	.00				1.0	4.6	2.9	.72	59	.09	.00	.00
21	.00				1.5	3.0	2.5	.57	19	.08	.00	.00
22	.00				2.0	2.7	2.2	.57	37	.07	.00	.00
23	.00				2.0	6.4	2.0	.50	26	.04	.00	.00
24	.00				2.0	35	1.9	.38	7.3	.03	.00	.00
25	.00				2.0	54	1.7	.33	4.4	.02	.00	.00
26	.00				2.5	36	2.1	.33	3.3	.01	.00	.00
27	.00				3.0	23	3.7	.44	2.2	.00	.00	.00
28	.00				3.5	19	3.3	.72	1.9	.00	.00	.00
29	.00				4.0	26	2.6	1.0	1.7	.00	.00	.00
30	.00				---	13	2.8	.72	1.4	.00	.00	.00
31	.00				---	12	---	.44	---	.00	.00	---
TOTAL	.00				---	291.5	226.5	57.80	485.30	16.82	.00	.00
MEAN	.000				---	9.40	7.55	1.86	16.2	.54	.000	.000
MAX	.00				---	54	33	11	88	3.6	.00	.00
MIN	.00				---	1.5	1.7	.33	.15	.00	.00	.00
CFSM	.000				---	1.96	1.57	.39	3.38	.11	.000	.000
IN.	.00				---	2.26	1.76	.45	3.76	.13	.00	.00
AC-FT	.00				---	578	449	115	963	33	.00	.00

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
MEAN VALUES

[illegible]

MINNESOTA RIVER BASIN

443636096095404 DILLON-SYLTIE IMPOUNDMENT OUTLET NEAR PORTER, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980-1984.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: March to May, July 1983, March to July 1984.

INSTRUMENTATION.-- Automatic sampler since May 1982.

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. During periods of high flows, March 28-30, May 12 to June 1, June 7-12, and June 20-25, daily suspended-sediment concentrations were defined by samples from automatic sampler, records are fair.

EXTREMES FOR PERIOD OF RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 192 mg/L June 12, 1984; minimum daily mean, 0 mg/L during periods of zero flow.

SEDIMENT LOADS: Maximum daily, 49 tons (44 tonnes) June 12; 0.00 ton (0.00 tonne) on many days during periods of zero flow.

EXTREMES FOR CURRENT PERIOD.-- March to July 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 192 mg/L June 12; minimum daily mean, 6 mg/L, Apr. 11.

SEDIMENT LOADS: Maximum daily during period, 49 tons (44 tonnes) June 12; minimum daily, 0.01 ton (0.01 tonne), June 1-4.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
MAR										
01...	1615	--	4.2	929	977	7.4	7.7	.5	730	9.9
28-30	1148	13	--	--	640	--	7.2	--	--	--
28...	1150	--	14	688	--	7.8	--	.0	726	11.1
30...	1730	--	11	675	--	7.8	--	3.5	729	8.5
APR										
06...	1130	--	7.0	904	--	7.7	--	5.5	728	10.5
11...	1300	--	6.4	861	--	7.9	--	4.5	719	13.2
27...	1515	--	4.0	--	--	--	--	--	--	--
30-30	1000	30	--	--	--	--	--	--	--	--
MAY										
01-01	1000	30	--	--	--	--	--	--	--	--
11...	1400	--	2.0	997	--	8.1	--	12.0	E725	10.7
JUN										
07...	1530	--	6.4	937	--	7.8	--	21.0	E714	6.6
07-12	2130	40	--	--	--	--	--	--	--	--
12...	1615	--	39	516	--	7.7	--	18.0	726	8.9
15...	1500	--	14	665	--	7.5	--	19.5	729	7.3
20...	1345	--	42	--	--	--	--	--	--	--

[illegible]

MINNESOTA RIVER BASIN

443636096095404 DILLON-SYLTE IMPOUNDMENT OUTLET NEAR PORTER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 + DIS- ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
MAR									
01...	290	6.0	.30	17	716	2.5	.40	.09	5
28-30	180	4.6	.20	12	424	3.4	1.9	.14	86
28...	--	--	--	--	--	--	--	--	70
30...	--	--	--	--	--	--	--	--	93
APR									
06...	--	--	--	--	--	--	--	--	88
11...	--	--	--	--	--	--	--	--	6
27...	--	--	--	--	--	2.9	.90	.13	--
30-30	--	--	--	--	--	--	--	.25	--
MAY									
01-01	--	--	--	--	--	--	--	.25	--
11...	--	--	--	--	--	1.7	3.5	<.01	49
JUN									
07...	--	--	--	--	--	--	--	.09	28
07-12	--	--	--	--	--	2.9	1.4	.21	108
12...	--	--	--	--	--	--	--	--	540
15...	--	--	--	--	--	--	--	.10	88
20...	--	--	--	--	--	--	--	.19	--

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	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)
MAY								
16...	1000	--	1.6	121	--	--	--	--
22...	1120	--	.60	38	--	--	--	--
JUN								
08...	1600	--	22	109	92	93	95	100
11...	2115	--	22	78	--	--	--	--
12...	1615	--	39	540	64	76	89	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	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)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
MAY											
11...	1400	8	14	18	34	58	68	75	80	87	100

MINNESOTA RIVER BASIN

443636096095404 DILLON-SYLTIE IMPOUNDMENT OUTLET NEAR PORTER, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)
	MARCH		APRIL		MAY		JUNE		JULY	
1	---	---	93	3.0	48	.31	13	.01	20	.06
2	---	---	93	3.0	62	.39	13	.01	20	.06
3	---	---	92	2.7	73	.43	13	.01	23	.09
4	---	---	91	1.9	93	.55	14	.01	33	.32
5	---	---	89	1.8	107	.78	14	.02	20	.11
6	---	---	88	1.6	124	.90	63	3.6	20	.06
7	---	---	80	1.2	185	5.5	36	1.0	20	.05
8	---	---	65	1.0	145	1.5	107	12	---	---
9	---	---	39	.65	103	.78	77	1.8	---	---
10	---	---	16	.22	56	.41	99	12	---	---
11	---	---	6	.12	50	.20	76	3.5	---	---
12	---	---	76	7.2	49	.19	192	49	---	---
13	---	---	76	6.8	38	.28	108	3.2	---	---
14	---	---	53	2.6	23	.25	83	2.3	---	---
15	---	---	38	.91	24	.16	98	5.0	---	---
16	---	---	28	.48	27	.12	80	3.0	---	---
17	---	---	22	.29	29	.08	83	3.8	---	---
18	---	---	17	.18	30	.07	85	3.2	---	---
19	---	---	11	.10	32	.07	51	1.1	---	---
20	---	---	11	.09	34	.07	182	37	---	---
21	---	---	12	.08	36	.06	88	4.5	---	---
22	---	---	13	.08	36	.06	132	16	---	---
23	---	---	13	.07	34	.05	105	8.1	---	---
24	---	---	13	.07	31	.03	53	1.0	---	---
25	---	---	13	.06	27	.02	33	.39	---	---
26	---	---	11	.06	24	.02	20	.18	---	---
27	---	---	53	.53	23	.03	20	.12	---	---
28	78	4.0	37	.33	22	.04	20	.10	---	---
29	110	7.7	26	.18	21	.06	20	.09	---	---
30	95	3.3	36	.27	19	.04	20	.08	---	---
31	93	3.0	---	---	18	.02	---	---	---	---
TOTAL	---	---	---	37.57	---	13.47	---	172.12	---	---

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 mi² (287 km²), 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.--23 years (water years 1961-1981, 1983-1984), 25.3 ft³/s (0.716 m³/s), 3.10 in/yr (79 mm/yr), 18,330 acre-ft/yr (22.6 km³/yr); median of yearly mean discharges, 16 ft³/s (0.45 m³/s), 1.96 in/yr (50 mm/yr), 11,600 acre-ft/yr (14 km³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,430 ft³/s (125 m³/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 ft³/s (2.32 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s)	Discharge (m ³ /s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft ³ /s)	Discharge (m ³ /s)	Gage height (ft)	Gage height (m)
Apr. 2	1300	920	26.1	9.00	2.743	June 8	1230	828	23.4	8.74	2.664
Apr. 13	1900	909	25.7	8.97	2.734	June 12	0600	1,530	43.3	10.35	3.155
Apr. 29	0700	94	2.66	4.94	1.506	June 17	1330	920	26.1	9.00	2.743
Apr. 8	0330	365	10.3	7.00	2.134	June 20	1600	*1,580	44.7	*10.44	3.182
Apr. 13	0700	129	3.65	5.34	1.628	June 23	1145	552	15.6	8.20	2.499

Minimum daily discharge, 0.56 ft³/s (0.016 m³/s) Oct. 7, 8, gage height, 2.55 ft (0.777 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	6.0	4.6	13	10	1.4	52	798	80	22	99	12	5.9		
2	2.3	4.9	12	10	1.8	54	884	79	20	93	13	6.2		
3	1.3	5.4	10	10	1.5	56	772	74	18	90	13	6.4		
4	.68	7.7	10	10	1.4	58	795	70	18	85	13	6.2		
5	.64	7.0	10	10	1.2	60	701	67	30	77	13	6.2		
6	.73	6.0	10	10	1.0	63	618	84	68	71	13	6.4		
7	.56	4.7	10	10	1.0	64	515	230	64	61	13	6.2		
8	.56	4.3	11	10	1.0	67	431	312	620	54	13	6.8		
9	.90	6.0	11	10	1.0	70	365	207	429	37	13	6.2		
10	1.9	6.6	11	10	1.5	73	317	147	846	30	12	5.9		
11	2.1	5.0	11	9.6	2.2	75	318	107	891	32	13	6.0		
12	2.0	5.5	11	9.2	4.3	78	652	93	1410	32	14	7.3		
13	2.0	6.0	12	8.8	9.0	82	870	129	822	29	12	8.1		
14	2.3	9.0	12	8.4	9.5	86	763	77	552	26	11	7.0		
15	3.1	11	12	8.0	10	92	441	68	630	26	9.9	7.0		
16	3.4	11	11	7.2	13	98	357	61	547	24	9.2	7.0		
17	3.2	11	11	6.8	13	105	266	54	805	23	9.2	7.0		
18	3.1	12	11	5.8	14	113	220	48	689	20	9.7	6.6		
19	3.3	14	11	5.0	14	128	190	39	373	19	9.2	6.6		
20	3.8	45	11	4.4	14	140	161	55	1200	18	9.0	6.0		
21	4.5	55	11	2.8	15	168	142	42	401	18	9.4	5.7		
22	4.5	53	11	1.8	16	190	128	38	329	15	9.0	5.5		
23	4.5	36	10	1.0	17	210	107	33	492	14	8.5	5.2		
24	3.9	29	10	2.7	22	240	94	29	281	13	8.3	7.3		
25	3.7	15	10	2.6	25	280	81	27	207	12	7.9	8.5		
26	4.6	7.3	10	2.3	30	350	69	25	166	12	7.5	7.9		
27	4.6	15	10	2.5	35	385	78	23	142	12	7.3	11		
28	4.6	15	10	2.5	45	460	92	36	123	11	6.8	9.2		
29	4.6	13	10	2.2	51	480	94	30	110	11	6.6	8.1		
30	4.6	13	10	2.0	---	550	85	28	107	12	6.4	7.9		
31	4.6	---	10	1.7	---	649	---	25	---	11	6.0	---		
TOTAL	92.57	438.0	333	197.3	371.8	557.6	11404	2417	12412	1087	317.9	207.3		
MEAN	2.99	14.6	10.7	6.36	12.8	180	380	78.0	414	35.1	10.3	6.91		
MAX	6.0	55	13	10	51	649	884	312	1410	99	14	11		
MIN	.56	4.3	10	1.0	1.0	52	69	23	18	11	6.0	5.2		
CFSM	.03	.13	.10	.06	.12	1.62	3.42	.70	3.73	.32	.09	.06		
IN.	.03	.15	.11	.07	.12	1.87	3.82	.81	4.16	.36	.11	.07		
AC-FT	184	869	661	391	737	11060	22620	4790	24620	2160	631	411		
CAL YR 1983	TOTAL	19712.95	MEAN	54.0	MAX	1040	MIN	.00	CFSM	.49	IN	6.61	AC-FT	39100
WTR YR 1984	TOTAL	34853.87	MEAN	95.2	MAX	1410	MIN	.56	CFSM	.86	IN	11.68	AC-FT	69130

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 mi² (1,691 km²).

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.--48 years (water years 1936-38, 1940-84), 115 ft³/s (3.257 m³/s), 2.39 in/yr (61 mm/yr), 83,320 acre-ft/yr (103 hm³/yr); median of yearly mean discharges, 79 ft³/s (2.24 m³/s), 1.64 in/yr (42 mm/yr), 57,200 acre-ft/yr (71 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,200 ft³/s (487 m³/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 ft³/s (714 m³/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 300 ft³/s (8.50 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Mar. 30	0030	3,460 98.0	a 7.84 2.390	June 15	0400	*5,290 150	*8.88 2.707
Apr. 16	1130	2,680 75.9	6.93 2.112	June 23	0230	5,000 142	8.70 2,652
May 9	2015	922 26.1	4.61 1.405				

a Backwater from ice.

Minimum discharge, 5.3 ft³/s (0.15 m³/s) Oct. 4; minimum gage height, 2.32 ft (0.707 m) Oct. 2, 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	7.1	12	66	28	20	266	3230	507	250	1210	77	19		
2	6.0	13	64	28	19	255	3050	485	241	1040	74	19		
3	6.3	14	62	28	19	244	2820	475	231	901	72	18		
4	5.6	20	61	28	19	236	2760	457	226	780	72	21		
5	6.3	17	60	28	19	212	2660	440	243	688	73	19		
6	8.3	20	59	28	18	188	2430	433	254	599	73	16		
7	8.8	25	58	29	18	168	2160	540	333	523	72	16		
8	9.9	25	57	29	18	162	1910	669	772	457	72	17		
9	8.9	30	57	30	18	152	1720	871	1210	404	66	16		
10	8.3	23	56	30	18	148	1550	885	1840	369	60	15		
11	7.8	21	55	30	18	148	1460	773	2290	352	55	15		
12	6.6	20	54	30	19	145	1600	669	2900	339	51	26		
13	7.0	29	52	30	19	148	1720	630	3620	322	48	24		
14	7.2	33	51	29	19	152	2070	570	4670	288	46	20		
15	7.7	30	49	28	19	162	2490	555	5020	263	46	20		
16	7.3	32	46	27	19	181	2690	508	3980	242	43	22		
17	7.3	41	39	26	21	202	2400	462	3440	225	41	19		
18	8.3	41	35	25	22	219	1940	423	3300	205	39	18		
19	8.8	50	31	24	25	240	1570	390	3590	190	36	16		
20	8.8	52	30	24	25	258	1300	362	3620	176	38	13		
21	8.7	80	29	23	26	301	1100	358	4070	161	40	12		
22	8.9	171	29	23	28	352	952	350	4300	150	37	11		
23	11	184	28	23	33	387	827	320	4840	136	35	12		
24	12	123	28	22	39	438	719	308	4130	125	34	23		
25	9.5	91	28	22	43	550	626	289	4060	114	33	26		
26	10	116	28	22	49	748	574	270	3310	108	32	53		
27	11	108	28	21	76	1070	535	259	2540	102	30	62		
28	15	90	28	21	171	1450	506	250	2060	97	27	55		
29	14	85	28	21	254	2670	520	243	1740	88	25	45		
30	13	68	28	20	---	3290	538	248	1440	81	23	38		
31	13	---	28	20	---	3200	---	252	---	76	21	---		
TOTAL	278.4	1664	1352	797	1111	18342	50427	14251	74520	10811	1491	706		
MEAN	8.98	55.5	43.6	25.7	38.3	592	1681	460	2484	349	48.1	23.5		
MAX	15	184	66	30	254	3290	3230	885	5020	1210	77	62		
MIN	5.6	12	28	20	18	145	506	243	226	76	21	11		
CFSM	.01	.09	.07	.04	.06	.91	2.57	.70	3.80	.53	.07	.04		
IN.	.02	.09	.08	.05	.06	1.04	2.87	.81	4.25	.62	.08	.04		
AC-FT	552	3300	2680	1580	2200	36380	100000	28270	147800	21440	2960	1400		
CAL YR 1983	TOTAL	101599.9	MEAN	278	MAX	2110	MIN	3.4	CFSM	.43	IN	5.79	AC-FT	201500
WTR YR 1984	TOTAL	175750.4	MEAN	480	MAX	5020	MIN	5.6	CFSM	.74	IN	10.01	AC-FT	348600

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 mi² (785 km²).

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.--44 years, 52.4 ft³/s (1.484 m³/s), 2.35 in/yr (60 mm/yr) 37,960 acre-ft (46.8 hm³/yr); median of yearly mean discharges, 39 ft³/s (1.10 m³/s), 1.75 in/yr (44 mm/yr), 28,300 acre-ft/yr (35 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--River only, maximum discharge, 5,370 ft³/s (152 m³/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 ft³/s (126 m³/s) Apr. 10, 1969, gage height, 78.45 ft (23.912 m); no flow on many days.

Combined flow, maximum discharge, 5,590 ft³/s (158 m³/s) Apr. 10, 1969; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,850 ft³/s (52.4 m³/s) June 22, gage height, 13.92 ft (4.243 m); minimum, 4.6 ft³/s (0.13 m³/s) Oct. 13, Nov. 2; minimum gage height, 5.98 ft (1.823 m) Oct. 12, 13.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.5	5.9	29	15	5.0	38	1600	346	98	345	51	7.7
2	9.0	5.6	28	15	5.0	37	1560	350	93	309	51	8.5
3	7.0	6.2	27	15	5.0	37	1500	347	85	283	48	9.5
4	6.8	9.0	26	16	5.0	38	1340	337	81	253	46	10
5	7.2	7.9	26	16	5.0	39	1310	319	82	224	46	9.7
6	7.6	8.3	25	16	5.0	39	1240	299	82	209	44	8.6
7	5.6	7.6	25	16	5.0	40	1130	637	88	189	43	8.3
8	5.2	7.2	24	15	5.0	40	1060	839	113	174	40	8.6
9	5.2	11	24	15	5.0	40	1070	899	180	162	37	8.3
10	5.2	11	24	14	5.0	40	1000	679	270	161	32	7.9
11	5.2	10	23	12	5.6	41	975	498	409	156	29	7.6
12	4.9	9.7	23	10	6.0	41	1170	392	506	146	27	15
13	5.2	10	23	9.6	6.6	41	1300	338	525	134	25	14
14	5.6	13	22	8.5	7.4	42	1330	384	655	133	22	14
15	9.0	15	22	7.5	8.0	43	1200	384	726	133	21	12
16	7.2	15	21	7.0	9.0	44	1060	326	767	135	20	12
17	6.6	15	20	7.0	10	46	918	277	901	139	20	9.5
18	6.6	18	19	6.6	11	48	798	234	860	126	19	9.2
19	8.3	25	17	6.6	12	49	687	212	770	122	18	9.7
20	8.6	50	16	6.0	14	52	597	210	882	120	17	9.1
21	8.6	49	16	6.0	16	58	536	189	933	110	16	8.3
22	7.9	47	15	6.0	18	70	481	170	1490	107	16	8.3
23	7.2	37	15	5.5	20	82	443	157	1590	101	14	9.9
24	6.6	35	15	5.5	22	116	400	144	1330	92	13	16
25	6.2	36	15	5.5	25	197	358	132	1080	88	12	14
26	6.2	35	15	5.5	30	279	340	120	874	80	12	12
27	6.2	33	15	5.5	35	303	338	116	673	73	12	12
28	5.9	32	15	5.5	38	328	350	120	543	67	10	12
29	4.9	31	15	5.5	39	648	306	121	461	61	10	11
30	5.2	30	15	5.0	---	982	312	115	396	57	9.2	13
31	5.2	---	15	5.0	---	1170	---	107	---	52	8.3	---
TOTAL	205.6	625.4	630	294.3	382.6	5068	26709	9798	17543	4541	788.5	315.7
MEAN	6.63	20.8	20.3	9.49	13.2	163	890	316	585	146	25.4	10.5
MAX	9.5	50	29	16	39	1170	1600	899	1590	345	51	16
MIN	4.9	5.6	15	5.0	5.0	37	306	107	81	52	8.3	7.6
CFSM	.02	.07	.07	.03	.04	.54	2.94	1.04	1.93	.48	.08	.04
IN.	.03	.08	.08	.04	.05	.62	3.28	1.20	2.15	.56	.10	.04
AC-FT	408	1240	1250	584	759	10050	52980	19430	34800	9010	1560	626
CAL YR 1983	TOTAL	72509.1	MEAN 199	MAX 2220	MIN 4.9	CFSM .66	IN 8.90	AC-FT	143800			
WTR YR 1984	TOTAL	66901.1	MEAN 183	MAX 1600	MIN 4.9	CFSM .60	IN 8.21	AC-FT	132700			

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 mi² (1,805 km²).

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.--50 years (water years 1912, 1936-84), 117 ft³/s (3.313 m³/s), 2.28 in/yr (58 mm/yr), 84,770 acre-ft/yr (105 hm³/yr); median of yearly mean discharges, 77 ft³/s (2.18 m³/s), 1.50 in/yr (38 mm/yr) 55,800 acre-ft/yr (69 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,700 ft³/s (558 m³/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 ft³/s (11.3 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Mar. 29	0900	ice jam	*8.43 2.569	May 7	2100	1,360 38.5	4.94 1.506
Apr. 4	1930	2,380 67.4	6.46 1.969	June 25	1230	*3,790 107	7.92 2.414
Apr. 16	0230	2,340 66.3	6.40 1.951	July 10	2015	760 21.5	3.75 1.143
May 1	0600	754 21.4	4.03 1.228				

Minimum discharge, 10 ft³/s (0.28 m³/s) Jan. 30 - Feb. 11; minimum gage height, 1.58 ft (0.482 m) Oct. 8, 9, Sept. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	22	48	30	10	62	2010	728	221	1140	109	24
2	36	23	47	30	10	62	2070	650	205	988	100	25
3	33	27	46	30	10	62	2230	626	193	867	155	25
4	24	26	46	30	10	62	2360	596	189	776	130	30
5	26	30	47	30	10	62	2340	584	189	670	115	25
6	26	37	46	30	10	62	2200	574	201	574	111	24
7	24	36	47	29	10	63	2000	1100	205	504	103	25
8	20	38	48	29	10	63	1830	1240	237	453	100	27
9	19	38	48	28	10	64	1700	1090	341	410	92	25
10	20	38	49	27	10	64	1540	1090	864	568	84	24
11	20	47	49	24	10	65	1490	1140	1000	663	77	26
12	20	46	49	21	11	66	1900	1070	1250	537	71	34
13	22	43	49	19	13	67	2210	897	1350	454	68	52
14	22	49	48	17	14	68	2270	715	1570	395	63	55
15	22	52	48	15	16	69	2310	626	2140	364	61	47
16	23	55	47	14	18	74	2300	608	2200	340	57	42
17	27	52	47	14	20	80	2040	574	1990	324	53	33
18	29	51	47	13	22	98	1690	515	1860	298	50	28
19	30	62	47	13	24	120	1400	460	1910	278	47	27
20	36	93	47	12	27	145	1180	408	2570	260	46	25
21	33	113	47	12	30	170	1010	381	2870	241	47	23
22	36	123	46	12	35	210	897	368	3190	222	45	22
23	34	93	43	11	40	260	793	325	3280	202	44	21
24	33	54	40	11	45	320	702	301	3380	186	39	22
25	32	63	38	11	50	420	626	285	3700	172	38	23
26	29	67	35	11	55	640	614	253	3260	164	36	40
27	25	60	33	11	60	1030	715	237	2550	149	34	32
28	24	57	32	11	61	1570	682	229	2000	136	32	31
29	23	49	32	11	62	2200	596	229	1600	123	30	28
30	22	49	31	10	---	2170	638	229	1320	114	27	27
31	21	---	31	10	---	2080	---	229	---	117	24	---
TOTAL	815	1593	1358	576	713	12548	46343	18357	47835	12689	2088	892
MEAN	26.3	53.1	43.8	18.6	24.6	405	1545	592	1595	409	67.4	29.7
MAX	36	123	49	30	62	2200	2360	1240	3700	1140	155	55
MIN	19	22	31	10	10	62	596	229	189	114	24	21
CFSM	.04	.08	.06	.03	.04	.58	2.22	.85	2.29	.59	.10	.04
IN.	.04	.09	.07	.03	.04	.67	2.47	.98	2.55	.68	.11	.05
AC-FT	1620	3160	2690	1140	1410	24890	91920	36410	94880	25170	4140	1770

CAL YR 1983	TOTAL	153110	MEAN	419	MAX	4150	MIN	12	CFSM	.60	IN	8.17	AC-FT	303700
WTR YR 1984	TOTAL	145807	MEAN	398	MAX	3700	MIN	10	CFSM	.57	IN	7.78	AC-FT	289200

MINNESOTA RIVER BASIN

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN

LOCATION.--Lat 44°12'18", long 95°30'17", 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 mi² (13.0 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May to October 1983 and February to September 1984 (discontinued).

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

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 87 ft³/s (2.46 m³/s) July 1, 1983, gage height, 12.47 ft (3.801 m); minimum discharge, 0.18 ft³/s (0.005 m³/s) Aug. 26, Sept. 26, 28, 1983; minimum gage height, 8.42 ft (2.566 m) Sept. 26, 28, Oct. 28, 29, 30, 31, Nov. 1, 1983.

EXTREMES FOR CURRENT PERIOD.-- October, November 1983, February to September 1984: Maximum discharge during period, 82 ft³/s (2.32 m³/s) May 7, gage height, 12.35 ft (3.764 m); maximum gage height, 12.32 ft (4.060 m), Feb. 17 (backwater from ice); minimum discharge, 0.22 ft³/s (0.006 m³/s) Oct. 28, 29, 30, 31, Nov. 1, gage height, 8.42 ft (2.566 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.28	.23			---	1.0	28	24	2.0	2.7	.70	.25
2	.28	---			---	1.0	29	18	1.9	2.5	3.3	.25
3	.25	---			---	1.5	28	13	1.9	2.2	4.9	.25
4	.24	---			---	1.5	26	13	1.9	2.0	1.7	.25
5	.24	---			---	1.0	20	13	1.8	1.9	1.4	.30
6	.26	---			---	1.0	16	14	1.8	1.8	1.4	.25
7	.26	---			---	.60	13	42	3.6	1.8	1.4	.30
8	.25	---			---	.60	16	23	6.1	1.7	1.3	.40
9	.24	---			---	.60	13	16	6.3	1.7	1.1	.43
10	.27	---			---	.60	13	9.9	18	3.5	.90	.47
11	.37	---			---	.60	26	7.7	14	2.2	.70	.47
12	.26	---			---	.60	31	6.3	25	1.9	.60	.47
13	.26	---			---	.60	32	5.8	10	1.8	.60	1.1
14	.26	---			---	.60	20	5.4	19	1.7	.50	.50
15	.28	---			---	.80	13	5.2	17	1.7	.50	.50
16	.25	---			---	.60	8.3	5.1	11	1.6	.50	.50
17	.24	---			3.0	.60	6.2	4.6	14	1.6	.60	.50
18	.24	---			5.0	.60	5.3	4.4	17	1.6	.40	.45
19	.24	---			3.0	.60	5.1	4.3	8.3	1.5	.40	.35
20	.26	---			2.5	1.0	5.3	3.8	18	1.5	.40	.30
21	.24	---			2.0	2.0	4.7	3.5	23	1.5	.50	.30
22	.24	---			2.0	4.0	4.3	3.2	44	1.4	.40	.30
23	.24	---			2.5	6.0	3.8	2.9	30	1.3	.40	.30
24	.26	---			3.5	8.0	3.4	2.6	13	1.2	.40	.30
25	.26	---			2.5	10	3.3	2.4	7.8	1.1	.40	.30
26	.26	---			1.5	21	7.3	2.2	5.6	1.1	.40	.30
27	.24	---			1.5	26	10	2.0	4.3	1.0	.40	.30
28	.23	---			1.5	26	6.5	2.0	3.6	1.0	.40	.30
29	.22	---			1.0	26	5.4	1.9	3.1	.90	.35	.30
30	.22	---			---	26	11	1.9	2.8	.90	.30	.30
31	.22	---			---	26	---	1.9	---	.80	.25	---
TOTAL	7.86	---			---	197.00	413.9	265.0	335.8	51.10	27.50	11.29
MEAN	.25	---			---	6.35	13.8	8.55	11.2	1.65	.89	.38
MAX	.37	---			---	26	32	42	44	3.5	4.9	1.1
MIN	.22	---			---	.60	3.3	1.9	1.8	.80	.25	.25
AC-FT	16	---			---	391	821	526	666	101	55	22

MINNESOTA RIVER BASIN

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--May to November 1983 and February to September 1984.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: March to August 1984.

INSTRUMENTATION.-- Automatic sampler since May 1983.

REMARKS.--Letter E indicates estimated value. Daily samples collected by automatic sampler during periods of base flow, and 1-7 samples collected during runoff events.

EXTREMES FOR CURRENT PERIOD.--March to August 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 507 mg/l June 22; minimum daily mean, 20 mg/l Apr. 21-25.

SEDIMENT LOADS: Maximum daily during period, 64 tons (58 tonnes) June 22; minimum daily, 0.11 ton (0.10 tonne) June 6.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
NOV										
01...	1200	--	.23	2000	--	7.2	--	10.0	730	11.0
FEB										
17...	1030	--	E3.0	886	947	7.3	7.2	.0	729	10.4
MAR										
22...	1300	--	E5.4	1590	--	7.8	--	3.0	730	13.2
30...	1720	--	19	1090	--	7.5	--	4.5	714	11.5
30-31	1720	48	--	--	1030	--	7.2	--	--	--
APR										
01-03	1720	48	--	--	1030	--	7.2	--	--	--
03...	1630	--	29	885	--	7.6	--	4.0	720	11.4
12...	1645	--	36	920	--	--	--	--	--	--
12-17	1645	20	--	--	1030	--	7.8	--	--	--
13...	1022	--	34	876	--	7.3	--	6.0	716	10.6
20...	1050	--	7.5	1340	--	7.6	--	7.5	735	11.1
27...	1000	--	12	1230	--	7.7	--	9.5	712	11.5
MAY										
10...	1450	--	10	1230	1300	7.7	7.9	14.0	720	9.3
11...	1753	--	7.7	1300	--	7.9	--	16.0	728	10.1
15...	1400	--	E5.4	1360	--	8.1	--	11.5	720	12.1
JUN										
01...	1545	--	2.0	1500	1550	--	7.8	15.5	720	--
07-13	1855	15	--	--	1250	--	7.8	--	--	--
13...	1340	--	9.7	1460	--	7.6	--	15.0	732	8.9
14-15	1235	21	--	--	1230	--	7.8	--	--	--
15...	1820	--	13	1390	--	7.6	--	16.0	729	8.9
17-18	1345	23	--	--	--	--	--	--	--	--
19...	2215	--	7.7	--	--	--	--	--	--	--
20...	0035	--	16	--	--	--	--	--	--	--
20...	1130	--	27	--	--	--	--	--	--	--
JUL										
10...	0630	--	2.4	--	--	--	--	--	--	--
10...	0830	--	7.7	--	--	--	--	--	--	--
10...	0955	--	7.7	--	--	--	--	--	--	--
12...	1540	--	1.8	1540	--	8.0	--	20.0	720	6.6
SEP										
06...	1600	--	.80	--	--	--	--	14.5	--	--

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

[illegible]

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO 1984

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)
NOV									
01...	--	--	--	--	--	.29	.60	.02	39
FEB									
17...	--	12	--	--	--	--	--	.37	36
MAR									
22...	--	--	--	--	--	--	--	--	23
30...	--	--	--	--	--	--	--	--	212
30-31	360	11	.70	16	767	5.0	1.5	.19	--
APR									
01-03	360	11	.70	16	767	5.0	1.5	.19	--
03...	--	--	--	--	--	--	--	--	215
12...	--	--	--	--	--	--	--	.21	789
12-17	380	12	.70	18	780	--	3.5	.32	--
13...	--	--	--	--	--	--	--	--	213
20...	--	--	--	--	--	--	--	--	19
27...	--	--	--	--	--	8.8	1.9	.68	--
MAY									
10...	500	12	.90	21	1230	8.4	3.5	.08	77
11...	--	--	--	--	--	--	--	--	108
15...	--	--	--	--	--	--	--	--	41
JUN									
01...	--	--	--	--	--	8.6	1.0	.02	45
07-13	500	15	.90	21	1150	12	2.4	.51	--
13...	--	--	--	--	--	--	--	--	72
14-15	480	14	1.0	21	1080	12	3.4	.27	--
15...	--	--	--	--	--	--	--	--	--
17-18	--	--	--	--	--	12	4.3	.39	--
19...	--	--	--	--	--	--	--	.11	--
20...	--	--	--	--	--	--	--	.15	--
20...	--	--	--	--	--	--	--	.32	--
JUL									
10...	--	--	--	--	--	--	--	.26	--
10...	--	--	--	--	--	--	--	.24	--
10...	--	--	--	--	--	--	--	.36	--
12...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	--	<.01	--

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	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)	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										
13...	1022	34	213	39	42	50	69	77	88	100
JUN										
18...	0015	27	--	56	79	93	100	--	--	--
26...	1500	5.0	116	--	--	--	--	--	--	--

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
APR										
03...	1630	2	7	17	39	56	75	89	97	100

MINNESOTA RIVER BASIN

441246095294801 LAKE LAURA SOUTH INLET NEAR WALNUT GROVE, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)
	MARCH		APRIL		MAY		JUNE		JULY		AUGUST	
1	---	---	213	16	273	18	42	.23	89	.65	61	.12
2	---	---	214	17	120	5.8	40	.21	87	.59	216	6.0
3	---	---	213	16	41	1.4	36	.18	90	.53	193	3.7
4	---	---	205	14	123	5.4	30	.15	92	.50	114	.52
5	---	---	189	10	115	4.0	28	.14	95	.49	111	.42
6	---	---	165	7.1	139	9.9	22	.11	100	.49	109	.41
7	---	---	143	5.0	269	34	120	3.0	106	.52	108	.41
8	---	---	143	6.2	96	6.0	121	2.0	115	.53	---	---
9	---	---	123	4.3	78	3.4	215	6.4	125	.57	---	---
10	---	---	105	3.7	76	2.0	168	9.5	207	2.4	---	---
11	---	---	459	38	67	1.4	175	9.1	115	.68	---	---
12	---	---	205	17	54	.92	125	8.4	103	.53	---	---
13	---	---	155	13	43	.67	78	2.1	93	.45	---	---
14	---	---	108	5.8	44	.64	251	20	87	.40	---	---
15	---	---	73	2.6	41	.58	85	3.9	81	.37	---	---
16	---	---	61	1.4	30	.41	93	2.8	74	.32	---	---
17	---	---	53	.89	29	.36	275	15	63	.27	---	---
18	---	---	42	.60	25	.30	180	11	63	.27	---	---
19	---	---	31	.43	29	.34	65	1.5	62	.25	---	---
20	---	---	23	.33	30	.31	202	10	62	.25	---	---
21	---	---	20	.25	31	.29	441	52	62	.25	---	---
22	---	---	20	.23	38	.33	507	64	62	.23	---	---
23	128	2.1	20	.21	44	.34	277	25	63	.22	---	---
24	155	3.3	20	.18	39	.27	128	4.5	63	.20	---	---
25	177	4.8	20	.18	30	.19	121	2.5	63	.19	---	---
26	216	12	172	4.6	33	.20	115	1.7	63	.19	---	---
27	213	15	311	8.4	38	.21	105	1.2	63	.17	---	---
28	213	15	100	1.8	33	.18	104	1.0	63	.17	---	---
29	213	15	50	.73	28	.14	99	.83	62	.15	---	---
30	213	15	199	9.9	31	.16	94	.71	62	.15	---	---
31	213	15	---	---	38	.19	---	---	62	.13	---	---
TOTAL	---	---	---	205.83	---	98.33	---	259.16	---	13.11	---	---

MINNESOTA RIVER BASIN

441246095294802 LAKE LAURA NORTH INLET NR WALNUT GROVE MN

LOCATION.--Lat 44°12'46", long 95°29'48", SE¼SW¼ sec.26, T.109 N., R.39 W., Redwood County, Hydrologic Unit 07020008, 0.25 mi (0.40 km) east of County Road 75, 0.7 mi (1.13 km) west of County Road 78, 0.9 mi (1.45 km) South of County Highway 20.

DRAINAGE AREA.-- 1.12 mi² (2.90 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.-- February to September 1984 (discontinued). Miscellaneous discharge measurements and annual peak available for 1983.

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

REMARKS.-- Water-stage recorder operated only during open water period. Records fair except those for Feb. 17 to Mar. 31, and July 31 to Sept. 30, which are poor.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 232 ft³/s (6.57 m³/s) July 1, 1983, gage height, 11.86 ft (3.615 m); observation of no flow Aug. 24, 1983.

EXTREMES FOR CURRENT PERIOD.-- February to September, 1984: Maximum discharge during period, 120 ft³/s (680 m³/s) June 22, gage height, 11.51 ft (3.508 m); maximum gage height, 14.95 ft (4.557 m) Mar. 23 (backwater from ice); minimum daily discharge, 0.05 ft³/s (0.001 m³/s) Aug. 30, 31, Sept. 1 - 4, 6, 19 - 30; minimum gage height 9.48 ft (2.890 m) Aug. 6, 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---			---	1.0	7.0	4.3	.35	.75	.16	.05
2	---	---			---	1.0	8.0	3.0	.36	.66	1.6	.05
3	---	---			---	1.5	6.8	2.1	.34	.61	2.4	.05
4	---	---			---	1.5	5.5	1.9	.38	.56	.80	.05
5	---	---			---	1.0	4.2	2.1	.36	.53	.21	.06
6	---	---			---	.50	3.3	5.7	.37	.52	.16	.05
7	---	---			---	.40	2.4	15	.71	.52	.11	.06
8	---	---			---	.40	3.2	3.0	.92	.52	.10	.07
9	---	---			---	.40	2.5	2.0	1.2	.50	.09	.08
10	---	---			---	.40	2.3	1.6	2.7	1.7	.09	.08
11	---	---			---	.40	4.8	1.4	2.4	.86	.08	.10
12	---	---			---	.40	12	1.2	4.6	.62	.08	.20
13	---	---			---	.40	7.9	1.2	1.9	.56	.07	.10
14	---	---			---	.40	4.2	1.0	4.2	.52	.07	.07
15	---	---			---	.60	2.5	.96	3.0	.52	.07	.07
16	---	---			---	.40	1.8	.92	2.1	.54	.06	.07
17	---	---			3.0	.40	1.5	.81	3.6	.49	.06	.07
18	---	---			5.0	.40	1.3	.76	4.2	.48	.06	.06
19	---	---			2.0	.40	1.1	.68	1.9	.48	.06	.05
20	---	---			2.5	.40	1.1	.65	5.4	.45	.06	.05
21	---	---			2.0	.40	.98	.63	18	.37	.06	.05
22	---	---			2.0	1.2	.93	.55	34	.29	.06	.05
23	---	---			2.5	1.3	.87	.48	7.8	.27	.06	.05
24	---	---			2.5	2.0	.79	.46	3.0	.26	.06	.05
25	---	---			2.5	1.5	.74	.42	1.9	.26	.06	.05
26	---	---			1.5	4.0	1.5	.39	1.5	.26	.06	.05
27	---	---			1.5	4.0	2.1	.42	1.2	.24	.06	.05
28	---	---			1.5	4.0	1.3	.40	1.1	.22	.06	.05
29	---	---			1.0	4.0	1.1	.37	.95	.22	.06	.05
30	---	---			---	4.0	2.8	.37	.84	.20	.05	.05
31	---	---			---	4.0	---	.35	---	.18	.05	---
TOTAL	---	---			---	42.70	96.51	55.12	111.28	15.16	7.03	1.94
MEAN	---	---			---	1.38	3.22	1.78	3.71	.49	.23	.065
MAX	---	---			---	4.0	12	15	34	1.7	2.4	.20
MIN	---	---			---	.40	.74	.35	.34	.18	.05	.05
AC-FT	---	---			---	85	191	109	221	30	14	3.8

MINNESOTA RIVER BASIN

441246095294802 LAKE LAURA NORTH INLET NEAR WALNUT GROVE, MN--Continued

WATER QUALITY RECORDS

PERIOD OF RECORD.--May to September 1983, and March to September 1984.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: March to August 1984.

INSTRUMENTATION.-- Automatic sampler since March 1984.

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.--March to August 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 1550 mg/L June 21; minimum daily mean, 5 mg/L May 3-5.

SUSPENDED LOADS: Maximum daily during period, 301 tons (273 tonnes) June 22; minimum daily, 0.01 ton (0.009 tonne) Aug 7.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
FEB											
17...	1310	--	E4.5	654	--	7.0	--	.0	729	8.4	--
MAR											
31...	1130	--	3.6	895	--	7.4	--	4.0	733	10.8	--
31-31	1200	5.2	--	--	860	--	7.2	--	--	--	--
APR											
01-03	1200	5.2	--	--	860	--	7.2	--	--	--	--
03...	1800	--	6.8	750	--	7.4	--	3.5	729	10.7	--
13...	1600	--	9.0	769	--	7.4	--	7.0	718	9.4	--
13-15	1600	5.6	3.0	--	903	--	7.8	--	--	--	--
20...	1415	--	E1.0	1090	--	7.5	--	12.5	733	10.1	--
26-26	1730	2.2	--	--	--	--	--	--	--	--	--
27...	1215	--	2.5	1040	--	7.6	--	13.5	730	10.5	--
30-30	1245	4.2	--	--	925	--	8.0	--	--	--	--
MAY											
01-02	1245	4.2	--	--	925	--	8.0	--	--	--	--
15...	1340	--	1.0	1020	--	8.0	--	14.0	736	14.0	--
JUN											
01...	1430	--	.35	1100	1120	7.4	7.7	18.0	722	--	71
07-10	2015	1.9	--	--	--	--	--	--	--	--	--
10...	1555	--	.74	1050	--	7.8	--	19.0	730	10.0	--
13...	1415	--	1.7	1280	--	7.6	--	20.0	732	7.2	--
14-15	1255	6.1	--	--	--	--	--	--	--	--	--
15...	1700	--	2.3	1120	--	7.6	--	17.0	729	7.9	--
17-21	1945	8.2	--	--	840	--	7.6	--	--	--	--
21...	1555	--	8.9	--	--	--	--	--	--	--	--
21...	1705	--	38	--	--	--	--	--	--	--	--
26...	1430	--	1.4	--	--	--	--	22.5	--	--	--
JUL											
10...	0530	--	1.7	--	--	--	--	--	--	--	--
10...	0700	--	3.5	--	--	--	--	--	--	--	--
10...	1200	--	1.7	--	--	--	--	--	--	--	--
SEP											
06...	1600	--	.05	1260	--	7.3	--	12.5	720	10.7	--

MINNESOTA RIVER BASIN

441246095294802 LAKE LAURA NORTH INLET NEAR WALNUT GROVE, MN--Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	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 .062 MM (70331)
JUN										
07...	2015	--	1.5	1500	55	64	--	81	100	--
17...	2110	--	--	258	68	79	93	99	--	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
APR						
03...	1800	57	90	95	98	100

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)
	MARCH		APRIL		MAY		JUNE		JULY		AUGUST	
1	---	---	23	.43	15	.17	18	.02	46	.09	69	.03
2	---	---	23	.50	6	.05	18	.02	40	.07	185	.80
3	---	---	23	.42	5	.03	18	.02	35	.06	95	.62
4	---	---	18	.27	5	.03	18	.02	34	.05	55	.12
5	---	---	20	.23	5	.03	18	.02	33	.05	53	.03
6	---	---	18	.16	246	.17	18	.02	30	.04	52	.02
7	---	---	12	.08	414	.32	232	1.1	30	.04	50	.01
8	---	---	13	.11	65	.53	115	.29	30	.04	---	---
9	---	---	13	.09	38	.21	284	1.8	30	.04	---	---
10	---	---	13	.08	28	.12	194	1.6	265	2.1	---	---
11	---	---	100	2.5	25	.09	237	1.9	110	.26	---	---
12	---	---	101	4.0	25	.08	290	4.0	110	.18	---	---
13	---	---	38	.81	28	.09	106	.54	110	.17	---	---
14	---	---	9	.10	28	.08	341	5.6	110	.15	---	---
15	---	---	10	.07	29	.08	128	1.0	110	.15	---	---
16	---	---	10	.05	25	.06	55	.31	110	.16	---	---
17	---	---	9	.04	22	.05	301	5.0	108	.14	---	---
18	---	---	9	.03	17	.03	415	5.1	104	.13	---	---
19	---	---	9	.03	15	.03	192	1.0	102	.13	---	---
20	---	---	8	.02	15	.03	447	8.6	98	.12	---	---
21	---	---	9	.02	15	.03	1590	201	97	.10	---	---
22	---	---	9	.02	15	.02	1570	304	93	.07	---	---
23	---	---	9	.02	15	.02	301	6.3	90	.07	---	---
24	---	---	8	.02	15	.02	103	.83	89	.06	---	---
25	---	---	8	.02	15	.02	93	.48	87	.06	---	---
26	---	---	110	.57	15	.02	82	.33	87	.06	---	---
27	---	---	24	.14	15	.02	73	.24	84	.05	---	---
28	---	---	13	.05	16	.02	63	.19	82	.05	---	---
29	---	---	11	.03	18	.02	58	.15	80	.05	---	---
30	---	---	84	.72	18	.02	53	.12	75	.04	---	---
31	20	.22	---	---	18	.02	---	---	73	.04	---	---
TOTAL	---	---	---	11.63	---	51.02	---	551.60	---	4.82	---	---

MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN

LOCATION.--Lat $44^{\circ}12'38''$, long $95^{\circ}29'50''$, in SW $\frac{1}{4}$ SE $\frac{1}{4}$ 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.--6.83 mi² (17.1 km²).

LAKE-STAGE RECORDS

PERIOD OF RECORD.--May to September 1983 and March to October 1984 (discontinued).

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.--Maximum gage height, 46.94 ft (14.307 m) May 8,9, 1983; minimum gage height, 34.43 ft (10.49 m) Sept. 27,1984.

EXTREMES FOR CURRENT PERIOD.--March to October 1984: Maximum gage height during period, 44.35 ft (13.52 m) April 14; minimum gage height, 34.43 ft (10.49 m) Sept. 27.

MONTHEND GAGE HEIGHT, IN FEET, MARCH TO OCTOBER 1984

Mar 31	40.37	June 30	36.81	Sept. 30	34.65
Apr 30	36.16	July 31	34.91	Oct. 11	34.85
May 31	35.17	Aug 31	34.78		

MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 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)	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)
NOV										
01...	1160	.66	.55	.80	.03	.03	.01	19000	20.0	<.100
01...	--	--	--	--	.04	--	--	--	--	--
FEB										
17...	--	--	--	--	.06	--	--	--	--	--
APR										
27...	--	--	--	--	.14	--	--	--	--	--
MAY										
15...	762	8.9	.45	1.0	.14	.06	.06	1100	3.60	3.80
15...	--	8.2	.55	1.5	.13	.09	.09	--	--	--
JUN										
01...	--	--	--	--	.05	--	--	1200	25.0	<.100
01...	--	--	--	7.8	.07	--	--	--	--	--
JUL										
12...	--	9.0	.04	.80	.02	.01	.01	1400	17.0	<.100
12...	--	4.2	2.2	3.1	.05	.01	<.01	--	--	--
AUG										
07...	1090	1.9	3.0	3.9	.15	.10	.08	1800	9.20	<.100
SEP										
07...	--	--	--	--	.03	--	--	1100	4.80	<.100
07...	--	--	--	--	.60	--	--	--	--	--

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
NOV						
01...	1343	5.00	9.0	11.0	7.7	1310
01...	1346	3.00	9.0	11.0	7.9	1360
01...	1348	6.00	9.0	10.7	7.9	1360
01...	1350	9.00	8.5	10.5	8.0	1360
01...	1353	12.0	8.5	10.3	8.0	1360
01...	1356	15.0	8.5	10.3	8.0	1360
01...	1400	18.0	8.5	10.1	8.0	1360
01...	1405	19.5	8.5	8.8	7.8	1380
FEB						
17...	1410	2.00	.0	10.7	7.2	944
17...	1413	3.00	.5	9.8	7.2	1080
17...	1415	4.00	2.0	4.1	7.1	1640
17...	1418	6.00	2.0	4.4	7.0	1610
17...	1420	9.00	2.0	3.3	7.0	1660
17...	1422	12.0	2.5	2.4	6.9	1700
17...	1424	15.0	2.5	2.5	6.9	1770
17...	1426	18.0	2.5	2.5	7.0	1820
17...	1430	21.0	2.5	1.8	7.0	1830
APR						
27...	1250	1.00	11.0	11.6	8.7	1240
27...	1252	2.00	10.5	--	8.6	1250
MAY						
15...	1200	.50	14.0	12.6	8.2	959
15...	1206	3.00	14.0	12.6	8.2	959
15...	1208	6.00	14.0	12.4	8.2	960
15...	1210	9.00	13.0	10.8	8.0	963
15...	1212	10.0	12.0	9.4	7.8	963
15...	1215	11.0	12.0	9.4	7.8	963
15...	1218	12.0	12.0	9.5	7.8	968
15...	1221	15.0	11.0	8.5	7.7	1020
15...	1224	18.0	10.0	7.6	7.6	1100
15...	1227	21.0	8.5	6.9	7.6	1080
15...	1230	24.0	7.5	4.6	7.5	1090
JUN						
01...	1244	.50	17.5	11.1	8.4	1120
01...	1247	3.00	17.5	10.5	8.4	1120
01...	1248	6.00	17.5	10.4	8.3	1120
01...	1250	9.00	17.5	10.0	8.2	1130
01...	1252	12.0	17.0	8.9	8.1	1140
01...	1254	15.0	16.0	8.1	7.9	1140
01...	1256	18.0	15.5	4.2	7.8	1170

MINNESOTA RIVER BASIN

441246095294800 LAKE LAURA NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
JUL						
12...	1455	.50	25.5	10.9	8.4	1100
12...	1458	3.00	25.5	10.7	8.4	1200
12...	1502	6.00	24.5	6.1	8.4	1250
12...	1504	7.00	19.5	4.2	8.3	1300
12...	1506	8.00	19.0	3.3	8.2	1300
12...	1508	9.00	18.0	2.5	8.2	1310
12...	1510	10.0	18.0	2.0	8.2	1320
12...	1512	11.0	16.5	1.8	8.2	1320
12...	1514	12.0	16.0	1.7	8.2	1320
12...	1516	13.0	15.0	1.6	8.3	1330
12...	1518	14.0	15.0	1.6	8.3	1330
12...	1520	15.0	14.5	1.5	8.2	1330
12...	1522	16.0	14.0	1.5	8.2	1330
12...	1524	17.0	14.0	1.5	8.1	1340
12...	1526	18.0	14.0	1.5	8.0	1350
12...	1528	19.0	13.5	1.6	8.0	1350
AUG						
07...	1440	.50	26.5	12.6	7.9	1240
07...	1443	3.00	26.5	12.4	7.9	1240
07...	1446	6.00	24.0	7.9	7.7	1310
07...	1449	7.00	23.0	6.8	7.5	1300
07...	1452	8.00	22.5	6.1	7.5	1310
07...	1455	9.00	22.0	5.6	7.5	1310
07...	1458	10.0	22.0	5.5	7.5	1320
07...	1501	11.0	21.5	5.3	7.5	1330
07...	1504	12.0	21.0	5.3	7.5	1340
07...	1507	13.0	20.0	5.3	7.6	1350
07...	1510	14.0	19.5	5.4	7.6	1360
07...	1513	15.0	17.5	5.6	7.7	1360
07...	1516	16.0	17.5	5.3	7.7	1360
07...	1519	17.0	14.5	5.7	7.8	1380
07...	1522	18.0	14.0	5.6	7.9	1380
07...	1525	19.0	13.5	5.5	7.9	1360
07...	1528	20.0	13.0	5.4	7.8	1380
SEP						
07...	0853	.50	18.5	21.6	8.6	1460
07...	0856	3.00	18.5	18.5	8.7	1460
07...	0859	6.00	18.0	18.1	8.6	1450
07...	0901	9.00	18.0	17.2	8.5	1440
07...	0903	12.0	18.0	16.4	8.5	1440
07...	0906	15.0	18.0	16.2	8.4	1440
07...	0909	18.0	16.5	11.9	7.5	1500
07...	0912	19.0	14.5	11.5	7.5	1510

MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NEAR WALNUT GROVE, MN

LOCATION.--Lat 44°12'49", long 95°29'35", 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.--6.83 mi² (17.7 km²), revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May to October 1983, February to September 1984 (discontinued).

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

REMARKS.--Water stage recorder operated only during open water period. Records good except those for Oct. 1 to Nov. 1, 1983, Feb. 16 to Mar. 25, Apr. 28 to May 15, Sept. 3 - 30, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 40 ft³/s (1.13 m³/s) May 8, 1983, gage height, 13.61 ft (4.148 m); minimum daily discharge, 0.13 ft³/s (.004 m³/s) Sept. 8-13, 1983, gage height, 11.01 ft (3.356 m).

EXTREMES FOR CURRENT PERIOD.--October 1983, February to September 1984: Maximum daily discharge during period, 39 ft³/s (1.10 m³/s) April 2, gage height, 12.89 ft (3.929 m); minimum observed discharge, 0.33 ft³/s (.009 m³/s) Nov. 1, and Sept. 1, 2; minimum recorded gage height, 10.78 ft (3.286 m), Aug. 31 to Sept. 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.77	.33			---	2.0	33	16	6.1	11	1.1	.33
2	.64	---			---	2.0	35	19	5.8	8.7	1.4	.33
3	.56	---			---	3.0	37	19	5.6	7.2	2.8	.34
4	.49	---			---	2.5	38	19	5.8	6.0	3.0	.34
5	.45	---			---	2.0	37	20	6.1	5.3	2.7	.37
6	.41	---			---	1.1	36	22	5.8	4.7	2.5	.37
7	.43	---			---	1.0	35	33	5.9	4.3	2.1	.41
8	.39	---			---	1.0	34	33	8.7	4.1	1.9	.48
9	.37	---			---	1.0	33	31	9.1	3.9	1.6	.52
10	.45	---			---	1.0	32	29	13	5.0	1.4	.52
11	.63	---			---	1.0	31	27	14	5.6	1.1	.52
12	.55	---			---	1.0	34	25	17	5.0	1.1	.85
13	.48	---			---	1.0	36	22	18	4.5	.99	.90
14	.47	---			---	1.0	35	21	17	4.1	.88	.81
15	.61	---			---	2.0	34	19	19	3.7	.81	.72
16	.57	---			3.0	1.5	33	17	19	3.4	.77	.64
17	.55	---			6.0	1.3	31	15	18	3.5	.80	.64
18	.45	---			10	1.2	29	12	19	3.2	.76	.64
19	.57	---			8.0	1.2	26	11	18	3.0	.71	.55
20	.70	---			5.0	1.4	24	9.5	18	2.8	.60	.55
21	.64	---			4.0	2.4	22	8.1	19	2.6	.62	.48
22	.58	---			4.0	5.2	20	7.3	24	2.5	.61	.44
23	.48	---			5.0	7.3	17	6.6	29	2.2	.55	.44
24	.48	---			6.0	10	14	6.3	27	2.0	.54	.44
25	.46	---			5.0	12	12	6.2	24	1.9	.52	.48
26	.43	---			3.0	28	11	6.0	22	1.8	.52	.48
27	.43	---			3.0	32	13	6.0	19	1.7	.52	.48
28	.41	---			3.0	31	13	6.3	17	1.5	.52	.48
29	.39	---			2.0	31	14	6.2	15	1.4	.48	.48
30	.37	---			---	31	14	6.1	12	1.2	.41	.48
31	.35	---			---	31	---	5.8	---	1.1	.34	---
TOTAL	15.56	---			---	250.1	813	490.4	456.9	118.9	34.66	15.51
MEAN	.50	---			---	8.06	27.1	15.8	15.2	3.84	1.12	.52
MAX	.77	---			---	32	38	33	29	11	3.0	.90
MIN	.35	---			---	1.0	11	5.8	5.6	1.1	.34	.33
AC-FT	31	---			---	496	1610	973	906	236	69	31

MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NEAR WALNUT GROVE, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--May to September 1983 and March to September 1984.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: May to September 1983 and March to September 1984.

REMARKS.--Letter E indicates estimated value. Letter K indicates non-ideal colony count. Once weekly samples collected by observers during periods of base flow, twice daily samples collected during periods of high-medium flow.

EXTREMES FOR PERIOD OF RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 139 mg/L June 14, 1983; minimum daily mean, 3 mg/L Sept. 8-10, 1983.

SEDIMENT LOADS: Maximum daily, 8.6 tons (7.8 tonnes) Apr. 13, 1984; minimum daily, 0.00 ton (0.00 tonne) on many days in 1983.

EXTREMES FOR CURRENT PERIOD.--March to September 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 106 mg/L March 26; minimum daily mean, 17 mg/L April 24-25.

SEDIMENT LOADS: Maximum daily during period, 8.6 tons (7.8 tonnes) April 13; minimum daily, 0.03 ton (0.03 tonne) on many days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
NOV										
01...	1250	--	.33	1370	--	7.9	--	10.0	729	10.8
FEB										
17...	1445	--	E4.3	940	--	--	--	.0	729	13.0
MAR										
31...	0915	--	30	1020	--	7.6	--	3.0	716	10.6
31-31	0915	36	--	--	996	--	7.3	--	--	--
APR										
01-03	0915	36	--	--	996	--	7.3	--	--	--
03...	0820	--	42	911	--	7.6	--	3.5	731	12.1
12-20	1710	32	--	--	1030	--	7.7	--	--	--
20...	1250	--	24	1040	--	7.6	--	8.0	734	11.5
27...	1200	--	13	1190	--	8.1	--	11.5	712	12.1
MAY										
15...	1300	--	19	962	1030	8.2	7.8	14.5	720	10.9
JUN										
01...	1030	--	6.5	1120	1190	8.0	8.1	17.5	722	8.8
10-13	1300	15	--	--	1170	--	8.0	--	--	--
13...	1530	--	17	1200	--	8.1	--	21.0	734	9.9
15...	1700	--	19	--	--	--	--	--	--	--
22...	1725	--	25	--	--	--	--	19.0	--	--
26...	1330	--	22	--	894	--	7.9	24.0	--	--
JUL										
12...	1400	--	5.0	1200	--	8.4	--	25.5	729	7.4
SEP										
06...	1506	--	E.80	1270	--	7.6	--	18.5	720	10.6

MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NEAR WALNUT GROVE, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)	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 (MG/L - CAC03) (99430)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
NOV 01...		K1	480	--	--	--	--	--	--	--
FEB 17...	--	--	--	--	--	--	--	--	--	--
MAR 31...	--	--	--	--	--	--	--	--	--	--
31-31	--	--	120	46	12	2.6	--	--	156	350
APR 01-03	--	--	120	46	12	2.6	--	--	156	350
03...	--	--	--	--	--	--	--	--	--	--
12-20	--	--	140	48	13	3.4	--	--	171	360
20...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	262	215	--	--
MAY 15...	--	--	160	34	12	2.9	--	--	165	--
JUN 01...	28	270	--	--	--	--	240	197	--	--
10-13	--	--	160	60	17	3.1	--	--	129	460
13...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	154	--
JUL 12...	--	--	--	--	--	--	--	--	--	--
SEP 06...	--	--	--	--	--	--	--	--	--	--

DATE	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)	CYANIDE TOTAL (MG/L AS CN) (00720)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
NOV 01...	--	--	--	--	1.1	1.0	.040	--	--
FEB 17...	13	--	--	--	--	--	.280	--	58
MAR 31...	--	--	--	--	--	--	--	--	30
31-31	11	.70	16	728	5.1	7.4	.180	--	83
APR 01-03	11	.70	16	728	5.1	7.4	.180	--	83
03...	--	--	--	--	--	--	--	--	81
12-20	12	.60	16	833	6.8	1.8	.240	--	72
20...	--	--	--	--	--	--	--	--	100
27...	--	--	--	--	6.7	.80	.150	--	105
MAY 15...	10	--	--	771	9.1	1.8	.130	<.01	16
JUN 01...	--	--	--	--	6.5	.80	.040	--	--
10-13	14	.80	12	987	6.5	1.1	.090	--	49
13...	--	--	--	--	--	--	--	--	36
15...	--	--	--	--	--	--	.100	--	--
22...	--	--	--	--	10	2.4	.240	--	29
26...	--	--	--	--	8.3	1.4	.160	--	21
JUL 12...	--	--	--	--	--	--	--	--	--
SEP 06...	--	--	--	--	--	--	.020	--	--

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
FEB 17...	1445	--	E4.3	58	--
MAR 31...	0915	--	30	30	--
31-31	0915	36	--	83	--
APR 01-03	0915	36	--	83	--
03...	0820	--	42	81	--
12-20	1710	32	--	72	--
20...	1250	--	24	100	--
27...	1200	--	13	105	--
MAY 15...	1300	--	19	16	--
JUN 10-13	1300	15	--	49	--
11...	1730	--	14	40	91
13...	1530	--	17	36	--
22...	1725	--	25	29	99
26...	1330	--	22	21	--

[illegible]

MINNESOTA RIVER BASIN

441246095294804 LAKE LAURA OUTLET NR WALNUT GROVE, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION	
	(MG/L)	LOADS (T/DAY)	(MG/L)	LOADS (T/DAY)	(MG/L)	LOADS (T/DAY)	(MG/L)	LOADS (T/DAY)	(MG/L)	LOADS (T/DAY)	(MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	83	7.4	53	2.3	41	.68	33	.98	23	.07	31	.03
2	83	7.8	48	2.5	42	.66	32	.75	26	.10	30	.03
3	81	8.1	46	2.4	44	.67	31	.60	59	.45	29	.03
4	78	8.0	43	2.2	45	.70	30	.49	56	.45	---	---
5	65	6.5	40	2.2	45	.74	29	.41	50	.36	---	---
6	56	5.4	41	2.4	45	.70	28	.36	43	.29	---	---
7	54	5.1	52	4.6	49	.78	26	.30	35	.20	---	---
8	58	5.3	48	4.3	63	1.5	24	.27	34	.17	---	---
9	63	5.6	44	3.7	68	1.7	21	.22	33	.14	---	---
10	61	5.3	40	3.1	75	2.6	37	.50	31	.12	---	---
11	59	4.9	36	2.6	55	2.1	41	.62	29	.09	---	---
12	74	6.8	32	2.2	34	1.6	41	.55	27	.08	---	---
13	88	8.6	28	1.7	34	1.6	40	.49	26	.07	---	---
14	73	6.9	23	1.3	33	1.5	39	.43	23	.05	---	---
15	73	6.7	18	.92	57	2.9	38	.38	21	.05	---	---
16	77	6.9	19	.87	56	2.9	38	.35	18	.04	---	---
17	73	6.1	23	.93	54	2.6	37	.35	21	.05	---	---
18	68	5.3	26	.84	51	2.6	35	.30	23	.05	---	---
19	63	4.4	28	.83	48	2.3	34	.28	24	.05	---	---
20	53	3.4	33	.85	44	2.1	32	.24	27	.04	---	---
21	40	2.4	35	.77	38	1.9	31	.22	28	.05	---	---
22	28	1.5	37	.73	32	2.1	29	.20	30	.05	---	---
23	18	.83	38	.68	63	4.9	29	.17	31	.05	---	---
24	17	.64	39	.66	63	4.6	30	.16	31	.05	---	---
25	17	.55	39	.65	42	2.7	30	.15	31	.04	---	---
26	35	1.0	39	.63	25	1.5	30	.15	31	.04	---	---
27	96	3.4	38	.62	28	1.4	30	.14	31	.04	---	---
28	85	3.0	37	.63	34	1.6	29	.12	31	.04	---	---
29	73	2.8	38	.64	35	1.4	28	.11	31	.04	---	---
30	63	2.4	38	.63	34	1.1	26	.08	31	.03	---	---
31	---	---	40	.63	---	---	24	.07	31	.03	---	---
TOTAL	---	143.02	---	50.01	---	56.13	---	10.44	---	3.38	---	---

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 mi² (8.11 km²).

WATER-DISCHARGE RECORDS

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 except those for winter period, which are fair.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 530 ft³/s (15.0 m³/s) June 12, 1984, gage height, 10.20 ft (3.109 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, 530 ft³/s (15.0 m³/s) June 12, gage height, 10.20 ft (3.109 m); minimum daily discharge, 0.04 ft³/s (0.001 m³/s) Feb. 6-10; minimum gage height, 3.73 ft (1.137 m) Sept. 21, 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.23	.26	.18	.11	.05	1.6	22	27	1.9	1.5	1.2	.39
2	.19	.23	.18	.11	.05	1.5	26	11	1.9	1.5	1.7	.40
3	.19	.23	.18	.11	.05	1.4	20	6.3	1.8	1.4	.98	.40
4	.17	.23	.18	.10	.05	1.3	16	6.3	2.0	1.3	.84	.43
5	.17	.23	.17	.10	.05	.74	11	6.7	3.5	1.3	.78	.40
6	.15	.23	.17	.10	.04	1.2	8.5	4.5	2.7	1.3	.69	.38
7	.13	.23	.17	.10	.04	1.1	5.6	16	4.4	1.2	.61	.38
8	.12	.23	.17	.10	.04	1.0	8.7	4.6	4.1	1.2	.64	.38
9	.12	.54	.16	.10	.04	.93	7.0	3.8	5.5	1.3	.57	.38
10	.15	.35	.16	.09	.04	.93	5.6	3.5	26	1.3	.56	.38
11	.35	.24	.15	.09	.10	.93	9.2	3.3	36	1.3	.54	.38
12	.19	.24	.15	.08	.50	.93	50	3.1	102	1.2	.54	.49
13	.23	.24	.15	.08	1.0	.89	31	3.6	4.4	1.2	.49	.39
14	.21	.24	.15	.08	2.5	1.1	13	3.1	12	1.2	.48	.35
15	.21	.23	.14	.08	5.0	1.9	9.2	3.0	4.4	1.2	.48	.35
16	.17	.23	.14	.08	8.0	1.5	7.6	2.9	3.7	1.1	.49	.34
17	.15	.23	.14	.08	10	1.3	5.1	2.8	6.9	1.1	.54	.32
18	.13	.22	.13	.07	5.0	1.2	4.2	2.7	4.2	1.1	.50	.32
19	.17	.22	.13	.07	2.0	1.2	3.8	2.6	2.9	1.0	.49	.32
20	.28	.22	.13	.07	1.8	1.2	3.6	2.6	6.3	1.0	.47	.32
21	.23	.21	.13	.07	1.0	1.3	3.2	2.5	16	.96	.59	.31
22	.21	.21	.13	.07	1.8	1.7	3.1	2.5	39	.93	.48	.27
23	.21	.21	.13	.07	1.8	3.0	3.0	2.3	5.6	.85	.47	.29
24	.21	.20	.12	.07	2.1	10	3.0	2.4	3.2	.86	.47	.29
25	.21	.20	.12	.06	2.3	15	2.8	2.3	2.5	.84	.45	.31
26	.23	.20	.12	.06	2.2	20	20	2.2	2.2	.85	.45	.32
27	.23	.20	.12	.06	1.8	30	17	2.4	1.9	.80	.43	.32
28	.23	.19	.11	.06	1.7	20	5.1	2.4	1.8	.77	.43	.32
29	.21	.19	.11	.06	1.6	18	4.6	2.2	1.7	.73	.38	.32
30	.23	.19	.11	.06	---	13	14	2.1	1.6	.72	.38	.32
31	.23	---	.11	.05	---	17	---	2.0	---	.80	.38	---
TOTAL	6.14	7.07	4.44	2.49	52.65	172.85	342.9	144.7	312.1	33.81	18.50	10.57
MEAN	.20	.24	.14	.080	1.82	5.58	11.4	4.67	10.4	1.09	.60	.35
MAX	.35	.54	.18	.11	10	30	50	27	102	1.5	1.7	.49
MIN	.12	.19	.11	.05	.04	.74	2.8	2.0	1.6	.72	.38	.27
CFSM	.06	.08	.05	.03	.58	1.78	3.64	1.49	3.32	.35	.19	.11
IN.	.07	.08	.05	.03	.63	2.05	4.07	1.72	3.71	.40	.22	.13
AC-FT	12	14	8.8	4.9	104	343	680	287	619	67	37	21
CAL YR 1983	TOTAL	1746.14	MEAN 4.78	MAX 129	MIN .07	CFSM 1.53	IN 20.75	AC-FT 3463				
WTR YR 1984	TOTAL	1108.22	MEAN 3.03	MAX 102	MIN .04	CFSM .97	IN 13.17	AC-FT 2200				

MINNESOTA RIVER BASIN

05316900 DRY CREEK NEAR JEFFERS, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.-- Water year 1984.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT: March to September 1984.

INSTRUMENTATION.-- Automatic sampler since March 1984.

REMARKS.-- Letter E indicates estimated value. 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, Apr. 12-13, 26-27, June 9-14, and June 21-23, daily suspended-sediment concentrations were defined by samples from an automatic sampler and observers samples, records are fair.

EXTREMES FOR CURRENT PERIOD.-- March to September 1984:

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 1,920 mg/L June 12; minimum daily mean, 30 mg/L on many days.

SEDIMENT LOADS: Maximum daily during period, 1,230 tons (1,120 tonnes) June 12; minimum daily, 0.03 ton (0.03 tonne) on many days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (DEG C) (00010)	BARO- METRIC PRES- SURE OF (MM HG) (00025)
OCT									
20...	1155	--	.30	1350	--	--	--	8.5	--
NOV									
01...	1040	--	.25	1320	--	7.8	--	10.5	729
FEB									
09...	1020	--	.04	1400	--	--	--	1.0	--
MAR									
20...	1430	--	1.1	1200	--	--	--	2.5	--
22...	1630	--	1.8	940	--	--	--	--	--
30...	1320	--	12	810	--	--	--	4.5	--
31...	1500	--	14	770	--	7.6	--	5.5	735
31-31	1500	14	--	--	737	--	7.3	--	--
APR									
01-03	1500	14	--	--	737	--	7.3	--	--
03...	1245	--	15	662	--	7.3	--	2.5	732
12...	1330	--	33	572	559	7.6	7.5	9.5	711
13...	0910	--	50	520	--	--	--	--	--
16...	1600	--	7.5	860	--	--	--	15.0	--
26-26	2100	77	--	--	388	--	7.5	--	--
MAY									
10...	1130	--	3.5	972	--	8.0	--	11.5	723
15...	1630	--	3.0	974	--	8.3	--	15.0	737
JUN									
01...	1715	--	1.9	1090	1140	7.9	8.0	17.0	723
09-11	2310	E43	--	--	506	--	7.5	--	--
12...	0128	--	E146	--	--	--	--	--	--
13...	1630	--	3.9	956	--	7.8	--	19.0	734
14-14	1300	23	--	--	363	--	7.4	--	--
15...	2030	--	3.5	860	--	--	--	--	--
21-21	1745	46	--	--	376	--	7.6	--	--
22...	1515	28	--	--	--	--	--	--	--
22...	1550	186	--	--	--	--	--	--	--
SEP									
06...	1800	--	.30	1150	--	8.0	--	15.5	720

MINNESOTA RIVER BASIN

05316900 DRY CREEK NEAR JEFFERS, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

	OXYGEN, DIS- SOLVED (MG/L) (00300)	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)	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)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT									
20...	--	--	--	--	--	--	--	--	--
NOV									
01...	9.7	--	--	--	--	--	--	--	--
FEB									
09...	--	--	--	--	--	--	--	--	--
MAR									
20...	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--
31...	9.7	--	--	--	--	--	--	--	--
31-31	--	--	--	96	28	7.6	2.3	157	200
APR									
01-03	--	--	--	96	28	7.6	2.3	157	200
03...	12.2	--	--	--	--	--	--	--	--
12...	9.9	--	--	72	20	5.3	3.1	107	140
13...	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--
26-26	--	--	--	50	12	4.8	3.4	--	72
MAY									
10...	12.6	--	--	--	--	--	--	--	--
15...	13.9	--	--	--	--	--	--	--	--
JUN									
01...	9.4	860	270	--	--	--	--	--	--
09-11	--	--	--	62	18	5.0	4.0	118	110
12...	--	--	--	--	--	--	--	--	--
13...	8.3	--	--	--	--	--	--	--	--
14-14	--	--	--	45	12	3.8	2.4	98	71
15...	--	--	--	--	--	--	--	--	--
21-21	--	--	--	46	12	4.0	3.6	95	65
22...	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--
SEP									
06...	11.2	--	--	--	--	--	--	--	--

[illegible]

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

	MEAN CONCEN- TRATION		LOADS		MEAN CONCEN- TRATION		LOADS		MEAN CONCEN- TRATION		LOADS		MEAN CONCEN- TRATION		LOADS	
DAY	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH					
1											---				---	
2											---				---	
3											---				---	
4											---				---	
5											---				---	
6											---				---	
7											---				---	
8											---				---	
9											---				---	
10											---				---	
11											---				---	
12											---				---	
13											---				---	
14											---				---	
15											---				---	
16											---				---	
17											---				---	
18											---				---	
19											---				---	
20											---				---	
21											---				---	
22											112			.51		
23											110			.89		
24											118			3.2		
25											136			5.5		
26											128			6.9		
27											108			8.7		
28											108			5.8		
29											109			5.3		
30											113			4.0		
31											112			5.1		
TOTAL											---			---		

MINNESOTA RIVER BASIN

05316900 DRY CREEK NEAR JEFFERS, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)	CONCEN- TRATION (MG/L)	LOADS (T/DAY)
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	63	3.7	1060	87	84	.43	98	.40	225	.73	30	.03
2	95	6.7	290	8.6	78	.40	99	.40	394	1.8	30	.03
3	102	5.5	160	2.7	69	.34	100	.38	166	.44	30	.03
4	94	4.1	99	2.0	60	.32	106	.37	150	.34	30	.03
5	90	2.7	67	1.2	53	.50	116	.41	139	.29	30	.03
6	36	.83	57	.69	53	.39	134	.47	128	.24	30	.03
7	23	.35	146	9.3	63	.75	146	.47	120	.20	30	.03
8	85	2.0	72	.89	48	.53	136	.44	117	.20	30	.03
9	109	2.1	71	.73	257	13	129	.45	110	.17	30	.03
10	63	.95	69	.65	932	93	129	.45	98	.15	30	.03
11	58	2.4	67	.60	975	179	128	.45	87	.13	30	.03
12	640	137	64	.54	1920	1230	125	.41	74	.11	30	.04
13	166	15	63	.61	150	1.8	129	.42	65	.09	30	.03
14	50	1.8	61	.51	919	53	129	.42	49	.06	30	.03
15	42	1.0	56	.45	380	4.5	130	.42	43	.06	30	.03
16	37	.76	56	.44	163	1.6	129	.38	38	.05	30	.03
17	49	.67	60	.45	173	3.2	130	.39	30	.04	30	.03
18	67	.76	60	.44	113	1.3	130	.39	30	.04	30	.03
19	67	.69	65	.46	66	.52	129	.35	30	.04	30	.03
20	67	.65	65	.46	98	1.7	131	.35	30	.04	30	.03
21	68	.59	65	.44	758	85	129	.33	30	.05	30	.03
22	68	.57	65	.44	1540	394	127	.32	30	.04	30	.02
23	64	.52	70	.43	284	6.0	124	.28	30	.04	30	.02
24	62	.50	70	.45	122	1.1	120	.28	30	.04	30	.02
25	56	.42	70	.43	113	.76	112	.25	30	.04	30	.03
26	633	110	75	.45	110	.65	107	.25	30	.04	30	.03
27	859	46	75	.49	108	.55	100	.22	30	.03	30	.03
28	730	10	75	.49	107	.52	92	.19	30	.03	30	.03
29	220	2.7	80	.48	103	.47	89	.18	30	.03	30	.03
30	426	32	80	.45	100	.43	83	.16	30	.03	30	.03
31	---	---	80	.43	---	---	142	.31	30	.03	---	---
TOTAL	---	392.96	---	123.70	---	2075.76	---	10.99	---	5.62	---	0.88

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 mi² (3,320 km²), 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.--50 years (water years 1912-13, 1936-37, 1939-84), 301 ft³/s (8.524 m³/s), 3.19 in/yr (81 mm/yr), 218,100 acre-ft/yr (269 hm³/yr); median of yearly mean discharges, 224 ft³/s (6.34 m³/s), 2.38 in/yr (60 mm/yr), 162,000 acre-ft/yr (200 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,700 ft³/s (813 m³/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 ft³/s (0.014 m³/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 ft³/s (36.8 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s)	Discharge (m ³ /s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft ³ /s)	Discharge (m ³ /s)	Gage height (ft)	Gage height (m)
Mar. 31	1145	5,160	146	11.90	3.627	June 18	0300	4,670	132	12.06	3.676
Apr. 14	2145	5,960	169	12.47	3.801	June 25	1730	*11,000	312	*15.24	4.645
May 9	0945	4,070	115	10.65	3.246						

Minimum discharge, 51 ft³/s (1.44 m³/s) Oct. 1, 2, gage height, 1.68 ft (0.512 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	73	112	78	75	608	4750	2230	596	1900	281	118
2	54	73	107	78	75	613	4670	3080	575	1630	304	116
3	60	73	102	78	75	635	4690	3280	541	1420	342	113
4	64	73	93	78	75	561	4330	3250	524	1240	486	115
5	63	73	89	78	75	495	4110	2970	544	1090	703	117
6	60	73	88	77	75	446	3830	3020	569	978	643	114
7	59	73	88	77	75	442	3610	2860	590	881	555	113
8	59	74	88	77	75	382	3210	3660	836	796	490	111
9	61	85	88	76	75	389	2800	4050	804	725	431	108
10	68	89	88	76	75	341	2660	3950	1620	889	380	106
11	79	88	88	75	75	331	2570	3250	2380	1060	339	105
12	71	90	88	75	75	331	2620	2490	3100	1230	304	137
13	68	92	88	75	75	326	3780	2060	4110	1130	276	130
14	66	102	88	75	75	314	5530	1780	4450	937	253	127
15	70	103	88	75	75	319	5830	1610	4040	838	238	126
16	72	106	87	75	86	330	5170	1440	3710	738	221	118
17	72	110	86	75	100	343	4070	1310	4340	732	208	110
18	69	112	85	75	120	365	3150	1200	4550	670	197	108
19	71	131	84	75	140	377	2500	1110	4200	598	192	105
20	80	149	83	75	160	394	2090	1020	3630	560	183	98
21	75	149	82	75	180	415	1800	955	3580	519	192	93
22	73	168	81	75	198	451	1580	900	4260	475	187	101
23	72	192	80	75	217	545	1400	837	6090	441	181	98
24	70	165	80	75	249	709	1260	780	7210	408	173	92
25	69	130	80	75	280	1120	1140	737	9830	376	172	91
26	69	117	79	75	330	1850	1100	697	8740	359	163	89
27	71	103	78	75	378	2730	1350	662	5940	340	153	85
28	75	84	78	75	486	3420	2040	643	4020	324	145	84
29	75	87	78	75	537	4160	2050	631	2970	307	137	82
30	75	113	78	75	---	4780	1950	623	2300	292	129	80
31	75	---	78	75	---	5080	---	613	---	281	122	---
TOTAL	2118	3150	2680	2348	4586	33602	91640	57698	100649	24164	8780	3190
MEAN	68.3	105	86.5	75.7	158	1084	3055	1861	3355	779	283	106
MAX	80	192	112	78	537	5080	5830	4050	9830	1900	703	137
MIN	53	73	78	75	75	314	1100	613	524	281	122	80
CFSM	.05	.08	.07	.06	.12	.85	2.39	1.45	2.62	.61	.22	.08
IN.	.06	.09	.08	.07	.13	.98	2.66	1.68	2.93	.70	.26	.09
AC-FT	4200	6250	5320	4660	9100	66650	181800	114400	199600	47930	17420	6330
CAL YR 1983	TOTAL	366658	MEAN	1005	MAX	11500	MIN 44	CFSM .79	IN 10.66	AC-FT	727300	
WTR YR 1984	TOTAL	334605	MEAN	914	MAX	9830	MIN 53	CFSM .71	IN 9.72	AC-FT	663700	

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 mi² (596 km²), 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 periods of no gage-height record and winter period, which are fair.

AVERAGE DISCHARGE.--11 years, 54.9 ft³/s (1.555 m³/s), 3.24 in/yr (82 mm/yr), 39,780 acre-ft/yr (49.0 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 951 ft³/s (26.9 m³/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 ft³/s (0.001 m³/s) Sept. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 180 ft³/s (5.10 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Mar. 31	0945	705 20.0	7.29 2.222	June 26	0915	*728 20.6	*7.40 2.256
Apr. 16	1615	558 15.8	6.54 1.993	July 10	1830	185 5.24	4.06 1.237
May 8	0830	274 7.76	4.77 1.454				

Minimum discharge, 5.4 ft³/s (0.15 m³/s) Oct. 4; gage height, 1.91 ft (0.582 m); minimum gage height, 1.85 ft (0.564 m) Dec. 31.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	5.8	11	26	8.4	10	115	488	213	60	285	30	13		
2	5.8	12	25	8.6	10	110	429	212	58	244	30	13		
3	5.6	11	24	9.0	10	118	409	214	54	210	33	13		
4	7.4	11	22	9.2	10	104	417	222	53	185	52	13		
5	9.1	11	21	9.8	10	97	430	239	56	166	74	13		
6	8.0	11	20	10	10	90	391	251	55	151	58	13		
7	8.0	10	19	10	10	108	348	267	53	136	68	14		
8	7.6	10	18	10	10	101	329	270	87	127	69	12		
9	6.9	13	17	10	10	105	314	257	122	118	48	12		
10	7.1	18	16	10	10	87	294	240	162	145	41	12		
11	11	19	14	10	11	75	277	225	225	177	36	13		
12	10	16	13	10	12	68	286	209	282	152	32	16		
13	12	15	12	10	12	66	317	205	344	141	29	17		
14	11	19	12	10	13	53	354	189	363	132	27	18		
15	10	18	11	10	15	40	441	174	437	122	26	18		
16	10	19	10	10	17	39	543	163	530	113	25	17		
17	11	18	9.9	10	21	38	511	154	564	113	24	15		
18	11	18	9.8	10	24	36	424	147	572	104	23	13		
19	10	22	9.5	10	26	36	348	140	534	95	21	12		
20	14	28	9.2	10	29	35	290	130	490	85	19	12		
21	16	27	9.1	10	33	37	247	122	492	75	22	11		
22	14	26	9.0	10	36	44	220	115	506	66	23	10		
23	14	25	8.9	10	42	67	201	100	584	59	22	10		
24	14	15	8.8	10	49	115	182	91	566	53	22	11		
25	13	23	8.7	10	61	167	167	83	638	50	21	12		
26	13	22	8.6	10	60	220	161	78	717	46	19	10		
27	15	20	8.6	10	57	281	158	74	635	44	18	11		
28	12	18	8.6	10	59	315	147	74	516	40	17	11		
29	11	18	8.6	10	78	400	147	69	409	38	15	11		
30	11	23	8.5	10	---	523	180	66	334	35	15	11		
31	11	---	8.5	10	---	655	---	64	---	32	14	---		
TOTAL	325.3	527	414.3	305.0	755	4345	9450	5057	10498	3539	973	387		
MEAN	10.5	17.6	13.4	9.84	26.0	140	315	163	350	114	31.4	12.9		
MAX	16	28	26	10	78	655	543	270	717	285	74	18		
MIN	5.6	10	8.5	8.4	10	35	147	64	53	32	14	10		
CFSM	.05	.08	.06	.04	.11	.61	1.37	.71	1.52	.50	.14	.06		
IN.	.05	.09	.07	.05	.12	.70	1.53	.82	1.70	.57	.16	.06		
AC-FT	645	1050	822	605	1500	8620	18740	10030	20820	7020	1930	768		
CAL YR 1983	TOTAL	51270.4	MEAN	140	MAX	925	MIN	5.3	CFSM	.61	IN	8.29	AC-FT	101700
WTR YR 1984	TOTAL	36575.6	MEAN	99.9	MAX	717	MIN	5.6	CFSM	.43	IN	5.92	AC-FT	72550

MINNESOTA RIVER BASIN

05319500 WATONWAN RIVER NEAR GARDEN CITY, MN

LOCATION.--Lat 44°02'47", long 94°11'43", in SW¼NE¼ sec.28, T.107 N., R.28 W., Blue Earth County, Hydrologic Unit 07020010, on left bank 25 ft (7.62 m) downstream from bridge on County Highway 13, 1.5 miles (2.4 km) west of Garden City, 7.3 mi (11.7 km) upstream from mouth, and 9.2 mi (14.8 km) downstream from Perch Creek.

DRAINAGE AREA.-- 812 mi² (2,103 km²).

PERIOD OF RECORD.--March 1940 to September 1945, 1953, 1960, 1961, 1969, one or more discharge measurements each year, September 1976 to current year.

REVISED RECORDS.--WDR MN-78-2: 1977.

GAGE.--Water-stage recorder. Datum of gage is 905.05 ft (275.859 m) National Geodetic Vertical Datum of 1929. Prior to September 30, 1945, nonrecording gage at site 200 ft (61 m) upstream and at datum 0.17 ft (0.052 m) higher.

REMARKS.--Records good except those for winter period and days of missing gage height record, which are fair.

AVERAGE DISCHARGE.--13 years (water years 1941-45, 1977-84), 341 ft³/s (9.657 m³/s), 5.70 in/yr (145 mm/yr), 247,100 acre-ft/yr (305 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,620 ft³/s (159 m³/s) May 21, 1944, gage height 9.84 ft (2.999 m) datum then in use; minimum daily, 1.9 ft³/s (0.054 m³/s) Jan. 20 to Feb. 8, 1977; minimum gage height, 0.27 ft (0.082 m) July 23, 1940, datum then in use.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 7, 1965, reached a stage of 18.89 ft (5.758 m) at datum 0.17 ft (0.052 m) higher, from floodmarks, discharge, 19,000 ft³/s (538 m³/s).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 900 ft³/s (25.5 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Apr. 3	1830	*4,400 125	*9.12 2.780	May 3	1430	1,610 45.6	5.26 1.603
Apr. 16	0315	4,020 114	8.68 2.646	June 25	0015	3,180 90.1	7.82 2.384

Minimum discharge, 25 ft³/s (0.71 m³/s) Oct. 1, 2, gage height, 0.81 ft (0.247 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	47	112	55	51	360	4050	1150	416	1020	128	48
2	25	46	112	55	51	330	4140	1450	401	892	161	49
3	27	45	108	54	51	310	4300	1580	381	800	190	48
4	27	45	102	54	52	290	4280	1570	369	740	172	50
5	28	45	97	54	54	270	3950	1480	387	690	163	61
6	27	45	94	53	55	250	3690	1360	395	640	161	64
7	27	44	92	53	56	240	3290	1360	410	600	150	64
8	27	43	88	52	58	235	2850	1400	407	560	154	68
9	27	48	85	52	59	230	2620	1320	426	650	170	68
10	29	54	83	52	61	225	2520	1210	512	750	159	64
11	57	56	80	51	62	225	2460	1080	594	895	141	62
12	62	56	78	51	63	225	2430	980	706	800	121	96
13	81	56	76	51	63	225	2610	927	971	680	107	117
14	75	64	74	51	64	230	3180	880	1130	600	98	111
15	66	75	72	51	66	235	3780	825	1350	530	91	89
16	58	86	70	51	68	240	3970	772	1440	460	86	79
17	52	88	68	51	73	250	3520	717	1470	420	81	71
18	49	90	67	51	80	260	2880	683	1750	370	77	64
19	46	103	66	51	90	270	2310	686	2220	330	74	60
20	46	133	65	51	105	280	1900	649	2340	300	68	56
21	48	161	64	51	130	290	1600	620	2330	270	67	50
22	60	167	63	51	170	320	1370	591	2330	250	68	48
23	62	177	62	51	210	450	1200	563	2540	225	67	44
24	60	127	61	51	240	600	1070	515	3030	210	67	41
25	57	128	60	51	300	770	966	486	3100	190	62	40
26	55	132	59	51	370	1020	897	457	2700	180	60	39
27	52	123	58	51	400	1520	854	432	2130	165	57	40
28	52	92	57	51	390	2040	817	426	1690	150	54	39
29	50	96	57	51	390	2650	800	426	1390	145	52	39
30	48	107	56	51	---	3300	842	426	1170	135	49	38
31	47	---	56	51	---	3800	---	422	---	126	48	---
TOTAL	1452	2579	2342	1605	3882	21940	75146	27443	40485	14773	3203	1807
MEAN	46.8	86.0	75.5	51.8	134	708	2505	885	1350	477	103	60.2
MAX	81	177	112	55	400	3800	4300	1580	3100	1020	190	117
MIN	25	43	56	51	51	225	800	422	369	126	48	38
CFSM	.06	.11	.09	.06	.17	.87	3.09	1.09	1.66	.59	.13	.07
IN.	.07	.12	.11	.07	.18	1.01	3.44	1.26	1.85	.68	.15	.08
AC-FT	2880	5120	4650	3180	7700	43520	149100	54430	80300	29300	6350	3580
CAL YR 1983	TOTAL	256368	MEAN 702	MAX 4140	MIN 25	CFSM .87	IN 11.74	AC-FT 508500				
WTR YR 1984	TOTAL	196657	MEAN 537	MAX 4300	MIN 25	CFSM .66	IN 9.01	AC-FT 390100				

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 powerplant (reactivated in 1984) operated by Rapidan Redevelopment Limited Partnership, 2 mi (3.2 km) west of Rapidan, 3.5 mi (5.6 km) downstream from Watonwan River, and 7.8 mi (12.6) upstream from Le Sueur River.

DRAINAGE AREA.--2,430 mi² (6,290 km²), 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.--41 years (water years 1940-45, 1950-84), 920 ft³/s (26.05 m³/s), 5.14 in/yr (131 mm/yr), 666,500 acre-ft/yr (822 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 43,100 ft³/s (1,220 m³/s) Apr. 9, 1965, gage height, 21.30 ft (6.511 m), from floodmark; minimum, 6.9 ft³/s (0.20 m³/s) Oct. 12, 1955, gage height, 1.04 ft (0.317 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,810 ft³/s (278 m³/s) June 23, gage height, 8.79 ft (2.679 m); minimum, 12.4 ft³/s (0.35 m³/s) July 22, gage height, 1.09 ft (0.332 m), due to construction on dam above site.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	199	294	250	280	230	3580	9080	4130	2620	4310	591	78		
2	191	291	270	279	228	3460	9080	4980	2420	3800	340	80		
3	180	280	280	278	228	3130	9100	5960	2240	3470	547	78		
4	176	277	290	277	228	2860	8910	6860	2150	3130	459	181		
5	164	269	295	275	228	2460	8420	7700	2330	2940	425	222		
6	164	260	295	273	228	2200	7980	7740	2650	2580	484	222		
7	157	253	295	272	228	1900	7520	7280	2770	2340	427	315		
8	154	245	295	271	228	1690	6880	6740	2660	2120	410	248		
9	151	260	295	270	228	1680	6430	6130	2530	1990	484	93		
10	146	266	295	269	228	1670	6370	5560	2980	1920	447	90		
11	225	268	295	268	219	1630	6430	5010	3400	1870	388	91		
12	204	270	295	268	206	1580	6430	4510	3330	2090	379	175		
13	230	274	295	264	206	1480	6540	4160	3480	2200	378	238		
14	244	328	295	262	210	1420	7380	3840	4240	2160	362	240		
15	385	334	295	260	232	1430	8310	3590	4800	2040	221	194		
16	335	360	294	260	260	1370	8760	3350	5410	1940	159	111		
17	354	422	293	259	404	1320	8450	3150	5820	1960	425	107		
18	309	494	292	259	432	1290	7640	2980	6420	1860	303	110		
19	306	549	291	258	800	1260	6630	2830	6870	1680	240	107		
20	297	602	291	258	1300	1290	5680	2680	7330	1570	227	105		
21	292	722	290	257	1700	1290	4930	2530	8120	1500	242	105		
22	288	981	290	255	1890	1310	4370	2420	9220	1010	149	105		
23	306	1120	290	253	2240	1320	3980	2330	9450	1360	99	105		
24	377	997	290	252	2490	1570	3660	2340	9390	1010	132	103		
25	392	805	289	251	2730	2480	3410	2350	9310	877	209	101		
26	378	660	288	250	2900	3690	3250	2270	8610	826	212	100		
27	357	510	286	248	3030	6500	3100	2200	7650	727	227	83		
28	333	420	283	244	3250	6890	2970	2220	6680	823	256	74		
29	341	350	282	241	3450	7730	3200	2290	5650	784	199	76		
30	293	300	281	238	---	8350	3690	2520	5000	476	164	76		
31	332	---	280	234	---	8740	---	2700	---	610	107	---		
TOTAL	8260	13461	8945	8083	30231	88570	188580	125350	155530	57973	9692	4013		
MEAN	266	449	289	261	1042	2857	6286	4044	5184	1870	313	134		
MAX	392	1120	295	280	3450	8740	9100	7740	9450	4310	591	315		
MIN	146	245	250	234	206	1260	2970	2200	2150	476	99	74		
CFSM	.11	.19	.12	.11	.43	1.18	2.59	1.66	2.13	.77	.13	.06		
IN.	.13	.21	.14	.12	.46	1.36	2.89	1.92	2.38	.89	.15	.06		
AC-FT	16380	26700	17740	16030	59960	175700	374000	248600	308500	115000	19220	7960		
CAL YR 1983	TOTAL	890520	MEAN	2440	MAX	12200	MIN	127	CFSM	1.00	IN	13.63	AC-FT	1766000
WTR YR 1984	TOTAL	698688	MEAN	1909	MAX	9450	MIN	74	CFSM	.79	IN	10.70	AC-FT	1386000

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 mi² (2,850 km²), 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.--41 years (water years 1940-45, 1950-84), 468 ft³/s (13.25 m³/s), 5.78 in/yr (147 mm/yr), 339,070 acre-ft/yr (418 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,700 ft³/s (700 m³/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 ft³/s (0.045 m³/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 ft³/s (36.8 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 25	1900	4,650 132	7.80 2.377	May 5	1000	5,920 168	8.92 2.719
Mar. 29	0745	*6,310 1.79	*9.25 2.819	June 6	0400	2,110 59.8	5.13 1.564
Apr. 15	2130	3,130 88.6	6.29 1.917	June 23	0315	4,300 122	7.47 2.277
				July 14	1500	1,430 40.5	4.23 1.289

Minimum discharge, 22 ft³/s (0.62 m³/s) Sept. 16, gage height, 0.95 ft (0.290 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	169	213	287	160	151	2400	4250	1960	746	1290	152	31
2	150	213	270	159	151	2100	3890	3370	712	1120	177	29
3	136	207	260	158	151	1900	3610	4620	661	1010	157	29
4	125	207	252	156	151	1740	3270	5520	792	911	145	32
5	119	201	245	155	151	1470	2930	5780	1760	816	195	29
6	113	198	239	155	151	1150	2640	5220	2010	748	154	29
7	109	195	232	154	151	1060	2370	4490	1730	667	137	37
8	102	189	227	154	158	1110	2170	3670	1580	615	189	42
9	98	204	220	153	182	1040	2070	3070	1500	560	184	48
10	101	216	218	152	215	929	1940	2650	1590	541	189	52
11	204	213	210	151	245	889	1830	2340	1470	522	193	54
12	288	210	207	151	270	802	1890	2050	1500	715	156	81
13	248	216	202	151	292	738	2310	1890	1650	1040	131	62
14	248	228	198	151	315	713	2930	1730	1660	1150	114	55
15	262	241	194	151	370	669	3090	1580	1880	1050	103	52
16	252	270	192	151	610	619	2990	1440	1830	942	93	30
17	241	348	189	151	1370	604	2700	1310	1880	887	86	37
18	225	384	186	151	1660	588	2400	1220	2110	737	80	38
19	213	417	183	151	1500	573	2150	1130	2260	636	72	40
20	213	503	181	151	1900	584	1910	1050	2500	546	67	40
21	245	580	179	151	2390	575	1710	986	2910	461	60	40
22	306	672	177	151	2620	543	1520	938	3510	396	55	40
23	384	672	174	151	3250	600	1380	911	4150	348	52	40
24	388	580	172	151	3660	881	1290	965	3980	306	49	40
25	364	484	170	151	3820	1760	1250	999	3670	280	48	40
26	333	410	168	151	3400	3020	1180	991	3150	255	43	40
27	299	370	167	151	3000	4560	1140	951	2570	239	40	40
28	277	325	166	151	2800	5640	1100	907	2110	224	39	40
29	255	300	164	151	2600	6130	1210	853	1760	208	36	40
30	238	290	162	151	---	5580	1440	811	1500	184	33	40
31	216	---	161	151	---	4790	---	771	---	164	32	---
TOTAL	6921	9756	6252	4727	37684	55757	66560	66173	61131	19568	3261	1247
MEAN	223	325	202	152	1299	1799	2219	2135	2038	631	105	41.6
MAX	388	672	287	160	3820	6130	4250	5780	4150	1290	195	81
MIN	98	189	161	151	151	543	1100	771	661	164	32	29
CFSM	.20	.30	.18	.14	1.18	1.64	2.02	1.94	1.85	.57	.10	.04
IN.	.23	.33	.21	.16	1.27	1.89	2.25	2.24	2.07	.66	.11	.04
AC-FT	13730	19350	12400	9380	74750	110600	132000	131300	121300	38810	6470	2470
CAL YR 1983	TOTAL	448072	MEAN	1228	MAX	7510	MIN	46	CFSM	1.12	IN	15.15
WTR YR 1984	TOTAL	339037	MEAN	926	MAX	6130	MIN	29	CFSM	.84	IN	11.47
									AC-FT	888800	AC-FT	672500

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 mi² (38,600 km²), 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.--63 years (water years 1905, 1911-17, 1930-84), 2,885 ft³/s (81.70 m³/s), 2.63 in/yr (67 mm/yr), 2,090,000 acre-ft/yr (2.58 km³/yr); median of yearly mean discharges, 2,540 ft³/s (71.9 m³/s) 2.31 in/yr (59 mm/yr), 1,840,000 acre-ft/yr (2.27 km³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,100 ft³/s (2,660 m³/s) Apr. 10, 1965, gage height, 29.09 ft (8.867 m); minimum observed, 26 ft³/s (0.74 m³/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 ft³/s (3,120 m³/s).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 41,000 ft³/s (1,160 m³/s) June 26, gage height, 24.55 ft (7.483 m); minimum daily, 760 ft³/s (21.5 m³/s) Feb. 3-10; minimum gage height, 3.84 ft (1.170 m) Oct. 9, 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	992	1540	2600	1140	775	8310	30900	18300	8100	25500	3820	1290
2	984	1530	2580	1120	770	8200	31700	20300	7670	23000	3670	1250
3	928	1520	2540	1100	760	7800	32300	23000	7230	21000	3450	1180
4	895	1490	2500	1080	760	7600	32600	25300	7070	19600	3540	1210
5	912	1460	2450	1070	760	6890	32100	26500	7910	18100	3740	1370
6	885	1450	2400	1050	760	6380	31000	26000	8440	16600	4480	1330
7	868	1440	2370	1040	760	6120	29600	24700	8260	15200	4710	1450
8	832	1420	2320	1020	760	5810	28700	23200	8270	14300	4460	1420
9	803	1460	2280	1000	760	5760	27800	21700	8580	13200	3850	1270
10	823	1450	2220	990	760	6120	26900	20900	9440	12600	3480	1190
11	1050	1400	2150	980	790	7280	26400	20300	10800	12500	3030	1160
12	1130	1460	2100	962	800	9090	25500	19600	12000	12600	2690	1350
13	1040	1460	2070	940	840	9860	25500	19000	13600	12900	2450	1340
14	1070	1560	1970	920	890	8790	27700	18000	16400	12900	2300	1290
15	1190	1600	1900	910	1070	6980	30200	17100	20100	12400	2190	1290
16	1250	1630	1820	900	1350	6220	32100	16200	23500	11500	2040	1140
17	1220	1790	1780	890	1550	5630	32100	15400	26900	11100	2080	1060
18	1180	1930	1700	880	2100	5330	31200	14500	30600	10300	2030	1000
19	1160	2090	1670	870	2870	4990	29300	13700	32900	9590	1840	964
20	1200	2220	1600	860	4320	4920	27100	12800	33600	8980	1740	930
21	1230	2380	1540	850	6060	4820	25100	12000	33500	8530	1690	895
22	1300	2770	1500	840	6510	4720	23100	11500	34300	7580	1630	852
23	1500	3140	1460	830	6680	4870	21500	11000	35300	7170	1470	861
24	1620	3130	1420	820	7370	5700	20200	10500	36700	6260	1440	868
25	1690	2850	1370	815	8000	8020	19000	10200	38800	5760	1460	842
26	1710	2820	1330	810	8200	11600	18100	9850	39900	5260	1420	816
27	1660	2730	1290	800	8250	16500	17200	9380	38700	4940	1390	861
28	1630	2280	1260	795	8310	19900	16400	9030	35700	4790	1440	955
29	1530	2650	1230	790	8240	22600	16500	8680	31800	4540	1400	1010
30	1520	2620	1200	785	---	25600	17500	8510	28800	4110	1310	1000
31	1490	---	1170	780	---	28400	---	8370	---	3880	1320	---
TOTAL	37292	59270	57790	28637	91825	290810	785300	505520	654870	356690	77560	33444
MEAN	1203	1976	1864	924	3166	9381	26180	16310	21830	11510	2502	1115
MAX	1710	3140	2600	1140	8310	28400	32600	26500	39900	25500	4710	1450
MIN	803	1400	1170	780	760	4720	16400	8370	7070	3880	1310	816
CFSM	.08	.13	.13	.06	.21	.63	1.76	1.10	1.47	.77	.17	.08
IN.	.09	.15	.14	.07	.23	.73	1.96	1.26	1.63	.89	.19	.08
AC-FT	73970	117600	114600	56800	182100	576800	1558000	1003000	1299000	707500	153800	66340
CAL YR 1983	TOTAL	2696967	MEAN	7389	MAX	32800	MIN	654	CFSM	.50	IN	6.73
WTR YR 1984	TOTAL	2979008	MEAN	8139	MAX	39900	MIN	760	CFSM	.55	IN	7.44
									AC-FT	5349000		
									AC-FT	5909000		

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: October 1967 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,850 mg/L Aug. 7, 1968; minimum daily mean, 13 mg/L

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.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 586 mg/L Mar. 28; minimum daily mean, 30 mg/L Oct. 9.

SEDIMENT LOADS: Maximum daily, 34,000 tons (30,800 tonnes) Mar 30; minimum daily, 65 tons (59 tonnes) Oct. 9.

[illegible]

MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	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)	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)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70331)
OCT 05...	903	--	--	--	--	--	--	--	90
FEB 24...	7340	--	--	--	--	--	--	--	72
MAR 28...	19600	36	40	54	76	84	98	100	--
JUN 18...	31200	--	--	--	--	--	--	--	54

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	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)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
JUN 18...	31200	3	0	3	27	57	69	75	91	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 mi² (614 km²).

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.

AVERAGE DISCHARGE.--11 years, 83.3 ft³/s (2.359 m³/s), 4.77 in/yr (121 mm/yr), 60,350 acre-ft/yr (74.4 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,760 ft³/s (49.8 m³/s) Aug. 25, 1981, gage height, 9.09 ft (2.771 m); minimum discharge, 0.20 ft³/s (0.006 m³/s) Jan. 4, 1981, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 300 ft³/s (8.50 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 25	0800	313 8.86	3.20 0.975	May 7	2345	520 14.7	4.36 1.329
Mar. 26	2300	842 23.8	5.65 1.722	June 17	2145	680 19.3	5.09 1.551
Apr. 2	1830	*1010 28.6	* 6.43 1.960	July 10	1230	590 16.7	4.65 1.417
Apr. 12	2315	825 23.4	5.78 1.762	July 16	1745	361 10.2	3.49 1.064

Minimum discharge, 4.5 ft³/s (0.13 m³/s) Sept. 29, gage height, 0.88 ft (0.268 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	77	149	54	28	289	912	463	106	214	49	18
2	33	74	145	53	28	280	983	430	96	206	67	16
3	33	70	142	50	28	280	971	406	91	203	78	15
4	33	68	138	49	28	270	895	398	101	185	48	15
5	33	67	135	48	28	256	808	408	122	167	70	13
6	33	67	131	46	28	242	732	416	125	152	72	11
7	33	65	128	45	28	240	661	489	133	140	70	9.1
8	31	64	125	43	28	236	614	491	235	127	92	9.1
9	30	69	122	42	28	231	575	440	208	118	120	8.1
10	42	75	119	41	28	228	519	416	423	340	154	7.6
11	116	75	114	39	29	223	477	384	407	473	178	6.5
12	96	77	111	38	31	220	643	373	531	338	191	24
13	87	77	109	37	35	217	804	434	506	270	194	20
14	86	86	104	36	38	212	697	436	488	249	185	15
15	90	102	101	36	48	208	611	394	565	248	164	12
16	98	105	98	35	76	203	571	365	615	270	133	11
17	96	105	95	34	115	200	543	338	658	288	101	9.3
18	87	105	91	34	143	197	518	321	658	263	77	7.7
19	85	135	86	33	162	207	485	303	590	236	62	7.3
20	100	254	81	32	175	193	454	285	541	210	52	6.5
21	112	273	76	32	193	189	411	263	499	184	49	6.0
22	110	230	70	31	204	196	380	257	469	158	46	6.0
23	102	214	66	31	257	235	357	241	437	132	42	6.9
24	97	153	64	30	287	338	326	228	399	112	37	6.5
25	91	154	60	30	307	556	298	213	380	96	37	8.0
26	90	156	58	29	283	740	298	197	345	85	35	6.6
27	89	158	57	29	282	779	282	177	328	76	32	6.3
28	85	158	56	29	272	749	261	161	292	70	30	6.3
29	83	156	55	29	280	737	249	145	262	62	26	6.1
30	79	152	55	28	---	690	327	130	234	56	21	5.6
31	79	---	54	28	---	801	---	118	---	52	19	---
TOTAL	2293	3621	2995	1151	3497	10642	16662	10120	10844	5780	2531	305.5
MEAN	74.0	121	96.6	37.1	121	343	555	326	361	186	81.6	10.2
MAX	116	273	149	54	307	801	983	491	658	473	194	24
MIN	30	64	54	28	28	189	249	118	91	52	19	5.6
CFSM	.31	.51	.41	.16	.51	1.45	2.34	1.38	1.52	.79	.34	.04
AC-FT	4550	7180	5940	2280	6940	21110	33050	20070	21510	11460	5020	606

CAL YR 1983	TOTAL	64668.0	MEAN 177	MAX 980	MIN 10	CFSM .75	IN 10.15	AC-FT 128300
WTR YR 1984	TOTAL	70441.5	MEAN 192	MAX 983	MIN 5.6	CFSM .81	IN 11.06	AC-FT 139700

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 mi² (42,000 km²), 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.--50 years, 3,631 ft³/s (102.8 m³/s), 3.04 in/yr (77 mm/yr), 2,631,000 acre-ft/yr (3.24 km³/yr); median of yearly mean discharges, 3,140 ft³/s (88.9 m³/s), 2.63 in/yr (67 mm/yr), 2,272,000 acre-ft/yr (2.80 km³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 117,000 ft³/s (3,310 m³/s) Apr. 11, 1965; maximum gage height, 35.07 ft (10.689 m) Apr. 12, 1965 (backwater from Mississippi River); minimum discharge, 79 ft³/s (2.24 m³/s) Nov. 17, 1955; minimum gage height, 2.66 ft (0.811 m) Nov. 22, 1935.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 45,300 ft³/s (1,280 m³/s) June 28, gage height, 27.54 ft (8.394 m); minimum, 974 ft³/s (27.6 m³/s) Oct. 10, gage height, 5.52 ft (1.682 m); minimum gage height 5.30 ft (1.615 m) Sept. 28, 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1330	1830	2920	1700	1210	10400	27300	17500	9180	37200	4470	1540
2	1260	1850	2800	1670	1210	10400	29600	17700	8890	33300	4510	1520
3	1220	1840	3000	1630	1210	9800	31600	18400	8460	30000	4570	1480
4	1170	1830	3090	1600	1210	9000	33000	19500	8050	27400	4230	1440
5	1130	1810	3030	1580	1210	8200	33500	21500	8240	25100	4580	1370
6	1100	1800	2980	1560	1210	7500	33300	23600	9140	22900	5340	1430
7	1080	1780	2940	1520	1210	7200	32700	25400	9660	20700	6460	1520
8	1050	1770	2900	1500	1210	7000	31900	26100	10100	19000	6960	1530
9	1010	1810	2810	1490	1210	7100	30700	25700	10200	17700	6710	1610
10	983	1900	2730	1470	1240	7300	29800	24700	10600	17100	5780	1560
11	1190	1960	2670	1440	1270	7400	28700	23600	11500	16800	5090	1410
12	1550	1910	2600	1420	1300	7400	28000	22300	12800	16400	4510	1440
13	1710	1900	2530	1400	1360	7300	28000	21500	13800	15900	4010	1550
14	1680	1940	2490	1390	1450	7100	28100	20900	14700	15300	3600	1560
15	1620	2040	2430	1380	1530	7100	28100	20100	15400	14800	3330	1520
16	1670	2150	2370	1370	1900	7000	28400	19400	16400	14400	3140	1480
17	1760	2180	2310	1360	2300	6900	29300	18600	18200	14000	2880	1430
18	1730	2220	2270	1330	3000	6800	30200	17800	22900	13400	2760	1310
19	1680	2390	2210	1310	3800	6700	30500	17200	28100	12600	2760	1230
20	1680	2890	2170	1300	4800	6700	30000	16600	31900	11500	2500	1160
21	1780	3410	2110	1290	5500	6800	28600	15900	34600	10500	2340	1110
22	1820	3530	2070	1280	6340	7050	27100	15100	36400	9690	2240	1070
23	1830	3690	2010	1270	6800	7260	25700	14200	37700	8800	2140	1050
24	1900	3920	1970	1260	7500	7850	24200	13300	39000	8020	1960	1030
25	1980	3840	1940	1250	8200	9320	22600	12500	40200	7290	1860	1030
26	2050	3780	1900	1240	8900	11300	21200	11800	41800	6570	1820	1020
27	2050	3300	1870	1230	9600	13500	20000	11300	43700	5850	1800	1000
28	2050	2730	1810	1220	10200	15100	19000	10700	44800	5460	1720	996
29	1980	2390	1780	1220	10300	16800	18100	10200	43600	5210	1690	1020
30	1920	2250	1760	1210	---	19400	17600	9730	40800	5030	1680	1100
31	1880	---	1720	1210	---	23800	---	9390	---	4760	1580	---
TOTAL	48843	72640	74190	43100	108180	292480	826800	552220	680820	472680	109020	39516
MEAN	1576	2421	2393	1390	3730	9435	27560	17810	22690	15250	3517	1317
MAX	2050	3920	3090	1700	10300	23800	33500	26100	44800	37200	6960	1610
MIN	983	1770	1720	1210	1210	6700	17600	9390	8050	4760	1580	996
CFSM	.10	.15	.15	.09	.23	.58	1.70	1.10	1.40	.94	.22	.08
IN.	.11	.17	.17	.10	.25	.67	1.90	1.27	1.56	1.09	.25	.09
AC-FT	96880	144100	147200	85490	214600	580100	1640000	1095000	1350000	937600	216200	78380
CAL YR 1983	TOTAL	3083473	MEAN	8448	MAX	33300	MIN	983	CFSM	.52	IN	7.08
WTR YR 1984	TOTAL	3320489	MEAN	9072	MAX	44800	MIN	983	CFSM	.56	IN	7.62
									AC-FT	6116000		
									AC-FT	6586000		

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952, 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, 1980-84): Maximum, 1,290 microsiemens Oct. 13, 1982; minimum, 324 microsiemens June 3, 1980.
pH (water years 1978, 1980-82, 1984): Maximum, 8.9 units May 4, Sept. 15, 1982; minimum, 6.4 units Aug. 11, 1982.
WATER TEMPERATURES (water years 1978-84): Maximum, 30.0°C July 15, 1980; minimum, 0.0°C several days during winter period.
DISSOLVED OXYGEN (water years 1978-84): Maximum, 19.6 mg/L Oct. 19, 1978; minimum, 2.5 mg/L Sept. 5, 1978.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 1,220 microsiemens Jan. 25, 26; minimum, 445 microsiemens Apr. 12.
pH: Maximum, 8.5 units Nov. 9-16, Aug. 20, Sept. 4-6, 11, 12; minimum, 7.2 units June 6, 7.
WATER TEMPERATURES: Maximum, 28.0°C Aug. 28, 29; minimum, 0.0° several days during winter period.
DISSOLVED OXYGEN: Maximum, 17.2 mg/L Mar. 9; minimum, 3.7 mg/L Aug. 6.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE LAB (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 HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 26...	1150	--	2060	872	888	8.3	8.2	9.0	5.5	14	745	11.2
FEB 01...	1215	1210	--	1000	1120	7.5	7.4	5.0	.0	5.0	739	8.2
APR 27...	1300	--	20000	860	854	8.6	8.3	13.5	13.5	8.7	706	10.6
JUL 26...	1145	--	6440	880	880	7.5	8.1	26.0	24.0	65	745	6.0

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI 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 26...	91	--	--	100	41	23	4.6	301	130	36	.30
FEB 01...	58	K2400	820	130	54	35	5.3	373	180	44	.30
APR 27...	110	24	230	93	42	16	4.9	211	210	19	.40
JUL 26...	73	K68	E380	100	45	20	5.0	282	170	22	.60

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (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- PENDEDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (MG/L) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 26...	19	567	4.4	.21	1.2	.18	.09	.08	35	195	97
FEB 01...	24	753	3.8	.50	1.1	.21	.17	.16	--	--	--
APR 27...	11	585	4.9	.46	1.3	.11	.03	.01	69	3730	95
JUL 26...	23	659	3.7	.03	1.4	.31	.15	.16	314	5460	95

DATE	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 26...	<10	2	93	<.5	<1	<1	<3	4	10	1
FEB 01...	<10	2	110	<.5	<1	<1	<3	1	10	2
APR 27...	<10	2	83	<1.0	<1	<1	<3	10	8	2
JUL 26...	20	4	110	1.0	<1	<1	<3	2	<3	<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)
OCT 26...	33	16	<.1	<10	3	1	2	330	<6	14
FEB 01...	37	120	<.1	<10	2	<1	<1	450	<6	29
APR 27...	37	4	<.1	<10	6	4	<1	360	<6	12
JUL 26...	37	2	.1	<10	4	2	1	390	<6	29

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 27...	1300	14	1.4	<7.7	3.9	<6.6	3.4	.14	14
JUL 26...	1145	<13	9.0	<5.7	6.4	<4.9	5.5	.13	11

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	856	826	842	898	870	884	940	930	935	---	---	---
2	872	824	852	876	868	872	938	890	911	---	---	---
3	876	812	852	892	878	886	946	900	923	---	---	---
4	878	812	854	884	868	875	1010	950	978	---	---	---
5	902	850	876	900	868	891	1030	1000	1010	1000	989	996
6	886	840	861	892	864	872	1020	1000	1010	1100	1080	1090
7	890	838	866	862	844	855	1030	1010	1020	1090	1070	1080
8	904	886	884	848	838	843	1050	1030	1040	1080	1070	1080
9	886	862	874	858	826	842	1070	1040	1060	1110	1080	1100
10	900	854	875	860	830	847	1070	1040	1050	1090	1070	1080
11	874	840	851	826	800	808	1050	1020	1040	1100	1070	1080
12	852	806	829	806	800	808	1020	1010	1020	1100	1090	1100
13	860	830	839	810	792	801	1010	982	1000	1110	1100	1110
14	846	788	822	830	796	816	984	968	978	1110	1100	1100
15	870	822	851	828	812	821	978	680	957	1110	1100	1110
16	878	852	867	854	826	841	980	954	968	1130	1110	1120
17	892	866	876	860	840	852	994	964	981	1140	1120	1140
18	932	894	916	872	854	863	990	970	979	1140	1120	1130
19	942	924	930	868	844	856	974	962	968	1130	1120	1120
20	---	---	---	854	816	834	---	---	---	1150	1120	1130
21	---	---	---	822	784	802	---	---	---	1170	1140	1150
22	---	---	---	842	786	814	---	---	---	1190	1160	1170
23	---	---	---	864	846	855	---	---	---	1200	1180	1190
24	---	---	---	872	852	862	---	---	---	1210	1180	1200
25	---	---	---	876	854	866	---	---	---	1220	1200	1210
26	892	868	882	926	862	890	---	---	---	1220	1120	1160
27	884	864	875	992	922	958	---	---	---	1130	1120	1120
28	888	870	878	980	958	969	---	---	---	1130	1110	1120
29	912	862	887	1000	960	980	---	---	---	1120	1110	1120
30	914	898	906	990	960	975	---	---	---	1130	1120	1120
31	906	892	899	---	---	---	---	---	---	1140	1130	1130
MONTH	---	---	---	1000	784	864	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIX	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	1160	1130	1150	700	658	678	---	---	---	755	720	736
2	1160	1100	1130	764	732	748	---	---	---	718	710	715
3	1110	1100	1100	779	764	771	---	---	---	718	706	712
4	1100	1080	1090	798	780	789	---	---	---	706	670	688
5	1100	1080	1090	809	796	802	---	---	---	700	663	681
6	1100	1090	1090	822	810	816	---	---	---	678	648	663
7	1120	1090	1100	830	820	835	---	---	---	670	648	659
8	1120	1100	1110	835	826	830	---	---	---	730	688	709
9	1120	1110	1110	844	838	841	---	---	---	794	752	773
10	---	---	---	854	844	849	---	---	---	842	806	824
11	---	---	---	862	854	860	---	---	---	864	846	857
12	---	---	---	868	860	864	695	445	583	874	861	867
13	---	---	---	870	868	869	702	694	697	860	850	855
14	---	---	---	880	870	875	725	702	709	872	862	867
15	---	---	---	885	870	877	739	724	732	866	850	858
16	940	872	903	908	886	899	739	732	735	880	868	874
17	862	706	793	930	904	915	741	728	732	870	866	868
18	---	---	---	946	920	934	777	740	757	890	880	887
19	---	---	---	958	932	942	706	694	700	890	886	888
20	---	---	---	964	948	956	778	726	753	906	890	898
21	---	---	---	966	954	959	826	782	805	920	906	915
22	---	---	---	966	946	956	858	828	845	928	918	923
23	---	---	---	---	---	---	876	860	869	934	916	925
24	592	582	586	---	---	---	888	880	884	948	922	935
25	590	576	583	---	---	---	892	888	889	964	916	934
26	608	582	591	---	---	---	890	868	881	934	926	929
27	622	602	612	---	---	---	868	662	818	932	924	927
28	652	622	637	---	---	---	788	720	748	932	926	928
29	662	650	657	---	---	---	720	718	718	936	926	931
30	---	---	---	---	---	---	---	---	---	934	924	929
31	---	---	---	---	---	---	---	---	---	932	922	926
MONTH	---	---	---	---	---	---	---	---	---	964	648	841

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	930	904	914	774	706	742	844	812	836	814	780	796
2	918	900	908	818	776	795	870	808	843	840	806	819
3	920	904	911	852	814	831	808	764	790	852	836	844
4	926	892	912	890	848	868	778	704	740	852	814	838
5	924	882	903	920	888	902	804	732	778	852	832	844
6	910	880	895	952	910	930	772	756	764	860	820	841
7	906	889	897	978	942	959	744	722	733	852	818	837
8	922	902	911	1000	970	987	748	728	738	860	818	843
9	922	910	916	1020	988	1010	722	692	716	828	786	809
10	950	914	937	1020	944	933	740	692	716	828	786	809
11	934	824	870	948	900	913	788	740	764	808	743	775
12	846	750	820	928	912	922	810	770	790	788	732	760
13	752	704	725	942	922	932	820	780	800	786	730	758
14	758	740	749	920	912	916	830	820	825	940	760	870
15	754	736	746	908	896	902	880	868	894	944	796	906
16	746	714	734	894	878	886	900	888	894	876	766	828
17	726	712	718	882	869	876	928	902	915	914	844	880
18	746	714	730	872	858	865	948	916	926	886	850	873
19	752	738	745	872	854	863	942	904	929	880	860	869
20	740	696	713	872	850	865	906	808	870	900	816	846
21	698	680	688	890	852	869	834	754	798	856	814	833
22	690	676	684	918	864	882	792	756	772	860	842	852
23	682	672	677	904	878	896	798	758	784	886	852	869
24	688	666	675	964	898	933	822	760	794	880	852	869
25	708	690	698	942	924	934	806	752	784	916	972	900
26	706	668	689	946	854	919	786	746	761	918	904	912
27	680	664	672	916	834	869	762	724	751	908	838	870
28	686	658	676	918	852	873	---	---	---	910	870	899
29	654	634	644	916	862	879	721	691	705	904	854	893
30	706	642	763	908	852	870	776	736	756	864	830	846
31	---	---	---	858	838	850	796	754	775	---	---	---
MONTH	950	634	781	1020	706	895	---	---	---	944	730	846

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	8.3	8.2	8.3	8.2	8.1	8.1	8.1	8.1	8.1	---	---	---
2	8.2	8.1	8.2	8.1	8.1	8.1	8.1	8.0	8.0	---	---	---
3	8.2	8.0	8.1	8.2	8.1	8.2	8.1	8.1	8.1	---	---	---
4	8.1	8.0	8.1	8.2	8.1	8.1	8.1	8.0	8.0	---	---	---
5	8.0	7.8	8.0	8.2	8.1	8.2	8.0	8.0	8.0	7.6	7.6	7.6
6	8.2	7.9	8.0	8.2	8.1	8.2	8.0	8.0	8.0	7.5	7.5	7.5
7	8.2	8.0	8.1	8.2	8.2	8.2	8.0	8.0	8.0	7.5	7.5	7.5
8	8.2	8.1	8.1	8.5	8.1	8.3	8.0	8.0	8.0	7.5	7.5	7.5
9	8.2	8.0	8.1	8.5	8.4	8.5	8.0	7.9	7.9	7.5	7.5	7.5
10	8.1	8.0	8.1	8.5	8.4	8.5	8.0	7.9	7.9	7.5	7.4	7.4
11	8.2	8.0	8.1	8.5	8.5	8.5	7.9	7.9	7.9	7.5	7.4	7.4
12	8.3	8.1	8.2	8.5	8.5	8.5	7.9	7.9	7.9	7.5	7.4	7.5
13	8.4	8.2	8.3	8.5	8.5	8.5	7.9	7.9	7.9	7.5	7.5	7.5
14	8.3	8.2	8.3	8.5	8.5	8.5	7.9	7.9	7.9	7.5	7.4	7.5
15	8.3	8.3	8.3	8.5	8.5	8.5	8.1	7.9	7.9	7.5	7.4	7.4
16	8.3	8.2	8.3	8.5	8.2	8.3	7.9	7.8	7.9	7.5	7.4	7.5
17	8.4	8.2	8.3	8.3	8.2	8.2	7.8	7.8	7.8	7.4	7.4	7.4
18	8.4	8.3	8.3	8.2	8.2	8.2	7.8	7.7	7.8	7.4	7.4	7.4
19	8.3	8.3	8.3	8.2	8.2	8.2	7.8	7.6	7.7	7.4	7.4	7.4
20	8.2	7.7	8.0	8.2	8.1	8.1	7.6	7.6	7.6	7.4	7.3	7.4
21	---	---	---	8.1	8.1	8.1	---	---	---	7.4	7.3	7.4
22	---	---	---	8.1	8.1	8.1	---	---	---	7.4	7.3	7.4
23	---	---	---	8.2	8.2	8.2	---	---	---	7.4	7.4	7.4
24	---	---	---	8.2	8.2	8.2	---	---	---	7.4	7.4	7.4
25	---	---	---	8.3	8.2	8.2	---	---	---	7.4	7.4	7.4
26	8.2	8.2	8.2	8.2	8.2	8.2	---	---	---	7.5	7.4	7.5
27	8.3	8.2	8.2	8.2	8.2	8.2	---	---	---	7.5	7.5	7.5
28	8.3	8.2	8.2	8.2	8.2	8.2	---	---	---	7.5	7.5	7.5
29	8.3	8.2	8.2	8.2	8.2	8.2	---	---	---	7.5	7.5	7.5
30	8.2	8.2	8.2	8.2	8.1	8.1	---	---	---	7.5	7.5	7.5
31	8.2	8.1	8.1	---	---	---	---	---	---	7.5	7.5	7.5
MONTH	---	---	---	8.5	8.1	8.2	---	---	---	---	---	---

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.5	7.5	7.5	8.1	8.0	8.1	8.0	7.9	8.0	8.3	8.2	8.3
2	7.6	7.5	7.6	8.1	8.1	8.1	8.1	7.9	8.0	8.2	8.1	8.2
3	7.6	7.6	7.6	8.1	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.0
4	7.6	7.6	7.6	8.1	8.1	8.1	8.1	8.0	8.1	8.0	8.0	8.0
5	7.6	7.5	7.5	8.1	8.1	8.1	8.2	7.9	8.0	8.0	7.9	7.9
6	7.6	7.5	7.5	8.1	8.1	8.1	7.9	7.8	7.9	7.9	7.9	7.9
7	7.6	7.5	7.6	8.1	8.1	8.1	7.9	7.8	7.9	7.9	7.8	7.9
8	7.6	7.5	7.6	8.1	8.1	8.1	7.9	7.9	7.9	8.0	7.9	7.9
9	7.6	7.6	7.6	8.1	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0
10	---	---	---	8.1	8.0	8.0	7.9	7.9	7.9	8.1	8.0	8.0
11	---	---	---	8.0	8.0	8.0	7.9	7.9	7.9	8.1	8.0	8.0
12	---	---	---	8.0	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0
13	---	---	---	8.0	8.0	8.0	7.9	7.9	7.9	8.0	7.9	8.0
14	---	---	---	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9
15	---	---	---	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9
16	7.7	7.7	7.7	8.0	7.9	7.9	8.0	7.9	8.0	8.0	7.9	8.0
17	7.9	7.7	7.8	7.9	7.9	7.9	8.0	7.9	7.9	8.0	7.9	8.0
18	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	8.0	8.0	7.9	7.9
19	8.0	7.9	8.0	8.0	7.9	7.9	8.0	7.9	8.0	7.9	7.8	7.8
20	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.0	7.8	7.8	7.8
21	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.1	7.8	7.7	7.7
22	8.0	8.0	8.0	8.0	8.0	8.0	8.2	8.1	8.1	7.8	7.6	7.8
23	8.0	8.0	8.0	8.0	7.8	7.9	8.3	8.2	8.2	7.8	7.8	7.8
24	8.0	8.0	8.0	8.1	7.9	7.9	8.3	8.2	8.3	7.8	7.7	7.8
25	8.0	8.0	8.0	8.1	7.9	8.0	8.4	8.3	8.3	7.8	7.7	7.8
26	8.0	8.0	8.0	8.1	8.0	8.0	8.4	8.3	8.4	7.8	7.8	7.8
27	8.0	8.0	8.0	8.2	8.1	8.1	8.4	8.2	8.3	7.8	7.8	7.8
28	8.0	8.0	8.0	8.2	8.1	8.1	8.2	8.1	8.2	7.8	7.8	7.8
29	8.0	8.0	8.0	8.3	8.2	8.3	8.4	8.3	8.3	7.8	7.7	7.8
30	---	---	---	8.4	7.9	8.1	8.3	8.3	8.3	7.8	7.8	7.8
31	---	---	---	8.1	7.9	8.0	---	---	---	7.8	7.8	7.8
MONTH	---	---	---	8.4	7.8	8.0	8.4	7.8	8.1	8.3	7.6	7.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	7.8	7.8	7.8	7.8	7.7	7.8	8.0	8.0	8.0	8.4	8.2	8.3
2	7.8	7.7	7.8	7.8	7.8	7.8	8.0	8.0	8.0	8.4	8.2	8.3
3	7.8	7.7	7.7	7.8	7.8	7.8	8.0	8.0	8.0	8.4	8.2	8.3
4	7.7	7.7	7.7	7.9	7.8	7.8	8.0	7.9	7.9	8.5	8.3	8.4
5	7.7	7.5	7.7	7.9	7.9	7.9	8.0	7.9	7.9	8.5	8.3	8.4
6	7.5	7.2	7.3	8.0	7.9	7.9	8.0	7.8	7.9	8.5	8.2	8.4
7	7.8	7.2	7.4	8.0	8.0	8.0	7.9	7.8	7.8	8.4	8.2	8.3
8	8.0	7.7	7.9	8.0	8.0	8.0	7.9	7.8	7.9	8.3	8.2	8.3
9	8.1	8.0	8.1	8.0	8.0	8.0	7.9	7.9	7.9	8.4	8.2	8.3
10	8.1	8.1	8.1	8.0	7.9	7.9	7.9	7.9	7.9	8.4	8.2	8.3
11	8.1	8.1	8.1	7.9	7.9	7.9	8.0	7.9	8.0	8.5	8.3	8.3
12	8.1	8.0	8.1	7.9	7.9	7.9	8.0	8.0	8.0	8.5	8.2	8.3
13	8.0	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0	8.4	8.1	8.2
14	8.0	7.9	8.0	7.9	7.9	7.9	8.0	8.0	8.0	8.3	8.1	8.2
15	7.9	7.9	7.9	8.0	7.9	7.9	8.1	8.0	8.1	8.4	8.1	8.3
16	7.9	7.9	7.9	8.0	7.9	7.9	8.2	8.1	8.1	8.4	8.3	8.3
17	7.9	7.8	7.8	8.0	7.9	8.0	8.2	8.1	8.1	8.3	8.2	8.2
18	7.8	7.8	7.8	8.0	8.0	8.0	8.3	8.1	8.2	8.3	8.1	8.2
19	7.8	7.8	7.8	8.0	8.0	8.0	8.4	8.3	8.3	8.3	8.0	8.1
20	7.8	7.7	7.8	8.0	8.0	8.0	8.5	8.3	8.4	8.2	7.9	8.1
21	7.7	7.7	7.7	8.0	7.9	7.9	8.4	8.3	8.3	8.1	7.9	8.0
22	7.7	7.7	7.7	7.9	7.9	7.9	8.3	8.2	8.3	8.0	7.9	7.9
23	7.7	7.7	7.7	7.9	7.9	7.9	8.4	8.3	8.3	8.0	7.8	7.9
24	7.8	7.7	7.8	7.9	7.9	7.9	8.4	8.3	8.3	8.0	7.9	7.9
25	7.8	7.7	7.7	7.9	7.9	7.9	8.4	8.2	8.3	8.1	7.8	8.0
26	7.7	7.7	7.7	7.9	7.9	7.9	8.3	8.1	8.2	8.3	8.0	8.1
27	7.7	7.7	7.7	7.9	7.9	7.9	8.3	8.1	8.2	8.3	8.1	8.2
28	7.7	7.7	7.7	8.0	7.9	7.9	8.3	7.5	7.8	8.2	8.0	8.1
29	7.7	7.7	7.7	8.0	7.9	8.0	8.3	7.7	7.9	8.4	8.1	8.3
30	7.8	7.7	7.7	8.0	8.0	8.0	8.3	8.0	8.1	8.2	8.1	8.2
31	---	---	---	8.0	8.0	8.0	8.3	8.1	8.2	---	---	---
MONTH	8.1	7.2	7.8	8.0	7.7	7.9	8.5	7.5	8.1	8.5	7.8	8.2

MINNESOTA RIVER BASIN
05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	20.5	19.0	20.0	10.0	9.5	10.0	.5	.5	.5	---	---	---
2	20.5	19.5	20.0	10.0	9.5	9.5	1.0	.5	.5	---	---	---
3	20.5	19.0	19.5	10.0	9.5	9.5	1.0	.5	.5	---	---	---
4	21.0	18.5	20.0	9.5	9.0	9.0	1.0	1.0	1.0	---	---	---
5	23.0	20.0	21.5	9.0	8.5	8.5	1.0	1.0	1.0	.5	.5	.5
6	20.5	16.5	18.5	9.0	8.0	8.5	1.0	.0	1.0	1.0	.5	.5
7	17.0	16.0	16.5	8.5	8.0	8.0	1.0	.5	.5	1.0	.5	.5
8	17.5	15.0	16.0	8.5	7.5	8.0	.5	.5	.5	.5	.5	.5
9	17.0	14.0	15.5	8.0	7.0	7.5	.5	.5	.5	.5	.5	.5
10	16.0	14.0	15.0	7.0	6.0	6.5	.5	.5	.5	.5	.0	.5
11	14.5	13.0	14.0	6.0	5.0	5.5	1.0	.5	.5	.5	.5	.5
12	12.5	11.5	12.0	5.0	4.5	4.5	.5	.5	.5	.5	.5	.5
13	11.5	10.5	11.0	4.5	4.0	4.5	.5	.5	.5	1.0	.5	.5
14	11.0	10.0	10.5	4.5	4.5	4.5	1.0	.5	.5	.5	.5	.5
15	10.5	10.0	10.5	5.0	4.5	4.5	.5	.5	.5	.5	.5	.5
16	10.5	10.0	10.5	5.0	4.5	5.0	.5	.5	.5	1.0	.5	.5
17	11.5	10.0	10.5	5.0	4.5	4.5	.5	.5	.5	.5	.5	.5
18	11.5	10.5	11.0	5.5	5.0	5.0	.5	.0	.5	.5	.0	.5
19	11.5	10.5	11.0	6.0	5.0	5.5	.0	.0	.0	.5	.0	.5
20	16.0	10.5	13.0	5.5	5.5	5.5	---	---	---	.5	.0	.5
21	---	---	---	5.5	5.5	5.5	---	---	---	.5	.5	.5
22	---	---	---	5.5	4.5	5.0	---	---	---	.5	.5	.5
23	---	---	---	4.5	2.5	3.5	---	---	---	1.0	.5	.5
24	---	---	---	2.5	1.5	2.0	---	---	---	1.0	.5	.5
25	---	---	---	1.5	1.0	1.0	---	---	---	1.0	.5	1.0
26	9.5	8.5	9.0	1.0	.5	1.0	---	---	---	1.0	.5	.5
27	9.5	9.0	9.0	1.0	.5	1.0	---	---	---	.5	.0	.5
28	9.5	8.0	9.0	1.0	1.0	1.0	---	---	---	1.0	.5	.5
29	9.0	8.0	8.5	1.0	.5	1.0	---	---	---	.5	.5	.5
30	9.0	8.5	8.5	1.0	.5	1.0	---	---	---	.5	.5	.5
31	9.5	8.5	9.0	---	---	---	---	---	---	.5	.5	.5
MONTH	---	---	---	10.0	.5	5.0	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	1.0	.5	.5	1.0	1.0	1.0	---	---	---	8.5	7.5	8.0
2	1.0	.5	.5	1.0	1.0	1.0	---	---	---	8.5	8.0	8.5
3	1.0	.5	1.0	1.0	1.0	1.0	---	---	---	10.5	9.5	10.0
4	.5	.5	.5	1.0	1.0	1.0	---	---	---	11.0	10.0	10.5
5	.5	.0	.5	1.0	1.0	1.0	---	---	---	12.0	10.5	11.0
6	.5	.0	.5	1.0	1.0	1.0	8.0	6.5	7.0	12.5	11.5	12.0
7	.5	.0	.5	1.0	1.0	1.0	8.0	7.5	7.5	12.5	12.0	12.5
8	1.0	.5	.5	1.0	1.0	1.0	8.0	7.5	7.5	12.0	11.5	11.5
9	.5	.5	.5	1.0	.5	1.0	8.0	7.5	7.5	12.5	11.0	11.5
10	---	---	---	1.0	1.0	1.0	8.0	7.5	8.0	12.5	11.0	12.0
11	---	---	---	1.0	1.0	1.0	8.0	8.0	8.0	13.5	12.0	12.5
12	---	---	---	1.0	1.0	1.0	8.0	6.0	6.5	13.5	13.0	13.0
13	---	---	---	1.0	1.0	1.0	6.0	6.0	6.0	14.0	13.0	13.5
14	---	---	---	1.0	1.0	1.0	6.5	6.0	6.0	14.5	13.5	14.0
15	---	---	---	1.0	1.0	1.0	7.0	6.0	6.5	15.5	14.5	15.0
16	.5	.5	.5	1.0	1.0	1.0	8.0	7.0	7.5	15.5	15.0	15.0
17	.5	.5	.5	1.0	1.0	1.0	8.5	7.5	8.0	16.0	15.0	15.5
18	.5	.5	.5	1.0	1.0	1.0	9.0	8.0	8.5	16.5	15.5	16.0
19	.5	.5	.5	1.0	1.0	1.0	9.5	8.5	9.0	17.5	16.5	17.0
20	.5	.5	.5	1.0	1.0	1.0	10.5	9.0	10.0	18.0	17.5	17.5
21	.5	.5	.5	1.5	1.0	1.0	10.5	10.0	10.0	18.5	18.0	18.0
22	.5	.0	.5	1.5	1.0	1.0	10.0	9.0	9.0	18.5	18.0	18.5
23	1.0	.5	1.0	---	---	---	9.0	8.5	9.0	18.5	18.0	18.0
24	1.0	1.0	1.0	---	---	---	10.0	8.5	9.0	18.5	17.5	18.0
25	1.0	1.0	1.0	---	---	---	10.0	9.5	10.0	17.5	17.5	17.5
26	1.0	1.0	1.0	---	---	---	11.5	10.0	10.5	17.5	17.0	17.0
27	1.0	1.0	1.0	---	---	---	11.5	9.0	10.5	16.5	16.0	16.0
28	1.0	1.0	1.0	---	---	---	8.5	8.0	8.5	16.0	15.5	15.5
29	1.0	1.0	1.0	---	---	---	11.0	9.5	10.0	15.5	15.0	15.5
30	---	---	---	---	---	---	9.5	8.0	8.5	16.0	15.0	15.5
31	---	---	---	---	---	---	---	---	---	16.0	15.5	15.5
MONTH	---	---	---	---	---	---	---	---	---	18.5	7.5	14.0

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	17.5	16.5	17.0	22.5	21.5	22.0	23.5	22.5	23.0	20.5	19.0	19.5
2	18.5	17.0	18.0	23.0	22.0	22.5	23.5	23.0	23.0	18.5	18.0	18.5
3	19.0	18.0	18.5	23.0	22.5	23.0	24.0	23.0	23.5	18.0	17.0	17.5
4	19.0	18.5	19.0	23.5	22.5	23.0	24.0	23.0	23.5	18.5	17.0	17.5
5	20.0	18.5	19.0	23.0	22.5	23.0	24.5	23.5	24.0	18.0	17.0	17.5
6	20.5	19.5	20.0	23.0	22.0	22.0	25.0	24.0	24.5	18.0	17.0	17.5
7	21.0	20.0	20.5	21.5	21.0	21.5	25.0	24.0	24.5	17.0	16.5	17.0
8	21.0	20.5	21.0	21.5	21.0	21.0	24.5	23.5	24.0	17.0	16.5	16.5
9	20.5	20.5	20.5	21.5	25.0	21.0	24.5	23.5	24.0	17.0	15.5	16.0
10	20.0	20.0	20.0	21.5	21.0	21.0	23.5	23.0	23.5	16.0	15.5	16.0
11	20.0	18.5	19.0	21.5	20.5	21.0	23.5	23.0	23.0	16.0	15.0	15.5
12	18.5	18.0	18.0	22.5	21.5	22.0	23.5	22.5	23.0	16.5	15.5	16.0
13	19.0	18.0	18.5	23.0	22.5	23.0	24.0	23.0	23.5	17.5	16.5	17.0
14	19.0	18.5	19.0	23.0	23.0	23.0	24.5	23.5	24.0	17.0	16.0	16.5
15	19.0	18.5	19.0	23.0	22.5	23.0	25.0	24.0	24.5	16.0	14.5	15.5
16	19.5	19.0	19.0	23.0	22.0	22.5	24.5	23.5	24.5	15.5	14.5	15.0
17	20.0	19.0	19.5	22.0	21.5	21.5	24.5	24.0	24.0	15.5	14.5	15.0
18	21.0	20.0	20.0	21.5	21.0	21.5	24.5	23.0	23.5	16.0	15.0	15.5
19	21.0	20.5	20.5	21.5	21.5	21.5	24.0	22.5	23.5	17.5	15.5	16.0
20	21.5	20.5	21.0	22.0	21.5	22.0	23.5	22.0	23.0	17.5	16.5	17.0
21	21.5	20.5	21.0	23.0	22.0	22.5	23.0	21.5	22.0	17.5	16.0	16.5
22	21.0	20.5	20.5	23.5	22.5	23.0	22.5	21.0	21.5	17.0	16.5	16.5
23	21.0	20.5	20.5	24.0	23.5	23.5	21.0	19.5	20.5	16.5	15.0	15.5
24	21.0	20.0	20.5	24.0	23.5	23.5	20.5	19.0	20.0	15.0	13.5	14.0
25	21.0	20.0	20.5	24.0	23.5	24.0	20.5	19.0	19.5	13.5	11.5	12.5
26	21.5	20.5	21.0	23.5	23.0	23.5	20.5	19.5	19.5	11.0	10.0	10.5
27	21.5	21.0	21.0	23.5	22.5	23.0	22.0	20.0	20.5	11.0	10.0	10.5
28	22.0	21.0	21.5	23.5	22.5	23.0	28.0	22.0	23.5	11.0	9.5	10.0
29	22.0	21.0	21.5	23.0	22.5	23.0	28.0	22.5	25.0	10.5	9.0	10.0
30	22.0	21.5	21.5	23.0	22.5	23.0	23.0	21.5	22.0	10.5	9.0	9.5
31	---	---	---	23.0	22.5	23.0	22.0	20.0	21.0	---	---	---
MONTH	22.0	16.5	20.0	24.0	20.5	22.5	28.0	19.0	23.0	20.5	9.0	15.5

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	11.8	9.6	10.5	13.0	11.9	12.4	14.7	12.9	14.0	---	---	---
2	10.0	8.2	9.1	12.2	11.7	11.9	15.2	14.3	14.6	---	---	---
3	8.7	7.0	7.7	11.6	11.2	11.4	14.6	13.4	13.9	---	---	---
4	8.8	6.7	7.8	12.4	11.1	11.9	13.6	13.1	13.4	---	---	---
5	8.2	6.5	7.1	12.0	11.5	11.7	13.4	13.2	13.3	10.8	10.4	10.6
6	10.3	7.8	9.0	11.9	11.3	11.6	13.4	13.2	13.4	12.2	11.8	12.0
7	9.9	9.2	9.6	11.9	11.2	11.5	13.4	13.1	13.3	12.2	11.6	11.9
8	10.1	8.8	9.4	12.6	11.2	12.2	16.0	12.8	14.7	12.3	11.7	12.0
9	10.0	8.3	9.2	12.2	11.6	11.9	15.8	14.7	15.1	12.4	11.8	12.0
10	8.8	7.9	8.3	12.2	11.5	11.9	14.7	13.9	14.3	13.2	11.8	12.7
11	9.0	7.7	8.5	12.7	11.9	12.3	14.0	13.5	13.8	12.9	12.5	12.7
12	9.4	8.5	8.9	12.8	12.4	12.6	13.8	13.5	13.6	12.9	12.5	12.7
13	11.4	8.6	9.9	12.6	12.1	12.2	13.6	13.4	13.5	12.9	12.3	12.7
14	11.3	9.9	10.7	12.2	11.8	11.9	13.6	13.2	13.4	12.9	12.2	12.5
15	11.3	10.5	10.8	12.0	11.2	11.5	13.7	13.2	13.4	12.4	11.9	12.1
16	11.3	10.3	10.8	12.9	11.5	12.3	14.5	13.4	14.0	12.3	11.6	11.9
17	11.8	10.9	11.3	12.9	12.4	12.7	14.4	14.1	14.2	13.6	11.6	12.9
18	10.9	10.0	10.4	12.6	11.6	12.0	14.4	14.0	14.2	13.2	12.6	12.9
19	10.1	9.4	9.7	12.0	10.9	11.5	14.0	13.8	13.9	13.1	12.5	12.8
20	---	---	---	11.1	10.4	10.7	---	---	---	13.2	12.6	12.9
21	---	---	---	10.5	10.1	10.3	---	---	---	13.1	12.6	12.9
22	---	---	---	10.5	10.2	10.4	---	---	---	13.2	12.4	12.7
23	---	---	---	10.7	10.4	10.5	---	---	---	12.9	12.4	12.7
24	---	---	---	10.8	10.4	10.6	---	---	---	13.0	12.3	12.7
25	---	---	---	11.1	10.7	10.9	---	---	---	13.4	12.7	13.0
26	---	---	---	11.2	10.8	11.0	---	---	---	13.1	12.5	12.7
27	14.8	13.4	14.1	11.2	10.7	11.0	---	---	---	13.4	12.5	12.8
28	14.8	13.9	14.2	11.4	10.6	10.9	---	---	---	12.9	12.2	12.5
29	14.6	13.7	14.0	12.6	11.4	11.6	---	---	---	12.9	12.3	12.6
30	14.1	13.1	13.6	12.9	12.6	12.7	---	---	---	13.0	12.4	12.7
31	13.1	12.3	12.7	---	---	---	---	---	---	13.1	12.4	12.7
MONTH	---	---	---	13.0	10.1	11.6	---	---	---	---	---	---

MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	12.8	12.1	12.6	14.6	14.3	14.5	---	---	---	12.0	11.1	11.5
2	13.6	12.1	13.0	14.4	14.3	14.3	---	---	---	12.0	11.3	11.5
3	13.7	13.3	13.6	15.5	15.1	15.3	---	---	---	12.1	11.3	11.8
4	13.8	13.5	13.7	15.3	14.8	15.0	---	---	---	11.7	11.3	11.5
5	14.0	13.4	13.7	15.2	14.8	14.9	---	---	---	11.4	10.7	11.0
6	14.0	13.5	13.7	15.0	14.7	14.9	10.4	10.0	10.2	11.0	10.4	10.7
7	14.2	13.7	13.9	14.8	14.3	14.6	10.5	10.2	10.4	10.5	10.1	10.3
8	14.3	13.8	14.1	14.4	14.1	14.3	10.8	10.4	10.6	11.1	10.1	10.6
9	14.2	13.9	14.1	17.2	13.9	15.8	10.9	10.7	10.8	11.8	10.9	11.4
10	---	---	---	16.6	15.4	16.0	11.0	10.2	10.6	12.9	11.3	12.4
11	---	---	---	15.1	13.9	14.6	10.8	10.3	10.5	14.1	11.5	12.4
12	---	---	---	13.7	12.8	13.3	10.9	10.3	10.6	13.2	12.4	12.8
13	---	---	---	12.7	12.4	12.5	12.5	10.4	11.6	12.5	11.7	12.0
14	---	---	---	12.4	12.0	12.2	12.0	11.3	11.7	12.2	11.0	11.6
15	---	---	---	12.1	11.9	12.0	12.2	11.4	11.8	13.7	11.3	12.6
16	12.3	11.9	12.1	12.0	11.8	11.9	12.1	11.4	11.8	13.3	11.9	12.5
17	13.8	12.1	13.3	11.8	11.5	11.7	12.3	11.3	11.9	12.5	10.9	11.2
18	14.3	13.7	14.1	11.7	11.5	11.6	11.9	11.5	11.7	11.2	10.3	10.7
19	14.7	14.2	14.4	11.5	11.4	11.5	12.0	11.3	11.6	10.6	9.8	10.1
20	14.8	14.4	14.6	11.6	11.2	11.4	12.3	11.1	11.7	10.0	9.2	9.5
21	15.4	14.7	15.1	11.4	11.0	11.2	12.5	11.4	11.8	9.4	7.9	8.5
22	15.2	14.9	15.1	11.3	10.9	11.1	12.3	11.3	11.8	8.9	7.5	8.6
23	15.3	14.2	14.6	---	---	---	13.1	11.3	12.2	8.8	8.4	8.6
24	15.8	14.4	15.1	---	---	---	13.7	12.1	12.8	8.9	8.1	8.4
25	16.1	15.4	15.7	---	---	---	13.5	12.2	12.9	8.6	8.0	8.2
26	15.3	14.7	15.0	---	---	---	13.6	12.0	12.7	8.1	7.8	8.0
27	14.8	14.3	14.6	---	---	---	12.7	10.3	11.4	8.0	7.6	7.9
28	14.9	14.3	14.6	---	---	---	12.0	10.5	11.3	8.2	7.8	8.0
29	14.6	14.5	14.6	---	---	---	11.5	10.6	10.9	8.3	7.9	8.1
30	---	---	---	---	---	---	11.5	10.2	10.8	9.5	8.4	9.0
31	---	---	---	---	---	---	---	---	---	9.6	9.0	9.3
MONTH	---	---	---	---	---	---	---	---	---	14.1	7.5	10.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	9.0	7.8	8.2	6.4	6.3	6.3	6.8	6.5	6.7	10.6	7.9	8.8
2	7.8	7.2	7.6	6.3	6.2	6.3	6.7	6.1	6.3	9.1	7.0	7.7
3	7.2	6.6	7.0	6.6	6.2	6.3	6.4	5.9	6.2	8.2	6.1	7.2
4	---	---	---	6.6	6.2	6.4	6.1	4.9	5.4	11.5	6.8	8.8
5	---	---	---	6.6	6.2	6.4	5.0	4.1	4.6	12.6	9.6	11.0
6	---	---	---	7.0	6.1	6.3	4.6	3.7	4.1	12.8	9.1	10.8
7	7.5	6.7	7.1	6.4	6.2	6.3	6.0	4.2	5.1	13.0	9.4	10.8
8	8.2	6.9	7.8	6.4	6.1	6.2	6.8	5.9	6.1	12.4	10.1	11.1
9	8.0	7.5	7.7	6.1	5.7	5.8	7.5	6.7	7.1	12.5	9.8	10.9
10	7.8	7.5	7.6	5.7	5.4	5.5	7.5	7.1	7.3	11.7	8.8	10.2
11	7.9	7.6	7.7	5.4	5.2	5.3	7.3	6.8	7.1	12.4	8.5	10.2
12	8.0	7.7	7.9	5.3	5.0	5.1	7.5	6.9	7.1	12.1	8.5	9.9
13	8.0	7.8	7.9	5.3	5.1	5.2	7.3	6.1	6.6	12.9	9.5	11.2
14	7.9	7.4	7.4	5.3	4.9	5.0	6.4	5.6	6.0	10.5	9.1	9.9
15	7.7	7.3	7.4	5.5	5.1	5.3	7.6	5.5	6.7	11.2	8.3	9.7
16	7.4	7.2	7.3	5.8	5.4	5.6	8.3	6.2	7.3	11.0	8.9	9.9
17	7.2	6.9	7.0	6.2	5.8	6.0	8.1	7.1	7.5	10.5	8.4	9.3
18	7.1	6.8	7.0	6.5	6.2	6.4	9.4	6.9	7.8	11.3	8.8	10.0
19	7.0	6.8	6.8	6.9	6.6	6.7	9.7	7.2	8.4	10.8	9.0	9.9
20	6.8	6.5	6.6	6.5	6.3	6.4	8.5	6.7	7.7	11.4	8.6	9.6
21	6.7	6.4	6.6	6.4	6.2	6.2	10.5	8.2	8.8	10.4	8.7	9.6
22	6.6	6.5	6.6	6.2	5.9	6.1	9.0	7.3	8.1	9.4	7.3	8.1
23	6.6	6.4	6.5	6.0	5.6	5.8	7.4	6.1	6.8	8.2	6.0	7.0
24	6.7	6.5	6.6	6.1	5.8	6.0	8.2	4.8	6.7	7.4	6.2	6.7
25	6.6	6.5	6.6	6.2	6.0	6.1	7.3	5.5	6.3	9.5	5.6	7.6
26	6.7	6.3	6.4	6.4	6.3	6.3	6.3	5.4	5.8	11.7	8.0	9.5
27	6.4	6.3	6.4	6.6	6.2	6.5	6.9	4.8	5.6	13.5	8.9	11.6
28	6.4	6.0	6.3	6.7	6.5	6.6	---	---	---	12.4	9.7	11.4
29	6.0	5.9	6.0	6.8	6.5	6.6	7.2	5.7	6.7	15.0	10.6	12.4
30	6.5	5.9	6.2	6.6	6.1	6.3	11.2	7.8	9.5	15.4	11.7	13.4
31	---	---	---	7.0	6.0	6.6	11.2	8.0	9.3	---	---	---
MONTH	---	---	---	7.0	4.9	6.1	---	---	---	15.4	5.6	9.8

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 mi² (95,300 km²), 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).--86 years (water years 1895, 1897, 1901-84), 10,910 ft³/s (309.0 m³/s), 4.03 in/yr (102 mm/yr); median of yearly mean discharges, 10,140 ft³/s (287 m³/s), 3.74 in/yr (95 mm/yr).

EXTREMES FOR PERIOD OF RECORD (1867-70, 1872-1984).--Maximum discharge, 171,000 ft³/s (4,840 m³/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 ft³/s (2,830 m³/s).

EXTREMES FOR PERIOD OF RECORD (1897,1917-84).--Minimum daily discharge, 632 ft³/s (17.9 m³/s) Aug. 26, 1934.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 70,800 ft³/s (2,010 m³/s) June 26; maximum gage height, 14.07 ft (4.289 m) June 26; minimum daily, 4,220 ft³/s (120 m³/s) Sept. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7050	11900	11400	10100	8110	27300	40800	39700	20000	67300	11000	5000
2	6720	11400	10400	9930	8350	27400	43700	40000	19300	64100	10600	5090
3	6800	11100	10900	9740	8080	26900	48200	40100	18800	59900	11000	4990
4	7030	10800	10900	9500	7880	27200	51100	40300	18200	55900	10600	4840
5	7100	10600	11600	9550	7300	23200	53300	41400	18800	51400	10100	4800
6	7080	10100	11700	9920	6850	23000	55600	42500	19300	46100	10300	4720
7	6790	10100	12300	9270	7020	20700	56200	44900	22600	42300	11600	4810
8	7390	10200	11600	9390	7080	18600	56100	47400	25600	37700	13000	4710
9	7660	10300	11400	9300	6120	18600	55500	50100	25600	34300	13500	4600
10	6240	9800	11600	9290	6530	18000	54800	52000	29700	33700	12900	4680
11	6690	10200	11200	8740	7300	18900	53100	52400	35000	31600	11900	4490
12	7920	10500	13000	8740	6980	18600	51600	50600	42500	30800	10800	4630
13	8670	10300	11600	9060	7320	18300	50600	50700	48100	29800	10100	5040
14	8970	10200	12500	9350	8050	18100	50400	49600	51700	28700	10000	5500
15	9180	10600	12400	8900	8810	18300	50500	48300	55400	27700	9620	5050
16	10200	10300	10900	8680	9870	17800	50600	47300	58200	26400	8720	5160
17	9940	10400	10000	8700	10200	17400	50800	45500	60100	25700	8200	7350
18	11500	10600	9580	8390	11100	17300	51600	43600	61600	24700	7900	7130
19	10700	10700	9750	8250	12700	17000	52500	41400	62600	24200	7480	5410
20	11500	10100	10200	8400	13400	17400	53000	39300	64000	22700	6950	5290
21	11800	10700	11000	8110	15800	17200	52800	37400	66200	21300	6520	4770
22	12300	13400	11100	8420	18100	17100	51500	35900	68700	19700	6480	4440
23	11700	14200	10600	8720	19900	17700	49500	33700	70300	18400	6050	4460
24	12000	14700	10500	8580	20700	18500	46600	32400	70700	17700	5980	4220
25	12400	14400	10500	8620	22600	21000	44000	30600	70700	16200	5780	4610
26	13400	14000	10900	8020	23300	23800	42400	28300	70800	15400	5920	5400
27	12500	12800	10800	8340	24500	28400	42000	26600	70500	14000	5630	5700
28	12400	12500	10500	8130	26000	30600	39700	25200	70400	13200	5650	5740
29	12800	13500	10100	8140	27200	32800	38700	23800	70200	12400	6040	6260
30	11700	11600	10100	7730	---	36000	39400	22300	69400	11700	5440	6700
31	11400	---	10100	7960	---	40500	---	21600	---	11400	4890	---
TOTAL	299530	342000	341130	273970	367150	693600	1476600	1224900	1455000	936400	270650	155590
MEAN	9662	11400	11000	8838	12660	22370	49220	39510	48500	30210	8731	5186
MAX	13400	14700	13000	10100	27200	40500	56200	52400	70800	67300	13500	7350
MIN	6240	9800	9580	7730	6120	17000	38700	21600	18200	11400	4890	4220
CFSM	.26	.31	.30	.24	.34	.61	1.34	1.07	1.32	.82	.24	.14
IN.	.30	.35	.34	.28	.37	.70	1.49	1.24	1.47	.95	.27	.16
†	319	281	298	288	358	343	356	370	422	346	350	333
MEAN ‡	9,981	11,681	11,298	9,126	13,018	22,713	49,576	39,880	48,942	30,556	9,081	5,519
CFSM ‡	.27	.32	.31	.25	.35	.62	1.35	1.08	1.33	.83	.25	.15
IN. ‡	.31	.35	.35	.29	.38	.71	1.50	1.25	1.48	.96	.28	.17

CAL YR 1983 TOTAL 7339540 MEAN 20110 MAX 64100 MIN 6240 MEAN + 20452 CFSM ‡ .56 IN ‡ 7.55
WTR YR 1984 TOTAL 7836520 MEAN 21410 MAX 70800 MIN 4220 MEAN ‡ 21750 CFSM ‡ .59 IN ‡ 8.05

† Diversion equivalent in cubic feet per second, through sewage disposal plant.

‡ Adjusted for diversion.

05331000 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 27.5°C Aug. 16; minimum, 0.0°C many days during winter period.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	19.0	18.5	18.5	9.0	9.0	9.0	.5	.0	.5	1.0	.5	1.0
2	19.0	18.5	19.0	10.5	9.0	10.0	1.0	.5	.5	1.0	.5	1.0
3	19.0	18.0	18.5	10.5	10.0	10.0	.5	.5	.5	1.0	.5	.5
4	18.5	18.0	18.0	10.0	8.5	9.0	1.0	.5	.5	1.0	.5	.5
5	18.0	17.0	17.5	8.5	8.0	8.0	1.0	.5	1.0	1.0	.5	.5
6	17.5	16.5	16.5	8.0	7.5	7.5	1.5	1.0	1.0	1.0	.0	.5
7	16.5	15.5	15.5	8.5	8.0	8.0	1.5	1.0	1.0	1.0	.5	.5
8	15.5	14.5	15.0	8.5	8.5	8.5	1.5	1.0	1.0	.5	.5	.5
9	15.0	14.0	14.5	8.5	7.0	7.5	1.5	1.0	1.0	1.0	.5	1.0
10	14.5	13.5	13.5	7.0	5.5	6.5	.5	.5	.5	1.0	.5	1.0
11	13.5	13.0	13.0	5.5	5.0	5.0	.5	.5	.5	1.0	1.0	1.0
12	13.0	12.0	12.5	5.0	4.5	4.5	1.0	.5	1.0	1.5	1.0	1.0
13	12.0	11.0	11.5	4.5	3.5	4.0	1.0	.5	.5	1.0	1.0	1.0
14	11.0	10.0	10.5	3.5	3.5	3.5	1.0	.5	.5	1.0	1.0	1.0
15	10.0	9.5	10.0	4.0	3.5	4.0	1.0	.5	1.0	1.0	1.0	1.0
16	10.5	9.5	10.0	4.0	4.0	4.0	1.0	.5	1.0	1.5	1.0	1.0
17	10.5	10.0	10.0	4.0	3.5	4.0	1.0	1.0	1.0	1.5	1.0	1.0
18	10.5	10.0	10.5	4.0	3.5	4.0	1.5	1.0	1.0	1.5	.5	1.0
19	10.5	10.0	10.5	4.5	4.0	4.0	1.5	1.0	1.5	1.5	1.0	1.0
20	10.0	10.0	10.0	5.0	4.5	5.0	1.5	1.5	1.5	1.5	1.0	1.0
21	10.0	10.0	10.0	5.0	4.5	5.0	1.5	1.0	1.0	1.5	1.0	1.0
22	10.5	10.0	10.0	4.5	3.5	4.0	1.5	1.0	1.5	1.0	1.0	1.0
23	10.5	10.5	10.5	3.5	2.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0
24	10.5	10.0	10.0	2.5	1.0	1.5	1.5	.5	1.0	1.0	1.0	1.0
25	10.5	10.0	10.0	1.0	1.0	1.0	1.5	1.0	1.5	1.0	1.0	1.0
26	10.0	9.0	9.5	1.0	.5	.5	1.5	1.0	1.0	1.0	1.0	1.0
27	10.0	9.0	9.5	.5	.5	.5	1.5	1.0	1.0	1.0	1.0	1.0
28	10.5	9.5	10.0	.5	.0	.5	1.5	1.0	1.5	1.0	.5	1.0
29	10.0	9.5	10.0	.5	.5	.5	2.0	1.5	1.5	1.0	1.0	1.0
30	9.5	9.0	9.0	.5	.0	.5	1.5	1.0	1.5	1.5	1.0	1.0
31	9.0	9.0	9.0	---	---	---	1.5	1.0	1.0	1.0	1.0	1.0
MONTH	19.0	9.0	12.5	10.5	.0	5.0	2.0	.0	1.0	1.5	.0	1.0

MISSISSIPPI RIVER BASIN

05331000 MISSISSIPPI RIVER AT ST. PAUL, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	1.0	1.0	1.0	1.0	.0	.5	4.0	3.0	3.5	9.0	8.0	8.5
2	1.0	.5	1.0	1.0	.0	.5	4.5	3.5	4.0	9.5	9.0	9.0
3	1.0	.5	1.0	1.0	.5	.5	5.0	4.5	4.5	10.5	9.5	10.0
4	1.0	.5	1.0	.5	.0	.5	6.0	5.0	5.0	11.0	10.5	11.0
5	1.0	.5	1.0	1.0	.5	.5	6.5	6.0	6.0	11.5	11.0	11.0
6	1.0	.5	1.0	1.0	.5	1.0	7.5	6.5	7.0	12.5	11.0	12.0
7	1.0	1.0	1.0	1.0	.5	.5	7.5	7.0	7.5	12.5	12.0	12.5
8	1.0	1.0	1.0	1.0	.5	1.0	7.5	7.5	7.5	12.0	11.0	11.5
9	1.0	.5	1.0	1.0	.5	1.0	7.5	7.5	7.5	11.5	10.5	11.0
10	1.0	.5	.5	1.0	.5	.5	7.5	7.5	7.5	13.0	11.5	12.0
11	1.0	.5	.5	1.0	.5	.5	7.5	7.5	7.5	14.0	13.0	13.5
12	1.0	.5	.5	.5	.5	.5	7.5	7.0	7.5	14.5	14.0	14.0
13	1.5	.5	1.0	1.0	.5	.5	7.0	7.0	7.0	14.5	14.0	14.5
14	1.5	1.0	1.0	.5	.5	.5	7.5	7.0	7.0	15.0	14.0	14.0
15	1.5	1.0	1.0	1.0	.0	.5	8.5	7.5	7.5	15.5	15.0	15.0
16	1.0	1.0	1.0	1.5	.5	1.0	9.5	8.5	8.5	15.5	15.0	15.5
17	1.0	1.0	1.0	1.0	.5	.5	10.0	9.0	9.5	16.5	15.0	15.5
18	1.0	.5	.5	1.5	.5	1.0	10.0	9.5	10.0	17.5	16.5	17.0
19	1.0	.5	.5	1.5	1.0	1.0	11.0	10.0	10.5	18.0	17.5	17.5
20	1.0	.5	1.0	1.5	1.0	1.5	11.5	10.5	11.0	19.0	18.0	18.5
21	1.0	.5	1.0	1.5	1.0	1.0	11.5	11.5	11.5	19.5	18.5	19.0
22	1.5	.5	1.0	1.5	1.0	1.0	11.5	10.5	11.0	19.0	18.5	19.0
23	1.0	.5	1.0	1.5	.5	1.0	11.0	10.5	10.5	19.5	18.5	19.0
24	1.0	.5	1.0	1.5	.5	1.0	11.5	11.0	11.0	19.0	18.5	19.0
25	1.0	.5	.5	1.0	.5	1.0	12.0	11.5	11.5	18.5	18.0	18.5
26	1.0	.5	.5	1.5	.5	1.0	13.0	11.5	12.0	18.0	17.5	17.5
27	1.0	.5	.5	2.0	1.0	1.5	13.5	12.5	13.0	17.5	17.0	17.0
28	.5	.5	.5	2.5	2.0	2.0	13.0	11.5	12.5	17.0	16.5	16.5
29	1.0	.5	.5	2.5	2.0	2.0	11.5	9.5	10.5	17.5	16.5	17.0
30	---	---	---	2.0	1.5	2.0	9.5	8.5	9.0	18.0	17.0	17.5
31	---	---	---	3.0	2.0	2.5	---	---	---	18.5	17.5	18.0
MONTH	1.5	.5	1.0	3.0	.0	1.0	13.5	3.0	8.5	19.5	8.0	15.0
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	19.5	18.5	19.0	24.0	23.5	23.5	25.5	24.0	25.0	23.5	22.0	22.5
2	20.0	19.0	19.5	24.5	23.5	24.0	26.0	25.0	25.5	22.0	20.5	21.5
3	20.5	19.5	20.0	24.5	24.0	24.5	26.0	25.0	25.5	20.5	20.0	20.0
4	20.5	20.0	20.5	25.0	24.5	24.5	26.0	25.0	25.5	20.0	19.5	

MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI R AT INDUSTRIAL MOLLASSES ST PAUL MN--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1										---	---	---
2										---	---	---
3										---	---	---
4										---	---	---
5										---	---	---
6										---	---	---
7										---	---	---
8										---	---	---
9										---	---	---
10										---	---	---
11										---	---	---
12										---	---	---
13										---	---	---
14										---	---	---
15										567	533	548
16										569	527	555
17										610	560	583
18										704	593	654
19										719	602	682
20										722	709	714
21										729	664	720
22										719	565	670
23										635	619	626
24										634	619	625
25										629	620	625
26										629	613	621
27										619	611	615
28										626	612	620
29										626	571	600
30										601	582	592
31										597	578	587
MONTH										---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	603	590	596	600	592	595	613	598	606	---	---	---
2	595	580	589	613	598	603	604	579	590	---	---	---
3	600	583	593	627	608	615	599	496	562	---	---	---
4	602	558	590	629	624	627	635	575	611	---	---	---
5	573	533	558	638	627	634	598	572	580	568	546	558
6	572	552	562	652	633	643	599	566	578	620	562	585
7	588	415	502	653	642	648	---	---	---	681	533	604
8	557	449	502	654	650	652	---	---	---	613	538	584
9	489	402	462	---	---	---	---	---	---	697	549	659
10	432	409	423	---	---	---	---	---	---	702	670	684
11	444	404	429	---	---	---	---	---	---	683	670	677
12	511	425	468	---	---	---	---	---	---	678	487	580
13	424	395	411	---	---	---	---	---	---	659	531	627
14	412	386	398	683	671	677	606	590	596	647	623	633
15	402	381	394	683	665	677	607	597	602	662	624	639
16	395	371	387	687	679	683	620	603	612	663	585	618
17	397	371	385	647	601	630	638	602	620	580	482	543
18	406	377	393	649	643	646	638	626	632	520	484	503
19	416	382	399	664	643	653	683	647	665	568	473	522
20	419	384	403	666	642	652	705	661	683	527	440	480
21	438	408	422	692	645	673	706	665	684	520	447	507
22	452	428	439	682	652	660	695	674	685	520	492	504
23	454	431	443	658	642	651	693	672	680	512	492	504
24	---	---	---	642	629	635	676	660	668	508	434	471
25	---	---	---	641	621	626	---	---	---	499	445	481
26	483	451	467	634	600	621	---	---	---	471	429	456
27	522	473	496	626	615	620	---	---	---	472	429	449
28	611	522	583	636	607	623	---	---	---	464	437	453
29	594	584	588	630	607	618	---	---	---	460	419	445
30	597	593	595	629	612	621	---	---	---	462	411	441
31	---	---	---	610	609	609	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.3	8.2	8.3	8.1	8.0	8.1	7.8	7.8	7.8			
2	8.2	8.2	8.2	8.1	8.0	8.1	8.2	7.7	7.8			
3	8.4	8.2	8.3	8.1	8.0	8.1	7.8	7.7	7.7			
4	8.2	8.1	8.2	8.1	8.0	8.1	7.7	7.7	7.7			
5	8.3	8.1	8.1	8.1	8.1	8.1	7.8	7.6	7.7			
6	8.2	8.0	8.1	8.1	8.1	8.1	7.7	7.7	7.7			
7	8.1	8.0	8.1	8.1	8.0	8.0	7.8	7.7	7.7			
8	8.1	8.0	8.1	8.1	8.0	8.1	7.8	7.7	7.7			
9	8.1	8.0	8.0	8.1	8.0	8.1	7.9	7.6	7.7			
10	8.0	7.9	8.0	8.2	7.6	7.9	7.8	7.7	7.7			
11	8.0	7.9	8.0	7.9	7.7	7.8	7.8	7.7	7.7			
12	8.0	7.9	7.9	7.9	7.9	7.9	7.8	7.7	7.7			
13	8.1	7.9	8.0	7.9	7.8	7.9	---	---	---			
14	8.2	8.0	8.1	7.9	7.7	7.8	---	---	---			
15	8.1	8.0	8.0	8.0	7.5	7.7	---	---	---			
16	8.1	8.0	8.0	7.7	7.5	7.6	---	---	---			
17	8.0	7.9	8.0	7.7	7.4	7.6	---	---	---			
18	8.1	8.0	8.0	7.5	7.4	7.5	---	---	---			
19	8.0	7.9	8.0	---	---	---	---	---	---			
20	8.0	7.9	7.9	---	---	---	---	---	---			
21	8.0	8.0	8.0	---	---	---	---	---	---			
22	8.0	8.0	8.0	---	---	---	---	---	---			
23	8.0	8.0	8.0	7.4	7.3	7.3	---	---	---			
24	8.0	7.8	7.9	7.4	7.3	7.4	---	---	---			
25	8.0	7.9	8.0	7.5	7.4	7.4	---	---	---			
26	8.0	8.0	8.0	7.5	7.5	7.5	---	---	---			
27	8.1	8.0	8.0	7.5	7.5	7.5	---	---	---			
28	8.1	7.9	8.0	7.6	7.5	7.6	---	---	---			
29	8.1	8.0	8.1	7.8	7.6	7.7	---	---	---			
30	8.1	8.1	8.1	7.8	7.8	7.8	---	---	---			
31	8.2	7.9	8.1	---	---	---	---	---	---			
MONTH	8.4	7.8	8.1	---	---	---	---	---	---			
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1										---	---	---
2										---	---	---
3										---	---	---
4										---	---	---
5										---	---	---
6										---	---	---
7										---	---	---
8										---	---	---
9										---	---	---
10										---	---	---
11										---	---	---
12										---	---	---
13										---	---	---
14										---	---	---
15										8.1	7.9	8.0
16										8.6	8.1	8.4
17										8.2	7.9	8.1
18										8.5	7.9	8.1
19										8.1	7.8	8.0
20										8.4	7.8	8.1
21										8.2	7.7	7.9
22										8.3	7.8	7.9
23										8.3	7.8	8.0
24										8.2	7.8	8.0
25										8.2	7.7	7.9
26										8.2	7.6	7.8
27										---	---	---
28										---	---	---
29										---	---	---
30										7.7	7.1	7.3
31										7.4	7.1	7.3
MONTH										---	---	---

MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLLASSES ST PAUL MN--Continued

TEMPERATURE, WATER (DEC. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1										---	---	---
2										---	---	---
3										---	---	---
4										---	---	---
5										---	---	---
6										---	---	---
7										---	---	---
8										---	---	---
9										---	---	---
10										---	---	---
11										---	---	---
12										---	---	---
13										---	---	---
14										---	---	---
15										15.0	14.5	15.0
16										15.0	14.5	15.0
17										15.5	14.5	15.0
18										16.5	15.5	16.0
19										17.5	16.0	16.5
20										18.0	17.0	17.5
21										18.0	17.5	18.0
22										18.0	17.5	18.0
23										18.5	17.5	18.0
24										19.0	17.5	18.5
25										19.0	18.0	18.5
26										18.0	17.0	17.5
27										18.0	17.0	17.5
28										18.0	16.0	17.0
29										17.5	15.5	16.0
30										17.0	16.0	16.5
31										17.5	16.5	17.0
MONTH										---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	18.5	17.5	18.0	22.5	22.0	22.5	23.5	23.0	23.5	---	---	---
2	19.0	18.0	18.5	23.0	22.5	22.5	24.5	23.5	24.0	---	---	---
3	19.5	18.5	19.0	23.0	22.5	23.0	25.0	24.0	24.5	---	---	---
4	19.5	19.0	19.5	23.5	23.0	23.0	25.0	24.5	24.5	---	---	---
5	20.0	19.0	19.5	23.5	23.0	23.5	25.0	24.0	24.5	18.5	18.0	18.0
6	21.0	19.5	20.5	23.0	22.5	23.0	24.5	24.0	24.5	18.0	17.5	17.5
7	22.0	20.5	21.0	22.5	22.0	22.0	25.5	24.0	24.5	18.0	17.5	17.5
8	21.5	20.5	21.0	22.5	21.5	21.5	24.5	23.5	24.0	17.5	17.0	17.5
9	21.0	20.5	20.5	23.5	20.5	22.0	24.5	24.0	24.0	17.0	16.0	16.5
10	20.5	20.0	20.5	22.0	21.5	21.5	24.0	23.5	24.0	16.0	15.5	16.0
11	20.0	19.0	19.5	22.0	21.5	21.5	23.5	23.0	23.5	16.0	15.5	16.0
12	19.0	18.5	19.0	22.5	22.0	22.0	24.0	23.0	23.5	16.5	15.5	16.0
13	19.5	19.0	19.0	23.5	22.5	23.0	24.0	23.5	23.5	17.0	16.0	16.5
14	20.0	19.0	19.5	24.0	23.5	23.5	24.5	23.5	24.0	16.5	15.5	16.0
15	19.0	19.0	19.0	23.5	23.0	23.5	25.0	24.0	24.5	16.0	15.0	15.5
16	19.0	18.5	18.5	23.5	23.0	23.0	25.5	25.0	25.5	15.5	14.5	15.0
17	19.0	18.5	18.5	23.0	22.0	22.5	26.0	25.5	25.5	15.0	14.0	14.5
18	26.5	19.0	20.5	22.0	21.5	22.0	25.5	25.0	25.0	15.0	14.0	14.5
19	26.5	20.0	21.5	22.5	22.0	22.0	25.5	24.5	25.0	17.0	15.0	16.0
20	20.5	20.0	20.5	22.5	22.0	22.5	24.5	23.0	24.0	17.0	16.0	16.5
21	21.5	20.5	21.0	23.5	22.5	23.0	23.5	22.5	23.0	17.5	16.5	17.0
22	21.5	21.0	21.0	23.5	23.0	23.5	22.5	21.5	22.0	17.5	16.5	17.0
23	21.5	21.0	21.5	24.0	23.5	24.0	22.5	21.5	21.5	17.0	16.0	16.5
24	23.5	18.5	21.0	24.5	23.5	24.0	22.0	21.0	21.5	16.0	14.5	15.5
25	24.0	19.0	21.5	24.5	23.5	24.0	---	---	---	14.5	13.0	13.5
26	22.0	21.0	21.5	24.5	23.5	24.0	---	---	---	13.0	12.0	12.5
27	22.0	21.5	21.5	24.5	23.5	24.0	---	---	---	12.0	10.5	11.5
28	22.0	21.5	21.5	24.0	23.5	24.0	---	---	---	10.5	10.0	10.5
29	22.0	21.5	22.0	24.0	23.0	23.5	---	---	---	10.5	9.5	10.0
30	22.5	22.0	22.0	24.0	23.0	23.5	---	---	---	11.0	10.0	10.5
31	---	---	---	23.5	23.0	23.0	---	---	---	---	---	---
MONTH	26.5	17.5	20.5	24.5	20.5	23.0	---	---	---	---	---	---

MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	9.4	9.2	9.3	11.8	11.1	11.5	12.3	12.2	12.3			
2	9.4	9.3	9.3	11.8	11.5	11.6	12.4	11.9	12.3			
3	9.5	9.0	9.4	11.7	11.5	11.6	12.8	12.4	12.6			
4	9.5	9.2	9.4	12.2	11.7	12.0	13.4	13.1	13.3			
5	9.7	9.3	9.5	12.7	12.2	12.5	14.3	14.0	14.1			
6	10.0	9.7	9.9	12.7	12.7	12.7	15.0	14.7	14.8			
7	10.4	9.6	10.1	12.7	12.2	12.5	15.0	14.7	14.8			
8	10.4	10.0	10.3	12.5	12.4	12.5	14.9	14.6	14.8			
9	10.8	10.4	10.6	13.2	12.5	12.8	14.9	14.7	14.8			
10	11.2	10.8	11.0	13.6	11.9	13.1	15.0	14.9	15.0			
11	11.3	9.2	10.6	13.7	13.1	13.5	15.1	15.0	15.0			
12	10.5	10.0	10.3	14.0	13.7	13.9	15.1	14.8	15.0			
13	10.8	10.3	10.7	14.4	14.0	14.3	15.5	14.9	15.1			
14	11.3	10.8	11.1	14.6	13.3	14.1	---	---	---			
15	11.5	11.3	11.4	14.3	13.1	13.7	---	---	---			
16	11.5	11.2	11.4	14.5	14.4	14.5	---	---	---			
17	11.6	10.4	11.2	15.0	14.1	14.6	---	---	---			
18	11.0	10.9	11.0	15.1	15.0	15.1	---	---	---			
19	11.2	10.9	11.0	---	---	---	---	---	---			
20	11.4	11.1	11.3	---	---	---	---	---	---			
21	11.5	11.4	11.4	---	---	---	---	---	---			
22	11.4	11.3	11.3	---	---	---	---	---	---			
23	11.4	11.2	11.3	11.2	10.8	11.0	---	---	---			
24	11.4	10.5	11.2	11.7	11.3	11.5	---	---	---			
25	11.3	11.0	11.2	11.9	11.7	11.8	---	---	---			
26	11.5	11.3	11.4	11.9	11.8	11.9	---	---	---			
27	11.7	11.2	11.5	11.9	11.8	11.9	---	---	---			
28	11.4	10.9	11.2	11.9	11.9	11.9	---	---	---			
29	11.2	11.0	11.2	12.3	11.9	12.1	---	---	---			
30	11.6	11.3	11.4	12.3	12.2	12.3	---	---	---			
31	11.6	10.5	11.4	---	---	---	---	---	---			
MONTH	11.7	9.0	10.8	---	---	---	---	---	---			
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1										---	---	---
2										---	---	---
3										---	---	---
4										---	---	---
5										---	---	---
6										---	---	---
7										---	---	---
8										---	---	---
9										---	---	---
10										---	---	---
11										---	---	---
12										---	---	---
13										---	---	---
14										---	---	---
15										11.2	10.5	10.8
16										11.1	10.9	11.0
17										11.7	10.9	11.3
18										11.4	10.4	11.0
19										11.1	10.2	10.7
20										10.8	10.1	10.5
21										11.3	9.8	10.6
22										11.0	9.2	10.1
23										10.7	9.7	10.2
24										11.4	8.8	10.3
25										10.1	9.3	9.6
26										11.1	10.2	10.5
27										12.0	11.1	11.5
28										12.7	11.6	12.1
29										13.2	9.4	11.5
30										11.1	10.7	11.0
31										11.3	10.2	10.9
MONTH										---	---	---

MISSISSIPPI RIVER MAIN STEM

05331005 MISSISSIPPI RIVER AT INDUSTRIAL MOLASSES, ST. PAUL, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	10.8	10.5	10.6	7.3	7.1	7.2	7.6	7.3	7.4	---	---	---
2	10.9	10.6	10.8	7.2	6.8	7.1	7.6	7.4	7.5	---	---	---
3	11.1	10.8	10.9	7.6	6.8	7.1	7.7	7.1	7.4	---	---	---
4	11.1	8.8	10.8	7.8	7.6	7.7	7.7	7.4	7.6	---	---	---
5	11.1	7.9	9.6	7.9	7.7	7.8	8.0	7.5	7.7	9.9	9.1	9.3
6	8.1	7.9	8.0	8.2	7.8	8.0	8.0	7.8	7.9	9.4	8.9	9.2
7	8.0	7.1	7.8	8.4	8.2	8.3	7.9	6.4	6.8	10.1	8.0	9.0
8	8.0	6.1	7.2	8.6	4.7	7.7	7.0	6.7	6.8	8.8	7.2	8.1
9	8.2	7.9	8.1	4.7	3.9	4.4	7.0	6.6	6.8	9.2	6.1	7.4
10	8.2	7.8	8.1	8.5	6.0	8.2	7.0	6.1	6.6	10.5	5.1	8.0
11	8.6	6.3	7.9	8.5	5.8	8.0	6.7	6.4	6.6	11.6	8.5	9.7
12	8.9	8.5	8.7	8.6	6.2	8.0	6.8	6.6	6.7	8.9	6.2	8.1
13	8.5	8.1	8.3	8.4	5.0	7.8	7.2	6.7	7.0	11.6	5.0	8.1
14	9.6	7.8	8.3	8.3	8.2	8.3	7.2	6.7	6.9	11.6	8.7	10.4
15	9.7	8.8	9.4	8.3	8.1	8.2	7.7	6.6	7.2	12.1	10.4	11.1
16	8.9	8.7	8.8	8.1	7.8	8.0	8.0	7.6	7.8	13.1	10.6	11.7
17	8.8	8.6	8.7	7.3	6.9	7.1	9.2	8.0	8.5	12.9	11.3	11.9
18	---	---	---	7.7	7.4	7.6	9.8	9.2	9.5	13.4	11.2	12.3
19	---	---	---	7.7	7.5	7.6	10.4	9.8	10.0	12.9	10.7	11.8
20	8.6	8.5	8.6	7.6	5.9	7.4	10.6	9.5	10.2	14.6	11.2	12.9
21	8.6	8.4	8.5	7.1	6.8	6.9	11.5	10.5	10.9	11.3	9.9	10.6
22	8.6	8.3	8.5	7.2	6.9	7.0	13.1	11.6	12.2	10.1	8.0	9.1
23	8.5	8.3	8.4	7.2	7.0	7.1	13.6	12.5	13.1	8.1	6.6	7.4
24	---	---	---	7.3	5.6	6.9	14.0	8.6	10.8	8.1	6.3	6.9
25	---	---	---	7.4	7.1	7.3	---	---	---	9.0	6.8	7.7
26	8.1	7.7	7.9	7.6	7.2	7.4	---	---	---	10.1	8.4	9.3
27	7.9	7.7	7.8	7.5	7.0	7.3	---	---	---	11.3	9.5	10.3
28	8.0	7.3	7.8	7.5	7.1	7.3	---	---	---	12.8	10.0	11.1
29	7.4	7.2	7.3	7.6	7.2	7.4	---	---	---	13.5	11.9	12.6
30	7.4	7.2	7.3	7.8	7.4	7.5	---	---	---	13.6	12.5	12.9
31	---	---	---	7.7	7.4	7.6	---	---	---	---	---	---
MONTH	---	---	---	8.6	3.9	7.5	---	---	---	---	---	---

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN

WATER-QUALITY RECORDS

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 daily record.

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

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water year 1981, 1983-84): Maximum, 821 microsiemens Nov. 15, 1982, minimum, 288 microsiemens Mar. 2, 1981.

pH (water year 1981, 1983-84): Maximum, 8.6 units Apr. 18, 1981, Sept. 17, 18, 1984; minimum, 7.2 Sept. 25, 1984.

WATER TEMPERATURES (water year 1981, 1983-84): Maximum, 27.5°C July 10, 1981; minimum, 0.0°C Jan. 13, 1981.

DISSOLVED OXYGEN (water year 1981, 1983-84): Maximum, 15.7 mg/L Mar. 25, 1981; minimum, 3.4 mg/L June 6, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 740 microsiemens Aug. 4; minimum, 305 microsiemens June 15.

pH: Maximum, 8.6 units Sept. 17-18; minimum, 7.2 units Sept. 25.

WATER TEMPERATURES: Maximum, 24.5° Aug. 3-10, 16-18; minimum, 0.0°C several days during winter.

DISSOLVED OXYGEN: Maximum, 14.7 mg/L Dec. 21; minimum, 3.4 mg/L June 6.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	593	552	573	546	519	531	609	596	602	547	533	540
2	608	570	586	552	532	537	603	574	585	537	517	526
3	597	540	574	568	537	563	607	581	597	538	524	529
4	587	546	564	578	553	566	627	603	613	586	532	547
5	570	556	563	578	535	559	644	603	630	587	549	565
6	572	557	566	580	543	570	666	637	650	565	546	557
7	568	504	537	578	553	565	676	638	662	558	537	545
8	535	492	504	583	459	520	694	670	683	558	536	546
9	493	464	477	499	456	471	705	669	689	547	522	532
10	535	494	515	496	446	467	698	677	688	532	523	527
11	512	396	459	520	496	507	712	691	703	547	517	525
12	485	403	446	513	476	498	705	624	680	563	536	547
13	492	467	476	506	455	487	686	622	658	563	546	556
14	497	473	483	510	455	491	684	636	651	558	517	538
15	494	473	484	510	478	498	663	645	655	526	510	519
16	488	455	475	528	506	520	673	638	657	538	518	524
17	487	446	474	543	515	529	696	668	678	561	541	549
18	464	423	444	561	525	541	697	686	690	562	543	552
19	494	448	470	563	530	548	697	678	685	557	547	551
20	473	443	459	567	523	543	658	652	655	569	552	560
21	482	440	459	583	548	569	654	619	634	571	553	564
22	494	470	483	592	551	572	618	601	609	576	558	567
23	504	483	493	568	537	553	598	575	583	565	537	552
24	508	492	501	564	526	543	594	580	585	549	527	538
25	509	473	494	593	517	552	594	581	588	553	532	540
26	497	479	488	619	576	598	588	572	581	553	526	536
27	512	487	502	632	593	608	575	548	559	562	542	553
28	535	512	524	663	613	637	551	543	547	562	528	543
29	545	509	525	642	573	607	561	550	553	571	542	562
30	557	519	533	607	576	590	563	549	555	570	551	558
31	552	542	547	---	---	---	555	535	544	577	571	574
MONTH	608	396	506	663	446	545	712	535	627	587	510	546

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	570	552	562	516	499	506	489	478	484	552	534	542
2	570	551	561	530	510	516	499	485	491	542	520	526
3	570	544	555	551	532	543	519	499	505	529	513	520
4	567	539	545	556	540	547	558	521	538	532	514	522
5	589	571	579	612	558	589	575	561	567	517	503	509
6	633	571	598	613	586	598	582	546	563	514	499	505
7	630	572	607	624	580	598	585	561	573	522	497	509
8	617	586	600	625	587	603	603	588	594	513	498	505
9	600	552	579	641	625	636	613	602	606	504	489	496
10	601	580	585	658	634	648	622	591	605	496	468	482
11	604	540	569	676	639	663	623	598	608	532	469	504
12	654	565	613	680	641	669	628	611	621	555	533	544
13	665	629	649	683	652	673	612	604	607	570	524	543
14	667	615	639	695	665	680	603	587	593	537	522	528
15	636	599	618	671	666	669	594	584	588	555	528	540
16	638	602	618	630	605	617	602	589	593	571	549	560
17	613	578	594	627	601	613	613	603	607	595	556	572
18	610	595	598	627	602	619	619	596	609	615	587	601
19	620	585	604	623	604	617	619	601	607	630	607	617
20	622	567	592	631	603	619	646	620	632	630	610	620
21	567	518	540	627	614	618	651	632	640	640	626	632
22	528	485	504	659	631	648	666	641	653	646	614	626
23	499	462	475	656	631	639	662	650	656	637	616	625
24	474	458	465	636	604	619	660	660	660	635	615	625
25	462	436	445	622	592	603	688	675	681	627	614	620
26	444	435	439	597	553	569	687	672	678	625	611	618
27	445	427	435	569	545	557	676	639	658	626	603	613
28	487	440	463	550	540	545	663	637	647	627	609	616
29	502	485	490	536	530	533	655	604	625	640	621	629
30	---	---	---	516	487	497	599	551	574	645	611	626
31	---	---	---	491	480	487	---	---	---	614	591	601
MONTH	667	427	556	695	480	598	688	478	602	646	468	567
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	634	606	623	576	568	571	640	619	627	637	543	584
2	633	606	617	594	570	580	619	533	590	580	509	551
3	619	602	611	627	591	609	670	466	588	595	500	557
4	637	602	613	639	627	632	740	662	707	593	510	577
5	627	538	570	653	639	648	710	631	669	588	522	570
6	598	564	578	680	654	671	686	634	654	589	572	580
7	601	550	575	682	672	678	695	487	611	594	525	566
8	540	515	527	696	631	685	582	489	539	525	457	490
9	550	520	535	727	693	706	625	564	589	495	436	463
10	510	480	495	725	665	700	672	604	645	712	485	613
11	440	410	425	678	618	648	589	530	546	680	619	652
12	443	403	431	620	610	614	594	530	554	712	642	673
13	403	346	365	638	615	624	626	556	591	639	551	604
14	349	314	327	635	617	628	639	597	619	650	589	619
15	377	305	351	636	622	629	665	620	632	645	586	599
16	366	351	359	635	611	630	659	633	643	652	572	611
17	364	348	355	629	589	610	679	650	661	570	474	521
18	387	351	365	648	631	639	682	622	648	505	472	485
19	423	387	403	655	637	647	666	625	643	577	500	539
20	471	423	444	652	622	638	708	591	639	590	455	523
21	525	473	497	653	615	635	716	617	648	543	488	514
22	538	471	495	635	615	623	650	579	601	570	502	538
23	514	485	498	636	610	626	659	570	614	546	488	517
24	541	513	528	611	594	605	657	611	628	546	462	505
25	563	540	553	613	604	609	625	584	607	553	444	483
26	576	512	540	609	587	599	644	547	605	530	478	511
27	541	523	530	610	592	605	631	530	587	537	458	498
28	554	537	546	622	589	605	643	539	614	572	429	481
29	565	553	557	602	513	561	663	550	603	443	386	415
30	573	566	569	599	502	546	574	476	555	430	397	410
31	---	---	---	642	500	579	639	485	543	---	---	---
MONTH	637	305	496	727	500	625	740	466	613	712	386	542

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.2	8.1	8.1	8.2	8.1	8.2	8.3	8.2	8.3	7.7	7.7	7.7
2	8.1	8.1	8.1	8.2	8.1	8.2	8.3	8.2	8.2	7.7	7.7	7.7
3	8.1	8.0	8.1	8.2	8.1	8.1	8.2	8.2	8.2	7.7	7.7	7.7
4	8.1	8.0	8.0	8.2	8.1	8.1	8.2	8.1	8.2	7.8	7.7	7.7
5	8.0	7.9	7.9	8.2	8.1	8.2	8.2	8.1	8.1	7.7	7.7	7.7
6	7.9	7.8	7.9	8.2	8.1	8.2	8.2	8.1	8.1	7.8	7.7	7.8
7	8.1	7.8	8.0	8.2	8.2	8.2	8.1	8.1	8.1	7.8	7.7	7.8
8	8.1	8.0	8.1	8.3	8.2	8.3	8.1	8.1	8.1	7.8	7.7	7.8
9	8.1	8.0	8.1	8.3	8.2	8.3	8.1	8.1	8.1	7.8	7.7	7.7
10	8.1	8.0	8.0	8.3	8.2	8.2	8.1	8.1	8.1	7.8	7.7	7.7
11	8.0	7.8	7.9	8.3	8.2	8.2	8.0	8.0	8.0	7.7	7.7	7.7
12	8.1	7.9	8.0	8.4	8.3	8.3	8.0	7.9	8.0	7.7	7.7	7.7
13	8.1	8.0	8.0	8.4	8.3	8.3	8.0	7.9	8.0	7.7	7.7	7.7
14	8.3	8.1	8.2	8.4	8.3	8.3	8.0	7.9	8.0	7.7	7.7	7.7
15	8.3	8.2	8.2	8.4	8.3	8.3	8.0	8.0	8.0	7.7	7.7	7.7
16	8.3	8.2	8.2	8.4	8.3	8.3	8.0	7.9	8.0	7.7	7.7	7.7
17	8.3	8.2	8.2	8.4	8.3	8.3	7.9	7.9	7.9	7.8	7.7	7.7
18	8.2	8.2	8.2	8.4	8.3	8.3	7.9	7.8	7.9	7.7	7.7	7.7
19	8.2	8.2	8.2	8.4	8.3	8.3	7.8	7.8	7.8	7.7	7.7	7.7
20	8.2	8.1	8.1	8.3	8.2	8.3	7.8	7.8	7.8	7.7	7.7	7.7
21	8.3	8.1	8.2	8.3	8.2	8.3	7.8	7.8	7.8	7.7	7.6	7.7
22	8.3	8.2	8.2	8.3	8.3	8.3	7.8	7.8	7.8	7.7	7.7	7.7
23	8.2	8.2	8.2	8.3	8.2	8.2	7.8	7.7	7.8	7.7	7.7	7.7
24	8.3	8.2	8.2	8.3	8.2	8.2	7.8	7.7	7.8	7.7	7.7	7.7
25	8.2	8.2	8.2	8.3	8.3	8.3	7.7	7.7	7.7	7.7	7.7	7.7
26	8.2	8.1	8.2	8.3	8.3	8.3	7.8	7.7	7.7	7.7	7.7	7.7
27	8.2	8.1	8.2	8.3	8.3	8.3	7.8	7.7	7.8	7.7	7.6	7.7
28	8.2	8.1	8.2	8.3	8.3	8.3	7.7	7.7	7.7	7.8	7.6	7.7
29	8.2	8.1	8.2	8.3	8.3	8.3	7.7	7.7	7.7	7.7	7.7	7.7
30	8.2	8.1	8.2	8.3	8.3	8.3	7.7	7.7	7.7	7.7	7.7	7.7
31	8.2	8.1	8.2	---	---	---	7.7	7.7	7.7	7.7	7.7	7.7
MONTH	8.3	7.8	8.1	8.4	8.1	8.3	8.3	7.7	7.9	7.8	7.6	7.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.7	7.6	7.6	7.8	7.8	7.8	7.9	7.8	7.9	8.2	8.0	8.1
2	7.7	7.6	7.7	7.8	7.8	7.8	7.9	7.8	7.9	8.2	8.0	8.1
3	7.7	7.7	7.7	7.8	7.8	7.8	8.1	7.9	8.0	8.1	8.0	8.0
4	7.7	7.7	7.7	7.8	7.8	7.8	8.0	8.0	8.0	8.0	7.9	7.9
5	7.7	7.6	7.7	7.9	7.8	7.8	8.1	8.0	8.1	8.0	7.8	7.9
6	7.7	7.6	7.6	8.2	7.8	8.0	8.1	7.9	8.0	7.9	7.8	7.8
7	7.6	7.6	7.6	8.1	8.0	8.1	8.0	7.9	7.9	7.8	7.7	7.7
8	7.7	7.7	7.7	8.1	8.1	8.1	7.9	7.9	7.9	7.8	7.7	7.8
9	7.7	7.6	7.6	8.1	8.0	8.1	7.9	7.9	7.9	8.1	7.8	7.9
10	7.6	7.6	7.6	8.0	8.0	8.0	8.2	7.9	8.0	8.1	7.9	7.9
11	7.7	7.6	7.6	8.0	7.9	8.0	8.0	8.0	8.0	8.0	7.9	8.0
12	7.6	7.6	7.6	7.9	7.8	7.9	8.0	8.0	8.0	8.1	8.0	8.1
13	7.6	7.6	7.6	8.2	7.8	7.9	8.1	8.0	8.0	8.1	8.0	8.0
14	8.0	7.6	7.7	8.0	8.0	8.0	8.1	8.0	8.1	8.0	7.9	7.9
15	7.8	7.8	7.8	8.1	7.9	8.0	8.2	8.1	8.1	8.2	7.9	8.0
16	7.9	7.8	7.8	8.1	7.9	8.0	8.2	8.1	8.1	8.1	7.9	8.0
17	7.8	7.8	7.8	7.9	7.9	7.9	8.4	8.0	8.2	8.1	7.9	8.0
18	7.8	7.8	7.8	7.9	7.8	7.9	8.3	8.1	8.2	8.0	7.9	7.9
19	7.9	7.8	7.8	7.8	7.8	7.8	8.2	8.0	8.1	7.9	7.9	7.9
20	7.8	7.8	7.8	8.2	7.8	8.0	8.2	8.1	8.2	7.9	7.8	7.8
21	7.8	7.8	7.8	8.0	8.0	8.0	8.2	8.1	8.1	7.8	7.7	7.7
22	8.1	7.8	7.9	8.1	8.0	8.0	8.1	8.1	8.1	7.7	7.6	7.6
23	7.9	7.9	7.9	8.0	7.9	8.0	8.2	8.1	8.2	7.9	7.5	7.7
24	8.1	7.9	8.0	7.9	7.9	7.9	8.2	8.0	8.2	7.8	7.7	7.8
25	7.9	7.8	7.9	7.9	7.9	7.9	8.0	7.9	8.0	7.9	7.7	7.8
26	7.8	7.8	7.8	7.9	7.9	7.9	8.2	8.0	8.1	7.8	7.5	7.8
27	7.8	7.8	7.8	8.2	7.9	8.0	8.1	8.0	8.0	7.9	7.8	7.8
28	7.8	7.8	7.8	8.1	8.0	8.1	8.1	8.0	8.0	7.9	7.8	7.8
29	7.8	7.8	7.8	8.1	8.0	8.1	8.0	7.9	8.0	7.9	7.8	7.8
30	---	---	---	8.1	7.9	8.0	8.0	7.9	8.0	8.1	7.8	7.9
31	---	---	---	7.9	7.8	7.9	---	---	---	8.0	7.9	8.0
MONTH	8.1	7.6	7.7	8.2	7.8	8.0	8.4	7.8	8.0	8.2	7.5	7.9

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.0	7.9	7.9	7.8	7.7	7.8	8.0	7.9	8.0	8.2	7.9	8.0
2	7.9	7.9	7.9	7.7	7.6	7.7	8.0	7.9	8.0	8.1	7.9	8.0
3	8.0	7.8	7.9	7.8	7.7	7.7	8.0	7.8	7.9	8.4	7.9	8.1
4	7.9	7.6	7.8	7.9	7.8	7.8	8.0	7.8	7.9	8.3	8.0	8.1
5	7.7	7.6	7.6	7.9	7.8	7.8	7.9	7.8	7.9	8.4	7.8	8.1
6	7.9	7.6	7.7	8.0	7.8	7.9	7.8	7.7	7.8	8.3	8.0	8.2
7	7.8	7.5	7.7	8.0	7.9	7.9	7.9	7.7	7.8	8.3	8.2	8.2
8	7.6	7.4	7.5	7.9	7.9	7.9	7.8	7.5	7.6	8.3	8.1	8.2
9	7.6	7.4	7.5	7.9	7.7	7.9	7.8	7.6	7.7	8.2	8.0	8.0
10	7.5	7.5	7.5	7.9	7.8	7.9	7.8	7.6	7.7	8.3	7.8	8.1
11	7.5	7.4	7.4	8.0	7.8	7.9	7.8	7.6	7.8	8.4	7.8	8.1
12	7.7	7.3	7.5	8.0	7.9	7.9	7.9	7.7	7.8	8.3	8.1	8.2
13	7.6	7.5	7.6	8.1	7.9	8.0	8.1	7.8	7.9	8.4	8.2	8.3
14	7.6	7.5	7.5	8.1	8.0	8.0	8.1	7.9	8.0	8.2	8.0	8.2
15	7.8	7.5	7.7	8.1	8.0	8.1	8.1	8.0	8.1	8.0	7.7	7.9
16	7.8	7.7	7.8	8.2	8.0	8.1	8.2	7.9	8.1	8.5	7.7	8.1
17	7.7	7.7	7.7	8.2	8.0	8.1	8.1	8.0	8.0	8.6	7.9	8.3
18	7.7	7.7	7.7	8.2	8.0	8.1	8.1	7.8	8.0	8.6	8.3	8.4
19	7.8	7.6	7.7	8.2	8.0	8.1	8.1	7.8	8.0	8.3	8.0	8.1
20	7.7	7.7	7.7	8.1	7.9	8.0	8.2	8.0	8.1	8.1	7.9	8.0
21	7.8	7.7	7.7	8.1	7.8	8.0	8.2	8.0	8.1	8.0	7.8	7.9
22	7.7	7.6	7.7	7.9	7.8	7.9	8.3	8.1	8.1	8.1	7.9	8.0
23	7.8	7.7	7.7	8.0	7.8	7.9	8.2	7.9	8.1	7.9	7.5	7.7
24	7.8	7.7	7.7	8.0	7.9	8.0	8.3	8.0	8.2	7.7	7.3	7.5
25	7.8	7.7	7.7	8.1	7.8	8.0	8.3	8.1	8.2	8.1	7.2	7.5
26	7.8	7.6	7.7	8.1	7.8	8.0	8.3	8.2	8.3	8.4	8.0	8.2
27	7.8	7.7	7.8	8.1	7.9	8.0	8.2	8.0	8.1	8.5	8.2	8.4
28	7.9	7.7	7.8	8.1	7.9	8.1	8.2	8.0	8.1	8.4	8.1	8.2
29	7.8	7.8	7.8	8.1	7.9	8.0	8.3	8.1	8.1	8.1	8.0	8.1
30	7.9	7.7	7.8	8.2	8.0	8.1	8.3	8.0	8.2	8.2	8.1	8.1
31	---	---	---	8.1	8.0	8.1	8.3	8.0	8.2	---	---	---
MONTH	8.0	7.3	7.7	8.2	7.6	8.0	8.3	7.5	8.0	8.6	7.2	8.1

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	16.5	16.0	16.0	9.5	9.5	9.5	2.0	2.0	2.0	.5	.5	.5
2	16.5	16.5	16.5	9.0	9.0	9.0	2.0	1.5	1.5	.5	.5	.5
3	16.5	16.0	16.0	9.0	8.5	9.0	2.0	1.5	1.5	.5	.5	.5
4	16.0	16.0	16.0	9.0	8.5	8.5	2.0	1.5	2.0	.5	.5	.5
5	16.0	15.5	16.0	8.5	8.0	8.0	1.5	1.5	1.5	.5	.5	.5
6	15.5	15.0	15.0	8.0	7.5	8.0	1.5	1.5	1.5	.5	.5	.5
7	16.0	15.0	15.5	8.0	7.5	8.0	1.5	1.0	1.5	.5	.5	.5
8	16.0	15.5	15.5	9.0	8.0	8.5	1.0	1.0	1.0	.5	.5	.5
9	15.5	15.0	15.0	9.0	8.5	8.5	1.0	1.0	1.0	.5	.5	.5
10	15.0	14.5	15.0	8.5	7.5	8.0	1.0	1.0	1.0	.5	.5	.5
11	14.5	14.0	14.5	7.5	7.0	7.5	1.0	1.0	1.0	.5	.5	.5
12	14.0	11.0	13.0	6.5	6.0	6.5	1.0	1.0	1.0	.5	.5	.5
13	11.0	11.0	11.0	6.0	6.0	6.0	1.0	1.0	1.0	.5	.5	.5
14	11.0	10.5	11.0	5.5	5.5	5.5	1.0	1.0	1.0	.5	.5	.5
15	10.5	10.0	10.5	4.5	3.5	4.0	1.0	1.0	1.0	.5	.5	.5
16	10.5	10.0	10.0	4.5	4.5	4.5	1.0	1.0	1.0	.5	.5	.5
17	10.5	10.0	10.0	4.5	4.5	4.5	1.0	1.0	1.0	.5	.5	.5
18	10.5	10.0	10.5	4.5	4.5	4.5	1.0	1.0	1.0	.5	.5	.5
19	10.5	10.5	10.5	5.0	4.5	4.5	1.0	1.0	1.0	1.5	.5	.5
20	10.5	10.0	10.5	5.0	5.0	5.0	.5	.5	.5	.5	.5	.5
21	10.0	10.0	10.0	5.0	5.0	5.0	.5	.5	.5	.5	.5	.5
22	10.0	10.0	10.0	5.0	4.5	5.0	.5	.0	.5	.5	.5	.5
23	10.0	10.0	10.0	4.5	4.0	4.5	.5	.0	.0	.5	.5	.5
24	10.0	10.0	10.0	4.0	3.5	3.5	.5	.0	.5	.5	.5	.5
25	10.0	9.5	9.5	3.5	2.5	3.0	.5	.5	.5	.5	.5	.5
26	10.0	9.5	9.5	2.5	2.5	2.5	.5	.5	.5	.5	.5	.5
27	9.5	9.0	9.5	2.5	2.5	2.5	.5	.5	.5	.5	.5	.5
28	10.0	10.0	10.0	2.5	2.5	2.5	.5	.5	.5	.5	.5	.5
29	10.0	9.5	10.0	2.5	2.0	2.5	.5	.5	.5	.5	.5	.5
30	9.5	9.5	9.5	2.0	2.0	2.0	.5	.5	.5	.5	.5	.5
31	9.5	9.0	9.5	---	---	---	.5	.5	.5	.5	.5	.5
MONTH	16.5	9.0	12.0	9.5	2.0	5.5	2.0	.0	1.0	1.5	.5	.5

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	1.0	.5	.5	1.0	.5	.5	3.0	2.5	2.5	10.0	9.5	9.5
2	1.0	.5	.5	.5	.5	.5	3.5	3.0	3.0	10.0	9.5	9.5
3	.5	.5	.5	.5	.5	.5	3.5	3.0	3.5	10.5	10.0	10.0
4	.5	.5	.5	.5	.5	.5	4.0	3.5	3.5	10.5	10.0	10.5
5	1.0	.5	.5	.5	.5	.5	4.5	4.0	4.0	11.0	10.5	10.5
6	.5	.5	.5	.5	.5	.5	5.0	4.5	4.5	11.5	10.5	11.0
7	.5	.5	.5	.5	.5	.5	5.0	5.0	5.0	11.5	11.5	11.5
8	.5	.5	.5	.5	.5	.5	5.0	5.0	5.0	11.0	10.5	11.0
9	.5	.5	.5	.5	.5	.5	5.0	5.0	5.0	11.0	10.5	10.5
10	.5	.5	.5	.5	.5	.5	6.0	5.0	5.5	11.5	11.0	11.0
11	1.0	.5	.5	.5	.5	.5	6.0	6.0	6.0	12.0	11.0	11.5
12	1.0	1.0	1.0	.5	.5	.5	6.0	6.0	6.0	12.5	12.0	12.5
13	1.0	1.0	1.0	.5	.5	.5	6.0	6.0	6.0	12.5	12.5	12.5
14	1.0	1.0	1.0	.5	.5	.5	6.0	6.0	6.0	13.0	12.5	13.0
15	1.0	1.0	1.0	1.0	.5	.5	7.0	6.5	6.5	14.0	13.5	13.0
16	1.0	1.0	1.0	1.0	.5	.5	7.5	7.0	7.0	14.0	13.5	13.5
17	1.0	1.0	1.0	1.0	.5	.5	8.5	8.0	8.0	14.0	13.5	14.0
18	1.0	1.0	1.0	1.0	.5	1.0	10.0	9.0	9.5	14.5	14.0	14.5
19	1.0	1.0	1.0	1.0	1.0	1.0	9.5	9.0	9.0	15.5	14.5	15.0
20	1.0	.5	1.0	1.0	1.0	1.0	10.0	9.0	9.5	16.5	15.5	16.0
21	1.0	1.0	1.0	1.0	1.0	1.0	10.0	9.5	10.0	17.0	16.5	16.5
22	1.0	1.0	1.0	1.5	.5	1.0	9.5	9.5	9.5	17.0	16.5	16.5
23	1.0	1.0	1.0	1.5	1.0	1.0	9.5	9.0	9.5	17.5	17.0	17.0
24	1.0	.5	1.0	1.5	1.0	1.5	10.5	9.5	9.5	17.0	17.0	17.0
25	1.0	.5	1.0	1.5	1.0	1.5	10.5	10.0	10.5	17.0	16.5	17.0
26	1.0	.5	.5	1.5	1.0	1.5	12.5	10.5	11.5	16.5	16.5	16.5
27	1.0	.5	.5	1.5	1.5	1.5	13.0	12.5	12.5	16.5	16.0	16.0
28	1.0	.5	.5	2.0	1.5	1.5	12.5	12.0	12.0	16.0	16.0	16.0
29	.5	.5	.5	2.0	1.5	2.0	12.0	11.0	11.5	16.0	15.5	16.0
30	---	---	---	2.0	2.0	2.0	11.0	10.0	10.5	17.5	16.0	17.0
31	---	---	---	2.5	2.0	2.0	---	---	---	18.0	17.0	17.5
MONTH	1.0	.5	.5	2.5	.5	1.0	13.0	2.5	7.5	18.0	9.5	13.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	18.5	18.0	18.0	23.0	22.5	23.0	24.0	23.5	23.5	21.5	21.0	21.5
2	19.0	18.0	18.5	23.0	23.0	23.0	24.0	23.5	24.0	21.0	20.0	20.5
3	19.0	18.5	19.0	23.5	23.0	23.0	24.5	24.0	24.0	20.0	19.5	20.0
4	19.0	19.0	19.0	23.5	23.5	23.5	24.5	24.0	24.0	19.0	17.5	18.5
5	19.5	19.0	19.0	23.5	23.5	23.5	24.5	24.0	24.0	18.5	17.5	18.0
6	20.0	19.5	19.5	23.5	23.0	23.0	24.5	24.0	24.5	18.0	17.5	17.5
7	20.5	20.0	20.0	22.5	22.5	22.5	24.5	24.0	24.5	18.0	17.5	17.5
8	20.5	20.0	20.0	23.5	22.0	22.5	24.5	24.0	24.5	17.5	17.5	17.5
9	20.0	20.0	20.0	22.5	22.0	22.5	24.5	24.0	24.5	17.5	17.0	17.5
10	20.0	19.5	20.0	22.5	22.5	22.5	24.5	24.0	24.0	17.0	16.0	16.5
11	19.5	19.0	19.0	23.0	22.5	22.5	24.0	23.5	24.0	16.5	16.0	16.0
12	19.0	19.0	19.0	23.0	22.5	23.0	24.0	23.5	24.0	16.5	16.0	16.0
13	19.5	19.0	19.0	23.5	23.0	23.5	24.0	23.0	23.5	16.5	16.0	16.5
14	19.5	19.0	19.0	23.5	23.5	23.5	23.5	23.0	23.5	16.5	16.0	16.0
15	19.0	19.0	19.0	23.5	23.5	23.5	24.0	23.5	23.5	16.0	16.0	16.0
16	19.0	18.5	19.0	23.5	23.0	23.5	24.5	23.5	24.0	16.0	15.5	16.0
17	19.0	18.5	19.0	23.0	22.5	23.0	24.5	24.0	24.0	15.5	15.5	15.5
18	19.5	19.0	19.0	23.0	22.5	22.5	24.5	24.0	24.0	16.0	15.0	15.5
19	20.0	19.5	19.5	23.0	22.5	22.5	24.0	23.5	24.0	16.5	15.5	16.0
20	20.0	19.5	19.5	23.5	22.5	23.0	24.0	23.0	23.5	17.0	16.0	16.5
21	20.0	19.5	20.0	23.5	23.0	23.5	23.0	23.0	23.0	17.0	16.5	16.5
22	22.0	20.0	21.5	24.0	23.5	23.5	23.0	22.0	22.5	17.0	16.5	17.0
23	22.0	22.0	22.0	24.0	23.5	24.0	22.5	21.5	22.0	17.0	16.5	16.5
24	22.0	22.0	22.0	24.0	23.5	24.0	21.5	21.0	21.5	16.5	16.0	16.0
25	22.0	22.0	22.0	24.0	23.5	24.0	21.5	21.0	21.0	16.0	14.5	15.0
26	22.5	22.0	22.5	24.0	23.5	24.0	21.0	21.0	21.0	14.5	14.0	14.5
27	22.5	22.5	22.5	24.0	23.5	24.0	22.5	21.0	21.5	14.0	13.5	14.0
28	22.5	22.5	22.5	24.0	23.5	23.5	22.5	21.5	22.0	13.5	10.0	11.5
29	23.0	22.5	22.5	24.0	23.5	23.5	22.5	22.0	22.0	10.0	9.5	9.5
30	23.0	22.5	22.5	23.5	23.5	23.5	22.0	21.5	22.0	10.0	9.5	9.5
31	---	---	---	23.5	23.5	23.5	22.0	21.5	21.5	---	---	---
MONTH	23.0	18.0	20.0	24.0	22.0	23.0	24.5	21.0	23.0	21.5	9.5	16.0

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.4	8.0	8.2	10.0	9.5	9.8	12.2	12.0	12.1	12.9	12.7	12.8
2	8.3	8.0	8.1	10.2	9.8	10.0	12.4	12.2	12.3	13.3	12.6	12.9
3	8.3	7.9	8.0	10.1	9.8	9.9	12.6	12.4	12.5	12.8	12.6	12.7
4	7.9	7.4	7.6	10.4	9.7	10.0	13.0	12.7	12.8	12.8	12.4	12.6
5	8.0	7.4	7.6	10.5	10.0	10.2	13.4	12.8	13.1	12.6	12.3	12.4
6	8.4	7.8	8.0	10.5	10.1	10.3	13.8	12.4	13.1	12.5	12.3	12.4
7	8.5	7.9	8.1	10.6	10.1	10.3	14.0	12.0	13.0	12.7	12.4	12.5
8	8.4	7.9	8.1	10.5	10.2	10.3	13.9	13.7	13.8	12.5	12.3	12.4
9	8.5	8.3	8.5	10.1	9.7	9.9	14.4	14.1	14.2	12.6	12.3	12.4
10	8.9	8.4	8.7	10.3	9.6	9.9	14.2	14.0	14.1	13.3	12.3	12.9
11	8.4	7.6	7.9	10.9	10.1	10.4	14.5	14.1	14.4	13.4	13.0	13.3
12	8.9	7.8	8.2	11.3	10.7	11.0	14.3	13.7	14.1	13.0	12.5	12.7
13	8.9	8.3	8.5	11.2	10.9	11.0	14.2	13.3	13.8	12.8	12.4	12.6
14	9.5	8.2	8.8	11.1	10.9	11.0	13.5	13.3	13.4	13.1	12.5	12.8
15	9.6	9.4	9.5	11.5	10.8	11.1	13.4	13.3	13.3	13.4	13.2	13.3
16	9.6	9.2	9.4	11.6	11.1	11.3	13.6	13.2	13.3	13.5	13.0	13.2
17	9.7	9.4	9.5	11.5	11.2	11.3	14.4	13.0	13.4	13.4	13.0	13.2
18	9.7	9.4	9.6	11.5	11.1	11.2	13.8	13.2	13.4	13.1	12.5	12.9
19	10.0	9.3	9.6	11.5	10.8	11.1	14.1	13.1	13.5	12.8	12.0	12.4
20	10.0	9.6	9.8	10.7	10.2	10.4	13.5	13.3	13.4	12.0	11.9	12.0
21	10.0	9.1	9.6	10.5	10.2	10.3	14.7	13.3	14.2	12.0	11.8	11.9
22	9.1	9.0	9.0	10.7	10.4	10.6	14.4	13.3	13.7	11.9	11.6	11.8
23	9.2	9.0	9.0	11.2	10.7	11.0	14.2	13.7	13.9	11.9	11.6	11.7
24	9.1	8.9	8.9	11.3	11.1	11.1	14.2	13.6	13.8	11.9	11.7	11.8
25	9.2	8.9	9.1	11.8	11.3	11.6	14.3	13.1	13.7	11.9	11.6	11.7
26	9.3	8.5	8.8	12.0	11.8	11.9	13.6	12.9	13.1	11.9	11.6	11.7
27	8.8	8.6	8.7	12.1	11.9	12.0	13.0	12.9	13.0	11.8	11.7	11.8
28	9.9	8.5	9.3	12.2	12.0	12.1	13.0	12.9	12.9	12.3	11.6	11.9
29	10.0	9.7	9.8	12.2	12.0	12.1	12.9	12.7	12.8	12.1	11.6	11.8
30	10.2	9.9	10.0	12.1	11.9	12.0	13.5	12.6	13.0	12.0	11.7	11.8
31	10.1	9.9	10.0	---	---	---	13.1	12.8	12.9	11.7	11.5	11.5
MONTH	10.2	7.4	8.8	12.2	9.5	10.8	14.7	12.0	13.4	13.5	11.5	12.4
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	11.8	11.4	11.6	12.9	12.7	12.9	12.3	12.1	12.2	11.8	9.6	10.6
2	11.8	11.5	11.6	13.0	12.8	12.9	12.1	11.9	12.0	11.9	11.2	11.6
3	12.0	11.6	11.8	13.0	12.7	12.9	12.0	11.7	11.8	11.6	11.2	11.4
4	12.1	11.8	11.9	13.0	12.8	12.9	11.7	11.6	11.6	11.2	10.6	10.9
5	12.6	11.7	12.0	12.8	12.6	12.7	11.5	11.4	11.5	11.5	10.4	10.9
6	12.0	11.3	11.7	12.8	12.5	12.7	11.3	11.1	11.2	11.1	9.9	10.5
7	11.9	11.4	11.7	12.8	12.6	12.7	11.1	11.0	11.0	9.9	9.1	9.3
8	11.4	11.0	11.2	12.8	12.6	12.7	11.0	10.9	10.9	9.3	8.8	9.1
9	11.7	11.1	11.4	12.8	12.6	12.7	10.9	10.8	10.9	10.8	8.6	9.7
10	11.4	11.1	11.3	12.7	12.6	12.7	10.9	10.1	10.4	11.3	10.4	10.8
11	11.7	11.2	11.4	12.8	12.7	12.8	10.2	9.9	10.0	11.1	10.3	10.6
12	11.4	10.9	11.2	12.9	12.7	12.8	10.0	9.7	9.9	11.1	10.1	10.5
13	11.5	11.1	11.3	12.8	12.6	12.7	10.1	9.7	9.9	10.1	9.2	9.6
14	11.6	11.1	11.3	12.6	12.4	12.5	10.2	9.9	10.1	10.3	9.3	9.8
15	11.7	11.2	11.4	12.4	12.2	12.3	10.2	9.9	10.0	10.6	9.6	10.1
16	11.7	11.2	11.4	12.5	12.2	12.4	10.0	9.7	9.9	10.2	9.5	9.8
17	11.7	11.4	11.6	12.7	12.5	12.6	10.4	9.6	10.1	9.8	9.3	9.6
18	11.8	11.6	11.7	12.7	12.5	12.6	10.5	10.0	10.2	10.3	8.9	9.6
19	11.9	11.5	11.7	12.6	12.4	12.5	10.4	9.8	10.1	10.1	9.4	9.8
20	12.1	11.8	11.9	12.6	12.4	12.4	10.2	9.6	9.9	9.9	9.2	9.6
21	12.2	11.9	12.0	12.5	11.8	12.1	10.2	9.6	9.9	9.7	9.0	9.4
22	12.4	12.0	12.2	12.0	11.8	11.9	9.9	9.5	9.7	9.4	8.8	9.1
23	12.3	12.1	12.2	12.1	11.8	11.9	9.7	9.3	9.5	9.2	8.6	8.9
24	12.6	12.3	12.4	12.1	11.9	12.0	11.5	9.4	10.4	8.8	8.4	8.6
25	12.6	12.4	12.5	12.1	11.9	12.0	11.5	10.7	11.1	8.8	8.2	8.5
26	12.7	12.5	12.6	12.1	11.9	12.0	11.2	10.5	10.9	8.8	7.4	8.4
27	13.0	12.7	12.8	12.0	11.8	11.9	10.3	9.5	9.8	8.7	7.9	8.3
28	12.9	12.7	12.8	11.8	11.7	11.8	9.5	9.1	9.3	8.5	7.8	8.2
29	12.9	12.8	12.8	12.4	11.7	12.0	9.3	9.0	9.2	8.2	7.6	7.9
30	---	---	---	12.6	12.4	12.5	9.5	8.9	9.1	9.0	7.3	8.3
31	---	---	---	12.5	12.3	12.4	---	---	---	9.0	8.1	8.6
MONTH	13.0	10.9	11.8	13.0	11.7	12.5	12.3	8.9	10.4	11.9	7.3	9.6

MISSISSIPPI RIVER MAIN STEM

05331545 MISSISSIPPI RIVER AT FIFTH STREET AT NEWPORT, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.6	7.8	8.2	5.6	5.2	5.4	6.1	5.3	5.7	6.4	5.9	6.1
2	8.6	7.4	7.9	5.1	4.8	4.9	6.0	4.4	5.2	6.6	6.0	6.3
3	8.1	7.2	7.7	7.1	4.6	6.1	5.8	4.3	5.3	6.8	6.3	6.5
4	7.5	5.2	6.6	7.2	6.8	7.0	5.7	5.2	5.4	6.9	6.4	6.7
5	5.1	4.0	4.4	7.0	6.7	6.8	5.5	5.1	5.3	7.6	6.9	7.3
6	7.3	3.4	5.3	6.7	6.3	6.5	5.5	5.1	5.3	7.6	6.9	7.3
7	7.1	4.5	5.8	6.4	5.8	6.1	5.7	5.3	5.5	8.1	6.8	7.4
8	7.0	5.4	6.2	---	---	---	5.2	4.3	4.6	8.1	7.4	7.7
9	7.2	5.9	6.5	---	---	---	5.9	4.4	5.0	7.4	6.3	7.1
10	7.5	6.3	6.9	---	---	---	5.9	5.4	5.7	8.6	6.1	7.3
11	7.7	6.6	7.2	---	---	---	5.8	5.4	5.6	8.3	7.7	8.0
12	7.9	7.0	7.5	6.3	5.9	6.1	5.6	4.9	5.3	8.2	7.7	8.0
13	7.8	6.6	7.3	6.9	5.8	6.3	6.1	4.7	5.5	9.1	8.6	8.8
14	6.9	6.1	6.5	6.7	5.9	6.4	5.9	5.4	5.7	10.3	9.1	9.7
15	8.5	6.0	7.6	6.7	6.1	6.3	6.0	5.3	5.6	10.0	9.1	9.6
16	8.8	8.4	8.6	6.8	5.6	6.3	5.4	4.5	5.0	9.8	9.4	9.6
17	8.7	8.1	8.5	6.5	6.0	6.2	---	---	---	11.3	9.7	10.7
18	8.2	7.2	7.9	6.5	6.1	6.3	---	---	---	11.6	10.7	11.2
19	8.2	7.2	7.6	6.4	5.6	6.0	---	---	---	11.2	9.8	10.6
20	8.4	8.0	8.2	6.3	5.3	5.9	---	---	---	10.9	8.9	9.8
21	8.0	7.8	8.0	6.3	5.6	5.9	---	---	---	11.2	8.6	10.2
22	7.8	7.4	7.7	5.8	5.1	5.4	---	---	---	10.4	8.6	9.5
23	7.8	7.5	7.6	5.8	5.0	5.4	---	---	---	9.6	8.0	8.8
24	7.5	7.1	7.4	5.8	5.7	5.7	5.9	5.8	5.8	8.4	7.0	7.7
25	7.1	6.5	6.8	5.6	5.2	5.4	6.2	5.5	5.9	7.7	6.7	7.2
26	7.5	6.3	6.9	5.2	4.5	4.8	6.0	5.2	5.7	7.5	6.9	7.2
27	7.4	7.1	7.3	6.1	4.1	5.3	5.5	4.5	5.2	7.7	7.0	7.3
28	7.2	6.7	6.9	5.9	5.2	5.8	6.2	4.8	5.7	10.6	7.6	9.4
29	6.7	6.2	6.4	6.2	5.6	5.9	6.5	5.9	6.2	10.9	10.4	10.6
30	6.2	5.7	6.0	6.6	6.0	6.3	6.5	5.8	6.1	10.7	10.3	10.5
31	---	---	---	6.8	6.4	6.6	6.3	5.6	6.0	---	---	---
MONTH	8.8	3.4	7.1	---	---	---	---	---	---	11.6	5.9	8.5

WATER-QUALITY RECORDS

DISSOLVED OXYGEN: Maximum, 15.9 mg/L Dec. 12; minimum, 2.4 mg/L Aug. 19.

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	OCTOBER				NOVEMBER				DECEMBER				JANUARY		
1	529	509	520		499	487	493		---	---	---		584	576	579
2	528	503	516		505	489	496		---	---	---		583	567	575
3	522	501	515		514	492	502		---	---	---		588	572	582
4	516	496	507		523	502	515		---	---	---		590	553	576
5	508	496	504		526	504	517		---	---	---		600	567	583
6	509	502	505		528	505	519		---	---	---		584	572	579
7	509	499	505		525	512	519		---	---	---		584	570	577
8	514	495	501		529	487	508		---	---	---		---	---	---
9	495	478	485		510	488	496		640	632	635		---	---	---
10	514	485	501		522	473	500		663	630	650		---	---	---
11	502	444	483		536	523	529		664	642	652		567	563	564
12	477	428	452		530	516	523		657	638	646		579	567	574
13	484	474	478		536	503	518		647	608	624		587	574	583
14	514	484	498		521	497	512		633	618	628		585	568	580
15	515	502	508		539	483	507		654	623	636		569	554	565
16	508	493	502		497	486	494		663	648	655		567	552	563
17	508	476	495		541	489	516		675	647	661		579	568	575
18	481	462	475		545	529	537		667	653	659		583	565	575
19	495	472	483		556	530	540		669	643	659		578	564	570
20	493	479	486		544	523	533		658	648	651		585	575	580
21	478	460	467		565	544	551		---	---	---		591	578	585
22	472	458	465		567	536	549		---	---	---		598	573	586
23	477	463	470		555	531	542		---	---	---		599	573	586
24	480	468	475		568	540	561		---	---	---		574	566	570
25	480	467	475		591	557	573		---	---	---		572	565	569
26	473	462	467		595	591	592		---	---	---		570	553	562
27	481	464	475		599	594	597		---	---	---		570	553	565
28	492	474	483		611	600	605		---	---	---		573	561	568
29	497	479	489		---	---	---		601	598	599		578	561	572
30	513	481	498		---	---	---		605	583	596		576	571	573
31	502	490	498		---	---	---		586	575	580		582	571	579
MONTH	529	428	490		---	---	---		---	---	---		---	---	---

MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

SPECIFIC CONDUCTANCE (MICROSTEMENS/CM AT 25-DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	583	574	579	536	529	533	---	---	---	594	572	584
2	579	574	577	544	537	540	---	---	---	585	570	578
3	584	568	578	563	545	556	---	---	---	580	565	571
4	576	567	570	565	555	560	---	---	---	577	566	570
5	592	482	532	583	566	573	---	---	---	568	556	561
6	484	467	478	629	507	584	543	532	537	561	553	556
7	---	---	---	512	507	509	561	541	549	569	554	562
8	---	---	---	595	503	563	568	560	564	568	556	559
9	---	---	---	598	591	594	577	568	571	563	548	555
10	---	---	---	600	594	596	580	576	578	---	---	---
11	---	---	---	---	---	---	594	579	585	---	---	---
12	---	---	---	---	---	---	598	589	594	569	551	560
13	---	---	---	---	---	---	591	584	587	574	546	558
14	---	---	---	---	---	---	585	575	579	564	543	533
15	631	614	621	---	---	---	578	574	575	556	547	55
16	637	613	626	619	579	602	581	575	577	568	555	558
17	623	600	612	618	582	604	588	582	585	585	562	570
18	615	609	612	618	592	604	591	588	590	597	546	586
19	625	603	613	613	593	603	602	592	596	609	589	598
20	626	593	613	610	596	602	618	602	610	609	599	604
21	593	562	579	605	596	600	626	614	620	624	607	613
22	567	545	556	612	592	603	638	620	629	626	593	610
23	554	532	541	619	599	604	656	627	646	609	588	596
24	540	530	534	618	597	605	674	649	662	607	597	601
25	531	515	521	615	594	602	676	667	672	600	593	596
26	520	516	517	610	593	599	680	659	668	606	595	600
27	519	512	515	606	587	594	661	632	649	604	597	600
28	526	519	521	601	586	593	654	623	644	607	598	601
29	527	521	523	589	577	582	634	604	619	610	604	606
30	---	---	---	591	575	579	612	589	598	617	606	610
31	---	---	---	593	572	579	---	---	---	617	594	602
MONTH	---	---	---	---	---	---	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	620	605	612	573	569	570	650	635	643	627	615	623
2	623	608	612	585	572	578	641	603	621	625	588	602
3	616	604	611	604	584	594	615	556	578	598	577	587
4	620	604	611	611	605	609	643	597	624	598	575	586
5	628	572	595	620	611	618	613	595	602	598	588	593
6	605	589	594	637	620	631	617	587	600	598	587	591
7	609	543	596	642	635	638	588	536	576	600	589	596
8	538	449	497	649	639	644	551	518	540	606	594	600
9	583	527	532	665	648	654	568	537	548	607	587	597
10	527	489	501	666	632	652	599	569	585	618	586	602
11	483	470	475	644	634	639	597	538	557	626	618	622
12	482	430	449	639	630	634	556	541	548	638	613	623
13	440	395	409	640	633	636	575	553	561	637	536	578
14	398	380	387	638	628	634	582	569	575	582	553	568
15	391	372	383	639	632	636	603	581	593	583	570	574
16	388	376	382	640	628	635	611	603	608	594	565	575
17	385	376	379	626	613	620	627	610	621	591	509	549
18	399	379	386	631	622	628	633	615	626	514	503	509
19	422	399	409	637	625	630	618	612	615	544	509	526
20	453	423	438	634	621	629	726	610	672	587	542	554
21	485	453	465	---	---	---	729	711	721	588	535	557
22	509	485	497	---	---	---	733	694	712	561	546	552
23	522	506	515	---	---	---	716	621	657	570	548	560
24	539	522	530	640	630	635	628	617	623	568	539	551
25	555	538	546	642	638	640	617	599	608	565	518	536
26	565	554	557	640	627	635	605	584	595	544	507	528
27	554	544	549	641	628	636	607	569	591	542	527	534
28	562	553	557	643	623	633	586	576	581	542	508	525
29	568	560	563	636	621	627	607	578	593	536	517	531
30	571	568	570	635	621	627	603	575	584	519	512	517
31	---	---	---	648	616	632	612	587	595	---	---	---
MONTH	628	372	507	---	---	---	733	518	605	638	503	568

MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	7.9	7.8	7.9	7.6	7.6	7.6	7.9	7.8	7.9	8.1	8.1	8.1
2	8.0	7.8	7.9	7.7	7.6	7.6	8.0	7.7	7.9	8.1	8.0	8.1
3	8.0	7.9	7.9	7.7	7.6	7.6	7.9	7.7	7.8	8.1	8.1	8.1
4	8.0	7.8	7.9	7.7	7.6	7.7	7.7	7.7	7.7	8.3	8.1	8.2
5	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.5	7.6	8.2	8.1	8.1
6	7.8	7.6	7.7	7.8	7.7	7.7	7.9	7.5	7.7	8.1	8.0	8.1
7	7.8	7.5	7.7	7.8	7.8	7.8	7.8	7.7	7.8	8.1	8.0	8.1
8	7.5	7.4	7.4	7.8	7.8	7.8	7.7	7.4	7.5	8.1	8.0	8.1
9	7.7	7.3	7.4	7.9	7.8	7.8	7.8	7.4	7.6	8.1	8.0	8.0
10	7.5	7.4	7.5	7.8	7.7	7.8	7.9	7.8	7.8	8.1	8.0	8.0
11	7.5	7.2	7.5	7.9	7.7	7.8	7.9	7.8	7.9	8.1	8.1	8.1
12	7.5	7.1	7.3	7.8	7.7	7.7	7.9	7.8	7.9	8.1	8.1	8.1
13	7.7	7.1	7.5	7.9	7.6	7.7	8.0	7.8	7.9	8.1	8.0	8.0
14	7.6	7.6	7.6	7.9	7.8	7.9	7.8	7.7	7.8	8.0	8.0	8.0
15	7.6	7.5	7.6	7.9	7.8	7.9	8.0	7.8	7.9	8.1	8.0	8.0
16	7.6	7.5	7.6	8.2	7.8	8.0	7.9	7.8	7.9	8.1	8.1	8.1
17	7.6	7.5	7.5	8.0	7.9	7.9	7.9	7.8	7.8	8.1	8.0	8.0
18	7.6	7.5	7.5	8.0	8.0	8.0	7.8	7.8	7.8	8.0	8.0	8.0
19	7.5	7.5	7.5	8.0	7.8	8.0	7.9	7.8	7.8	8.0	8.0	8.0
20	7.5	7.5	7.5	8.0	7.9	8.0	8.0	7.9	8.0	8.1	8.0	8.0
21	7.5	7.5	7.5	---	---	---	8.0	7.9	8.0	8.1	8.0	8.1
22	7.5	7.5	7.5	---	---	---	8.0	7.9	7.9	8.1	8.0	8.1
23	7.5	7.5	7.5	---	---	---	8.3	7.9	8.1	8.1	8.0	8.1
24	7.5	7.5	7.5	8.0	8.0	8.0	8.3	8.2	8.2	8.1	8.0	8.1
25	7.6	7.5	7.5	8.0	8.0	8.0	8.3	8.2	8.2	8.1	8.0	8.0
26	7.5	7.5	7.5	8.0	7.9	8.0	8.2	8.2	8.2	8.1	8.0	8.1
27	7.7	7.7	7.7	8.1	7.9	8.0	8.2	8.2	8.2	8.1	8.1	8.1
28	7.7	7.6	7.6	8.0	8.0	8.0	8.2	8.1	8.1	8.1	8.0	8.1
29	7.6	7.6	7.6	8.0	7.9	8.0	8.2	8.1	8.1	8.1	8.0	8.0
30	7.6	7.6	7.6	8.0	7.9	7.9	8.1	8.0	8.0	8.0	8.0	8.0
31	---	---	---	8.0	7.8	7.9	8.1	8.0	8.0	---	---	---
MONTH	8.0	7.1	7.6	---	---	---	8.3	7.4	7.9	8.3	8.0	8.1

TEMPERATURE, WATER (DEG.C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	OCTOBER				NOVEMBER				DECEMBER				JANUARY		
1	18.5	17.5	18.0		9.0	8.5	8.5		---	---	---		.5	.0	.0
2	19.0	18.5	18.5		9.5	9.0	9.0		---	---	---		.5	.0	.0
3	18.5	17.5	18.0		9.5	9.0	9.5		---	---	---		.5	.0	.5
4	17.5	17.0	17.0		9.0	8.5	9.0		---	---	---		.5	.0	.5
5	17.0	16.5	17.0		8.5	7.5	8.0		---	---	---		.5	.0	.5
6	16.5	15.5	16.0		7.5	7.5	7.5		---	---	---		.5	.5	.5
7	16.0	15.0	15.5		8.0	7.0	7.5		---	---	---		.5	.0	.5
8	14.5	14.0	14.5		8.0	7.5	7.5		---	---	---		---	---	---
9	14.0	13.5	13.5		7.5	6.5	7.0		.5	.0	.5		---	---	---
10	13.5	12.5	13.0		7.0	6.0	6.5		.5	.5	.5		---	---	---
11	12.5	11.5	12.5		6.5	5.5	6.0		.5	.5	.5		.5	.0	.5
12	11.5	11.0	11.5		5.5	5.0	5.0		.5	.5	.5		.5	.5	.5
13	10.5	10.0	10.5		5.0	4.5	4.5		.5	.5	.5		.5	.5	.5
14	10.5	10.0	10.0		4.5	4.5	4.5		1.0	.5	.5		.5	.5	.5
15	10.0	9.0	9.5		4.5	4.0	4.0		---	---	---		.5	.5	.5
16	9.5	9.0	9.5		4.5	4.0	4.5		---	---	---		.5	.0	.5
17	9.5	9.0	9.0		4.5	4.0	4.5		---	---	---		.5	.0	.5
18	9.5	9.0	9.0		4.5	4.5	4.5		---	---	---		.5	.0	.5
19	10.0	9.0	9.5		5.5	4.5	5.0		---	---	---		1.0	.5	.5
20	10.0	9.5	10.0		5.5	5.0	5.5		---	---	---		---	---	---
21	9.5	9.5	9.5		5.5	5.0	5.5		---	---	---		---	---	---
22	10.0	9.5	9.5		5.5	4.0	4.5		---	---	---		---	---	---
23	9.5	9.5	9.5		5.5	3.0	3.5		---	---	---		---	---	---
24	9.5	9.5	9.5		---	---	---		---	---	---		---	---	---
25	9.5	9.0	9.0		---	---	---		---	---	---		.5	.5	.5
26	9.5	9.0	9.0		---	---	---		---	---	---		.5	.5	.5
27	9.0	8.5	8.5		---	---	---		---	---	---		.5	.0	.5
28	9.5	9.0	9.0		---	---	---		---	---	---		.5	.5	.5
29	9.5	9.0	9.0		---	---	---		.0	.0	.0		.5	.0	.5
30	9.0	8.5	9.0		---	---	---		.5	.0	.0		.5	.0	.0
31	8.5	8.5	8.5		---	---	---		.5	.0	.0		.5	.0	.5
MONTH	19.0	8.5	11.5		---	---	---		---	---	---		---	---	---

MISSISSIPPI RIVER MAIN STEM

191

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.5	.5	.5	1.0	.0	.5	---	---	---	8.5	7.0	8.0
2	1.0	.5	.5	1.0	.0	.5	---	---	---	9.0	8.0	8.5
3	1.0	.5	.5	.5	.0	.5	---	---	---	10.0	8.5	9.0
4	.5	.0	.5	.5	.0	.0	---	---	---	10.5	9.5	10.0
5	.0	.0	.0	.0	.0	.0	---	---	---	11.0	10.0	10.5
6	.0	.0	.0	.5	.5	.5	6.5	5.5	6.0	11.5	10.5	11.0
7	---	---	---	.5	.0	.5	7.0	6.0	6.5	12.0	11.5	11.5
8	---	---	---	.5	.0	.5	7.0	6.5	6.5	11.5	10.0	11.0
9	---	---	---	.5	.0	.5	7.0	6.5	6.5	11.0	10.0	10.5
10	---	---	---	.5	.0	.5	7.0	7.0	7.0	12.0	10.5	11.5
11	---	---	---	---	---	---	7.0	6.5	6.5	---	---	---
12	---	---	---	---	---	---	6.5	6.5	6.5	14.0	13.5	13.5
13	---	---	---	---	---	---	6.5	6.5	6.5	14.0	13.5	13.5
14	---	---	---	---	---	---	7.0	6.5	6.5	---	---	---
15	1.0	.5	.5	---	---	---	7.5	6.5	7.0	15.5	13.5	14.5
16	.5	.5	.5	1.0	.5	.5	8.5	7.5	8.0	15.5	14.5	14.5
17	1.0	.5	1.0	.5	.5	.5	9.0	8.0	8.5	17.0	14.5	15.5
18	1.0	1.0	1.0	1.0	.5	.5	9.5	8.5	9.0	17.0	13.0	16.0
19	1.0	.5	1.0	1.0	.5	.5	10.0	9.0	9.5	17.5	16.5	17.0
20	1.0	.5	1.0	1.0	.5	.5	11.0	9.5	10.5	19.0	17.0	18.0
21	1.5	.5	1.0	1.0	.5	.5	11.0	10.5	10.5	18.5	18.0	18.0
22	1.5	.5	1.0	1.0	.5	1.0	10.5	9.5	10.0	18.5	16.5	17.5
23	1.0	.5	1.0	1.5	1.0	1.0	10.5	9.5	10.0	17.5	16.0	17.0
24	1.0	.5	.5	1.5	1.0	1.0	11.0	9.5	10.5	17.0	16.5	17.0
25	1.0	.5	.5	1.5	1.0	1.0	11.0	10.5	11.0	17.0	16.0	16.5
26	1.0	.0	.5	1.5	1.0	1.0	12.5	11.0	11.5	16.5	15.5	16.0
27	.5	.0	.5	1.5	1.0	1.0	13.5	11.5	12.5	15.5	15.0	15.0
28	.5	.0	.5	2.0	1.0	1.5	12.5	11.0	11.5	15.5	14.5	15.0
29	.5	.0	.5	1.5	1.5	1.5	11.0	8.5	10.0	17.0	14.0	15.5
30	---	---	---	1.5	1.0	1.5	8.5	7.0	8.0	17.5	16.0	16.5
31	---	---	---	2.0	1.5	1.5	---	---	---	18.0	16.5	17.0
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	18.5	17.5	18.0	23.5	23.0	23.0	24.0	23.0	23.5	22.0	21.0	21.5
2	19.5	18.0	18.5	24.0	23.0	23.5	24.0	23.5	24.0	21.0	19.0	20.0
3	20.0	18.5	19.5	24.0	23.5	23.5	24.5	24.0	24.0	19.5	18.5	19.0
4	19.5	19.0	19.5	24.0	23.5	23.5	24.5	24.0	24.5	18.5	18.0	18.5
5	19.5	14.0	16.5	24.0	23.5	23.5	25.0	24.0	24.5	18.5	17.0	17.5
6	20.0	15.0	16.0	23.5	22.5	23.0	25.5	24.0	24.5	17.5	16.5	17.0
7	18.0	16.0	17.0	23.0	22.0	22.5	25.0	24.5	24.5	17.0	16.0	16.5
8	22.0	16.5	19.0	22.0	21.5	22.0	25.5	24.0	24.5	17.0	16.5	16.5
9	22.0	15.5	20.5	22.0	21.5	21.5	25.0	24.0	24.5	16.5	16.0	16.0
10	16.5	15.5	16.0	22.0	22.0	22.0	25.0	24.0	24.5	16.0	15.5	16.0
11	20.0	14.5	16.0	22.0	21.0	21.5	24.5	23.5	24.0	16.5	15.5	16.0
12	23.0	19.5	21.0	22.5	21.0	22.0	24.5	23.0	24.0	16.5	15.0	15.5
13	23.5	19.0	20.5	23.5	22.0	22.5	24.0	23.0	23.5	16.5	15.5	16.0
14	20.0	19.5	19.5	23.5	22.5	23.0	24.5	23.0	23.5	15.5	15.0	15.0
15	20.0	19.0	19.5	23.5	22.5	23.0	25.0	23.5	24.0	15.5	14.5	15.0
16	19.0	18.5	9.0	23.0	22.0	22.5	25.0	24.0	24.5	15.5	14.5	15.0
17	19.0	18.5	19.0	22.0	21.5	21.5	25.0	24.5	25.0	15.0	14.0	14.5
18	20.0	19.0	19.5	22.0	21.0	21.5	25.5	24.5	25.0	15.0	14.0	14.5
19	21.0	20.0	20.5	23.5	21.0	22.0	25.0	24.0	24.5	16.0	14.5	15.0
20	21.0	20.0	20.5	22.5	21.5	21.5	24.5	23.5	24.0	16.5	15.0	15.5
21	20.5	15.5	17.5	---	---	---	24.0	23.0	23.5	17.0	15.5	16.0
22	16.5	15.0	16.0	---	---	---	23.0	21.5	22.5	16.5	16.0	16.0
23	18.0	16.0	17.5	---	---	---	27.0	21.0	24.0	16.5	16.0	16.0
24	17.5	16.5	17.0	24.0	23.5	24.0	26.0	21.5	23.5	16.0	15.0	15.5
25	22.0	16.5	19.0	24.0	23.5	24.0	21.5	20.5	21.0	15.0	12.5	13.5
26	23.0	22.0	22.5	24.0	23.5	23.5	21.5	20.5	21.0	12.5	12.0	12.0
27	22.5	22.0	22.5	24.0	23.0	23.5	23.0	21.0	21.5	12.0	11.5	12.0
28	23.0	22.0	22.5	24.0	23.0	23.5	23.0	21.5	22.0	11.0	10.0	10.5
29	23.0	22.5	22.5	24.0	23.0	23.5	23.0	22.0	22.5	10.0	9.5	9.5
30	23.0	22.5	23.0	23.5	22.5	23.0	23.0	22.0	22.5	10.0	9.0	9.5
31	---	---	---	23.5	22.5	23.0	22.5	21.5	22.0	---	---	---
MONTH	23.5	14.0	19.0	---	---	---	27.0	20.5	23.5	22.0	9.0	15.5

MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

[illegible]

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	FEBRUARY				MARCH				APRIL				MAY		
1	10.2	9.8	10.0		12.6	12.5	12.5		---	---	---		13.6	10.5	11.8
2	10.2	9.8	10.0		12.7	12.4	12.6		---	---	---		13.1	10.0	12.1
3	12.3	9.9	11.3		12.7	12.4	12.6		---	---	---		11.8	9.8	10.6
4	12.3	11.8	12.1		12.8	12.6	12.7		---	---	---		10.8	8.4	9.8
5	12.7	10.7	12.2		12.7	12.6	12.6		---	---	---		10.9	6.7	8.7
6	12.6	12.2	12.3		12.8	11.5	12.2		11.8	10.7	10.9		10.2	9.7	10.0
7	---	---	---		12.9	12.3	12.4		10.7	10.4	10.5		10.1	8.4	9.1
8	---	---	---		12.8	12.0	12.3		10.6	10.3	10.4		12.0	8.2	9.6
9	---	---	---		12.9	11.9	12.2		10.6	10.2	10.4		9.5	6.8	8.2
10	---	---	---		12.6	11.9	12.2		11.3	10.8	11.0		11.2	6.6	9.3
11	---	---	---		---	---	---		11.0	10.8	10.9		---	---	---
12	---	---	---		---	---	---		11.0	10.8	10.9		11.3	9.8	10.8
13	---	---	---		---	---	---		11.1	10.9	11.0		10.7	9.4	10.0
14	---	---	---		---	---	---		11.2	10.9	11.1		10.3	8.3	9.5
15	12.9	12.5	12.7		---	---	---		11.3	11.1	11.2		10.0	8.3	9.1
16	12.9	12.5	12.7		11.6	11.3	11.4		11.3	11.0	11.1		10.2	8.1	8.8
17	13.0	12.6	12.8		11.7	11.3	11.4		11.2	10.9	11.1		---	---	---
18	13.1	12.8	12.9		11.8	11.1	11.3		11.9	10.8	11.3		10.7	10.1	10.3
19	13.3	12.9	13.1		11.3	10.8	11.0		11.7	11.4	11.5		10.8	9.6	10.1
20	13.4	13.2	13.3		11.3	10.7	11.0		11.7	11.3	11.5		10.4	6.7	9.0
21	13.6	13.2	13.4		11.5	10.8	11.0		11.7	11.3	11.5		8.4	6.0	6.7
22	13.6	13.2	13.4		11.5	10.6	10.9		11.5	11.2	11.4		9.4	5.6	7.4
23	13.6	13.3	13.5		11.1	10.6	10.8		11.8	11.2	11.6		9.1	8.2	8.7
24	13.7	11.8	12.8		11.1	10.7	10.8		12.8	11.5	12.2		8.2	7.2	7.8
25	12.7	12.3	12.5		10.9	10.7	10.8		12.9	12.3	12.5		9.4	6.7	8.4
26	12.7	12.6	12.7		11.2	10.6	10.8		13.1	9.2	12.2		10.2	8.6	9.3
27	12.9	12.6	12.7		12.9	10.6	11.4		12.2	9.8	10.6		9.7	9.3	9.5
28	12.7	12.5	12.6		12.6	12.0	12.3		11.2	9.6	10.6		10.1	9.0	9.5
29	12.6	12.4	12.5		12.6	12.0	12.3		10.6	9.5	10.3		9.7	8.2	8.7
30	---	---	---		12.5	12.2	12.5		11.7	9.1	10.7		8.3	7.9	8.1
31	---	---	---		12.5	12.1	12.3		---	---	---		8.2	7.7	7.9
MONTH	---	---	---		---	---	---		---	---	---		---	---	---

MISSISSIPPI RIVER MAIN STEM

05331560 MISSISSIPPI RIVER AT GREY CLOUD ISLAND NEAR COTTAGE GROVE, MN--Continued

OXYGEN DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.2	7.2	7.7	6.0	5.7	5.9	5.1	3.9	4.7	8.3	7.6	7.9
2	9.0	7.4	8.0	6.1	5.8	6.0	7.1	3.1	5.1	7.9	6.4	7.1
3	8.7	8.1	8.4	6.5	6.0	6.2	6.3	4.8	5.7	6.8	6.0	6.4
4	8.1	6.6	7.4	6.7	6.1	6.4	5.5	5.2	5.3	7.0	6.2	6.6
5	6.7	5.5	5.9	6.8	6.3	6.6	5.1	4.3	4.8	7.2	6.4	6.8
6	7.0	5.1	5.9	6.6	6.2	6.4	6.8	3.7	5.3	7.8	6.8	7.3
7	---	---	---	6.9	6.1	6.4	6.1	4.7	5.5	7.9	7.4	7.7
8	---	---	---	6.7	6.1	6.4	4.6	3.6	4.0	7.9	7.4	7.6
9	---	---	---	6.5	6.0	6.2	6.3	3.5	4.8	7.8	7.2	7.6
10	---	---	---	6.4	5.2	5.8	5.8	5.0	5.5	7.8	7.4	7.7
11	---	---	---	6.1	5.2	5.7	5.3	4.8	5.0	8.0	7.7	7.8
12	---	---	---	6.0	5.6	5.7	5.1	4.6	5.0	8.8	7.7	8.2
13	---	---	---	6.1	5.4	5.7	6.5	4.3	5.4	8.6	7.1	8.0
14	7.9	7.6	7.7	6.1	5.5	5.8	6.3	5.7	6.0	8.8	8.1	8.4
15	8.2	7.5	7.9	5.8	5.3	5.6	6.3	5.6	5.9	8.6	8.1	8.4
16	8.2	7.6	7.9	6.6	5.5	6.1	5.4	4.1	4.7	8.7	7.9	8.2
17	7.7	7.1	7.4	6.3	5.4	5.8	4.0	3.4	3.6	9.1	8.0	8.7
18	7.3	6.7	7.0	---	---	---	3.5	2.6	3.0	9.5	8.7	9.1
19	7.0	6.3	6.7	---	---	---	4.5	2.4	3.1	8.8	8.1	8.5
20	8.5	6.2	7.3	---	---	---	7.1	4.6	5.8	8.9	7.7	8.2
21	8.4	7.7	8.0	---	---	---	6.4	5.4	6.0	8.7	7.7	8.3
22	7.9	6.6	7.3	---	---	---	5.9	5.0	5.3	8.3	7.5	7.8
23	6.8	6.1	6.4	---	---	---	5.5	5.0	5.2	7.6	5.9	7.1
24	6.2	5.8	6.0	6.3	6.0	6.2	6.0	4.4	5.1	6.8	5.8	6.5
25	6.7	5.3	5.8	6.3	5.6	6.0	5.9	4.9	5.4	7.4	5.1	6.3
26	6.5	6.1	6.3	6.7	5.4	6.1	6.5	4.9	5.8	8.1	7.5	7.9
27	6.4	6.1	6.2	7.1	6.3	6.6	7.1	5.0	5.8	8.1	8.0	8.0
28	6.2	5.7	6.0	6.9	6.0	6.6	7.0	3.6	5.1	10.1	8.9	9.5
29	6.1	5.8	5.9	6.7	6.2	6.5	6.8	4.4	5.7	10.1	9.6	9.9
30	6.1	5.7	5.9	7.3	6.5	6.9	6.6	5.3	5.9	10.5	10.0	10.3
31	---	---	---	7.0	6.8	6.9	8.7	4.4	6.3	---	---	---
MONTH	---	---	---	---	---	---	8.7	2.4	5.2	10.5	5.1	7.9

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 mi² (95,800 km²), 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 1983 TO SEPTEMBER 1984

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)
OCT , 1983											
20...	1030	11300	520	497	8.5	7.8	7.0	7.0	12	752	11.4
JAN , 1984											
12...	1430	9210	530	589	7.9	7.8	-10.0	.5	4.5	753	12.8
APR											
17...	1400	52000	610	607	7.3	8.0	14.0	10.0	11	740	10.2
JUL											
05...	1245	57300	650	634	7.7	7.9	25.5	25.0	18	737	6.7

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 , 1983											
20...	95	100	560	56	21	15	3.5	189	37	21	.20
JAN , 1984											
12...	90	4000	K2500	64	24	19	3.3	219	47	27	.20
APR											
17...	93	60	75	73	26	11	3.4	181	100	17	.20
JUL											
05...	84	200	530	76	29	12	4.0	196	110	16	.30

MISSISSIPPI RIVER MAIN STEM

05331570 MISSISSIPPI RIVER AT NININGER, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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 (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 (MG/L) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT , 1983											
20...	12	322	1.5	.240	2.3	.170	.130	.160	33	1010	94
JAN , 1984											
12...	15	361	1.6	1.20	1.9	.220	.150	.160	2	50	92
APR											
17...	14	444	4.7	.200	2.6	.150	.080	.050	56	7860	96
JUL											
05...	18	474	3.7	.040	1.2	.220	.160	.140	139	21500	62

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 , 1983											
20...	1030	<10	2	63	<.5	1	<1	<3	4	13	3
JAN , 1984											
12...	1430	<10	1	68	<.5	<2	<1	<3	<10	35	<10
APR											
17...	1400	<10	2	72	<.5	<1	<1	<3	4	16	1
JUL											
05...	1245	80	4	91	<.5	<1	<1	<3	4	14	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)
OCT , 1983										
20...	17	22	.2	<10	5	<1	<1	130	<6	15
JAN , 1984										
12...	16	41	<.1	<10	15	<1	<1	160	<6	20
APR										
17...	24	18	<.1	<10	7	2	<1	210	<6	19
JUL										
05...	22	10	.1	<10	2	1	1	250	<6	56

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 SE&SW¼ 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 microsiemens June 27, July 6, 20, 1980; minimum, 341 microsiemens 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, 1983-84): 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, 29.0°C July 23; minimum, 0.0°C several days during winter.

SPECIFIC CONDUCTANCE (MICROSIEMENS /CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	456	450	453	548	545	546			
2	---	---	---	510	455	487	547	543	545			
3	---	---	---	510	500	504	550	545	547			
4	---	---	---	504	497	499	552	543	549			
5	527	518	522	504	497	500	553	544	547			
6	519	510	514	508	502	504	555	550	552			
7	510	504	506	506	498	500	564	555	559			
8	507	498	501	503	496	499	564	559	561			
9	496	488	492	496	485	492	566	563	564			
10	489	478	484	519	480	504	567	564	565			
11	478	471	474	517	512	514	567	563	565			
12	474	464	468	513	508	511	565	562	563			
13	467	451	457	510	506	508	566	561	564			
14	455	447	451	511	505	507	565	556	561			
15	455	452	453	509	506	508	556	551	554			
16	458	450	454	510	505	507	555	552	554			
17	457	450	453	508	503	505	556	553	554			
18	453	449	451	506	501	503	556	550	553			
19	452	442	446	506	502	505	558	548	553			
20	446	441	442	510	505	507	558	550	554			
21	445	440	442	513	503	506	557	552	554			
22	445	441	443	509	504	507	558	539	551			
23	442	438	440	511	503	507	540	479	517			
24	443	434	436	504	493	498	---	---	---			
25	444	434	438	496	493	494	---	---	---			
26	443	436	440	497	492	494	---	---	---			
27	442	436	439	502	495	499	---	---	---			
28	443	439	441	504	500	502	---	---	---			
29	444	438	441	512	502	505	---	---	---			
30	445	439	442	546	507	513	---	---	---			
31	456	441	447	---	---	---	---	---	---			
MONTH	---	---	---	546	450	501	---	---	---			

MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1							---	---	---	655	648	652
2							---	---	---	651	595	617
3							---	---	---	603	593	598
4							---	---	---	604	597	600
5							---	---	---	606	597	601
6							---	---	---	604	598	602
7							---	---	---	603	597	600
8							---	---	---	596	591	594
9							---	---	---	607	590	598
10							---	---	---	608	596	602
11							---	---	---	612	601	607
12							---	---	---	621	604	612
13							---	---	---	627	618	621
14							---	---	---	621	604	614
15							---	---	---	609	597	603
16							---	---	---	608	601	605
17							---	---	---	624	606	613
18							---	---	---	637	620	627
19							---	---	---	651	635	642
20							634	619	629	671	648	656
21							636	626	631	674	667	671
22							634	628	630	672	657	665
23							649	631	639	665	650	658
24							656	643	649	662	655	659
25							698	652	678	659	654	657
26							710	696	702	653	645	650
27							710	700	706	651	644	647
28							697	678	685	648	638	643
29							684	666	679	649	636	643
30							664	648	652	653	643	647
31							---	---	---	658	646	651
MONTH							---	---	---	674	590	628
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	661	653	656	548	532	540	621	608	613	576	569	573
2	667	656	661	552	535	543	620	611	615	572	563	566
3	670	659	664	559	543	550	616	608	613	577	564	569
4	667	661	664	571	554	562	611	591	601	583	575	577
5	674	658	665	582	558	566	617	595	601	573	568	570
6	670	664	666	570	557	563	623	606	614	569	556	562
7	672	663	667	579	564	571	618	593	604	562	551	555
8	665	637	656	577	564	569	591	576	583	558	548	555
9	638	629	633	582	570	575	577	569	572	555	550	552
10	623	613	619	581	565	573	578	563	570	559	549	553
11	582	566	575	582	566	573	589	574	580	560	552	555
12	525	516	521	585	573	578	585	578	581	559	548	553
13	473	444	458	580	570	575	584	566	575	568	554	561
14	440	422	429	---	---	---	591	580	585	566	558	560
15	420	412	415	---	---	---	610	589	599	562	547	557
16	411	405	407	---	---	---	614	602	608	550	536	540
17	409	403	406	---	---	---	615	610	613	536	532	534
18	417	407	412	---	---	---	624	613	618	555	532	539
19	432	413	422	---	---	---	630	620	624	543	533	540
20	447	427	435	---	---	---	627	620	623	539	518	526
21	465	447	455	---	---	---	621	614	616	522	515	518
22	484	465	476	---	---	---	614	604	608	526	521	524
23	492	481	487	---	---	---	630	601	609	534	522	527
24	503	487	495	---	---	---	619	606	611	531	520	526
25	515	496	504	---	---	---	612	605	608	519	505	512
26	522	507	514	---	---	---	612	608	610	508	499	504
27	527	506	517	629	620	623	638	608	615	502	498	500
28	538	520	529	630	618	624	623	604	613	498	489	493
29	540	526	533	628	618	623	611	599	603	494	487	491
30	546	529	537	627	608	616	598	579	588	491	483	487
31	---	---	---	614	609	611	579	574	575	---	---	---
MONTH	674	403	536	---	---	---	638	563	602	583	483	539

MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 HASTINGS, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	---	---	---	8.2	8.2	8.2	8.2	8.2	8.2			
2	---	---	---	8.2	8.2	8.2	8.2	8.1	8.2			
3	---	---	---	8.3	8.2	8.3	8.1	8.1	8.1			
4	---	---	---	8.4	8.3	8.3	8.1	8.1	8.1			
5	8.3	8.2	8.2	8.4	8.3	8.3	8.1	8.0	8.1			
6	8.3	8.2	8.3	8.3	8.3	8.3	8.1	8.0	8.0			
7	8.3	8.2	8.2	8.3	8.3	8.3	8.0	8.0	8.0			
8	8.3	8.2	8.2	8.4	8.3	8.3	8.0	8.0	8.0			
9	8.3	8.2	8.3	8.3	8.3	8.3	8.0	8.0	8.0			
10	8.3	8.3	8.3	8.3	8.2	8.2	8.0	8.0	8.0			
11	8.3	8.3	8.3	8.3	8.2	8.2	8.0	8.0	8.0			
12	8.3	8.2	8.2	8.2	8.2	8.2	8.0	7.9	8.0			
13	8.2	8.2	8.2	8.3	8.2	8.2	8.0	7.9	7.9			
14	8.3	8.2	8.2	8.3	8.2	8.3	7.9	7.9	7.9			
15	8.3	8.3	8.3	8.3	8.2	8.3	7.9	7.9	7.9			
16	8.3	8.2	8.3	8.3	8.3	8.3	7.9	7.9	7.9			
17	8.4	8.3	8.3	8.3	8.2	8.3	7.9	7.9	7.9			
18	8.3	8.3	8.3	8.3	8.3	8.3	7.9	7.8	7.9			
19	8.3	8.2	8.2	8.4	8.3	8.3	7.9	7.8	7.8			
20	8.3	8.2	8.2	8.3	8.2	8.2	7.9	7.9	7.9			
21	8.2	8.2	8.2	8.2	8.2	8.2	7.9	7.8	7.8			
22	8.2	8.2	8.2	8.3	8.2	8.3	7.8	7.8	7.8			
23	8.2	8.1	8.2	8.3	8.2	8.2	7.8	7.8	7.8			
24	8.2	8.1	8.2	8.3	8.2	8.3	---	---	---			
25	8.2	8.2	8.2	8.3	8.3	8.3	---	---	---			
26	8.2	8.2	8.2	8.3	8.2	8.3	---	---	---			
27	8.2	8.1	8.2	8.3	8.2	8.3	---	---	---			
28	8.2	8.1	8.1	8.3	8.2	8.3	---	---	---			
29	8.2	8.1	8.2	8.3	8.2	8.2	---	---	---			
30	8.2	8.2	8.2	8.2	8.2	8.2	---	---	---			
31	8.2	8.2	8.2	---	---	---	---	---	---			
MONTH	---	---	---	8.4	8.2	8.3	---	---	---			
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1							---	---	---	8.4	8.3	8.3
2							---	---	---	8.3	8.1	8.2
3							---	---	---	8.2	8.1	8.1
4							---	---	---	8.1	8.0	8.1
5							---	---	---	8.1	8.0	8.0
6							---	---	---	8.0	7.9	8.0
7							---	---	---	7.9	7.9	7.9
8							---	---	---	7.9	7.9	7.9
9							---	---	---	7.9	7.6	7.7
10							---	---	---	7.6	7.4	7.5
11							---	---	---	7.6	7.5	7.5
12							---	---	---	7.7	7.5	7.6
13							---	---	---	7.6	7.5	7.6
14							---	---	---	7.7	7.5	7.6
15							---	---	---	7.7	7.5	7.6
16							---	---	---	7.8	7.5	7.7
17							---	---	---	7.8	7.7	7.7
18							---	---	---	7.9	7.7	7.8
19							---	---	---	7.9	7.7	7.8
20							8.3	8.2	8.3	7.8	7.7	7.8
21							8.3	8.2	8.3	7.8	7.6	7.7
22							8.3	8.2	8.3	7.7	7.6	7.6
23							8.4	8.2	8.3	7.9	7.6	7.8
24							8.4	8.3	8.4	7.9	7.8	7.8
25							8.4	8.2	8.3	7.9	7.7	7.8
26							8.3	8.2	8.2	7.9	7.8	7.8
27							8.2	8.2	8.2	7.9	7.8	7.8
28							8.3	8.2	8.2	7.9	7.8	7.8
29							8.3	8.3	8.3	8.0	7.8	7.9
30							8.3	8.2	8.2	8.0	7.9	8.0
31							---	---	---	8.0	7.9	7.9
MONTH							---	---	---	8.4	7.4	7.8

MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 HASTINGS, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.0	7.9	7.9	7.7	7.6	7.7	8.3	8.0	8.2	8.1	8.0	8.0
2	8.0	7.9	7.9	7.8	7.7	7.7	8.3	8.1	8.2	8.0	8.0	8.0
3	8.0	7.9	8.0	7.8	7.7	7.7	8.4	8.1	8.2	8.0	7.9	7.9
4	8.0	7.9	7.9	7.9	7.7	7.8	8.2	8.0	8.1	8.0	7.9	7.9
5	7.9	7.8	7.9	7.9	7.7	7.8	8.3	8.0	8.1	8.0	8.0	8.0
6	7.9	7.7	7.8	8.0	7.9	7.9	8.4	8.0	8.1	8.0	8.0	8.0
7	7.8	7.7	7.7	8.1	7.9	8.0	8.1	8.0	8.1	8.0	8.0	8.0
8	7.8	7.7	7.7	8.0	7.9	8.0	8.0	7.9	8.0	8.0	8.0	8.0
9	7.7	7.5	7.6	8.0	7.9	7.9	8.0	7.8	7.9	8.0	8.0	8.0
10	7.6	7.5	7.6	7.9	7.9	7.9	8.0	7.8	7.9	8.0	8.0	8.0
11	7.5	7.5	7.5	7.9	7.9	7.9	8.1	7.9	7.9	8.0	8.0	8.0
12	7.5	7.5	7.5	7.9	7.8	7.9	8.1	7.9	8.0	8.0	8.0	8.0
13	7.6	7.4	7.5	7.9	7.8	7.9	8.0	7.9	8.0	8.0	8.0	8.0
14	7.6	7.5	7.5	---	---	---	8.1	7.9	8.0	8.0	8.0	8.0
15	7.6	7.5	7.5	---	---	---	8.2	8.0	8.1	8.0	8.0	8.0
16	7.5	7.5	7.5	---	---	---	8.2	8.0	8.1	8.0	8.0	8.0
17	7.5	7.4	7.4	---	---	---	8.2	8.0	8.1	8.0	8.0	8.0
18	7.5	7.4	7.5	---	---	---	8.1	8.0	8.1	8.0	8.0	8.0
19	7.5	7.4	7.4	---	---	---	8.2	8.0	8.0	8.0	8.0	8.0
20	7.7	7.5	7.6	---	---	---	8.1	8.0	8.0	8.0	8.0	8.0
21	7.7	7.6	7.7	---	---	---	8.2	8.0	8.1	8.0	8.0	8.0
22	7.7	7.6	7.6	---	---	---	8.2	8.0	8.1	8.0	8.0	8.0
23	7.7	7.6	7.6	---	---	---	8.6	8.1	8.3	8.0	8.0	8.0
24	7.7	7.6	7.7	---	---	---	8.4	8.2	8.3	8.0	8.0	8.0
25	7.7	7.6	7.6	---	---	---	8.2	8.2	8.2	8.0	8.0	8.0
26	7.8	7.6	7.7	---	---	---	8.2	8.1	8.2	8.0	8.0	8.0
27	7.8	7.7	7.8	8.2	7.9	8.0	8.4	8.0	8.2	8.0	8.0	8.0
28	7.7	7.7	7.7	8.2	7.9	8.0	8.6	8.0	8.3	8.0	8.0	8.0
29	7.7	7.7	7.7	8.1	8.0	8.1	8.3	8.1	8.2	8.0	8.0	8.0
30	7.7	7.6	7.7	8.1	8.0	8.1	8.1	8.0	8.1	8.0	8.0	8.0
31	---	---	---	8.1	8.1	8.1	8.1	8.0	8.0	---	---	---
MONTH	8.0	7.4	7.7	---	---	---	8.6	7.8	8.1	8.1	7.9	8.0

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	9.5	9.0	9.0	.0	.0	.0			
2	---	---	---	10.0	9.5	9.5	.0	.0	.0			
3	---	---	---	10.0	8.5	9.0	.0	.0	.0			
4	---	---	---	8.5	7.5	8.0	.0	.0	.0			
5	17.5	17.0	17.0	8.0	7.5	8.0	.0	.0	.0			
6	17.0	15.5	16.0	8.5	8.0	8.0	.0	.0	.0			
7	16.0	15.0	15.5	8.5	8.0	8.0	.5	.0	.0			
8	15.5	14.5	15.0	8.5	7.5	8.0	.0	.0	.0			
9	14.5	14.0	14.5	7.5	5.5	6.5	.0	.0	.0			
10	14.0	13.0	13.5	6.0	5.0	5.5	.0	.0	.0			
11	13.0	12.5	13.0	5.5	5.0	5.5	.0	.0	.0			
12	12.5	11.0	11.5	5.0	4.0	4.5	.0	.0	.0			
13	11.5	10.5	11.0	4.5	4.0	4.0	.0	.0	.0			
14	11.0	10.0	10.5	4.0	3.5	4.0	.0	.0	.0			
15	10.5	10.0	10.5	4.0	4.0	4.0	.0	.0	.0			
16	10.5	10.0	10.0	4.5	3.5	4.0	.0	.0	.0			
17	10.5	9.5	10.0	4.0	3.0	3.5	.0	.0	.0			
18	10.5	10.0	10.0	4.0	3.5	4.0	.0	.0	.0			
19	10.5	10.0	10.0	5.0	4.0	4.5	.0	.0	.0			
20	10.0	9.5	9.5	5.5	5.0	5.0	.0	.0	.0			
21	10.0	9.0	9.5	5.0	4.5	4.5	.0	.0	.0			
22	10.0	9.5	10.0	4.5	4.0	4.0	.0	.0	.0			
23	10.0	9.0	9.5	4.0	2.5	3.5	.0	.0	.0			
24	9.0	9.0	9.0	2.5	1.0	1.5	---	---	---			
25	9.5	8.5	9.0	1.5	.5	1.0	---	---	---			
26	10.0	8.5	9.0	1.5	.5	1.0	---	---	---			
27	10.0	9.0	9.5	1.0	.0	.5	---	---	---			
28	10.0	9.5	10.0	.5	.5	.5	---	---	---			
29	9.5	8.5	9.0	.5	.0	.5	---	---	---			
30	9.5	8.0	9.0	.5	.0	.0	---	---	---			
31	9.0	8.5	9.0	---	---	---	---	---	---			
MONTH	17.5	8.0	11.0	10.0	.0	4.5	---	---	---			

MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 HASTINGS, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1							---	---	---	8.5	7.0	8.0
2							---	---	---	9.0	8.0	8.5
3							---	---	---	10.5	8.5	9.5
4							---	---	---	10.5	9.5	10.0
5							---	---	---	11.0	9.5	10.5
6							---	---	---	11.5	10.5	11.0
7							---	---	---	11.5	10.0	11.0
8							---	---	---	10.0	9.5	9.5
9							---	---	---	12.0	9.0	10.5
10							---	---	---	12.5	10.5	11.5
11							---	---	---	13.5	11.5	12.5
12							---	---	---	14.5	12.0	13.0
13							---	---	---	14.5	13.0	13.5
14							---	---	---	15.0	13.0	14.0
15							---	---	---	15.5	13.5	14.5
16							---	---	---	15.5	13.5	14.5
17							---	---	---	16.5	14.0	15.0
18							---	---	---	17.0	15.0	16.0
19							---	---	---	18.5	16.5	17.5
20							11.0	9.0	10.5	19.5	17.0	18.0
21							10.5	9.0	10.0	19.0	17.5	18.5
22							10.0	8.5	9.0	19.0	17.5	18.5
23							10.5	8.5	9.5	18.5	16.5	17.5
24							10.5	9.0	10.0	18.0	17.0	17.5
25							11.0	9.5	10.5	17.5	17.0	17.5
26							13.0	10.5	11.5	17.5	16.0	16.5
27							13.0	12.0	12.5	17.0	16.0	16.0
28							12.0	9.0	10.0	16.5	15.0	16.0
29							10.0	8.0	9.5	17.0	15.0	16.0
30							8.0	6.5	7.0	17.5	16.0	16.5
31							---	---	---	18.5	16.0	17.0
MONTH							---	---	---	19.5	7.0	14.0
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	19.0	17.5	18.0	23.5	21.5	22.5	25.5	23.0	24.0	19.5	18.5	19.0
2	19.0	17.5	18.5	24.0	21.5	22.5	25.5	23.5	24.5	18.5	17.5	18.0
3	20.5	18.0	19.0	23.5	22.0	23.0	27.0	24.0	25.0	18.5	17.5	18.0
4	20.0	19.0	19.0	24.0	22.5	23.0	25.5	24.5	25.0	18.5	18.0	18.5
5	21.0	18.5	19.5	24.0	22.5	23.0	26.5	24.5	25.5	19.0	18.0	18.5
6	21.5	20.5	21.0	23.0	21.0	22.0	28.5	25.0	26.0	18.0	16.5	17.5
7	22.0	20.5	21.5	23.0	21.0	22.0	26.5	24.5	25.5	17.5	16.0	16.5
8	21.5	20.5	21.0	22.0	20.5	21.0	25.0	23.0	24.0	17.0	16.5	16.5
9	21.5	21.0	21.0	22.0	20.5	21.0	24.5	23.5	24.0	16.5	16.0	16.0
10	21.0	20.0	20.5	22.0	21.0	21.0	25.0	23.0	24.0	17.0	15.5	16.0
11	20.0	19.0	19.5	23.0	20.5	21.5	24.0	23.0	23.5	16.5	15.5	16.0
12	20.5	19.0	19.5	23.5	22.0	22.5	24.5	22.5	23.5	17.5	15.5	16.0
13	21.0	19.5	20.0	24.0	22.5	23.0	24.0	22.5	23.5	17.5	16.5	17.0
14	20.5	19.0	19.5	27.0	23.0	25.0	25.0	23.0	24.0	17.0	15.0	16.0
15	20.0	19.0	19.5	27.5	25.0	25.5	25.5	23.5	24.5	15.0	14.5	15.0
16	19.5	18.5	19.0	27.0	24.0	25.0	25.5	24.0	24.5	15.0	14.0	14.5
17	19.5	18.5	19.0	24.5	22.5	23.0	25.0	24.5	24.5	14.5	13.5	14.0
18	21.0	19.0	20.0	25.0	21.5	23.0	25.5	24.0	24.5	17.5	14.5	15.0
19	21.5	19.5	20.5	26.0	23.5	25.0	25.0	23.5	24.5	17.0	15.5	16.0
20	21.0	19.0	20.0	28.0	25.0	26.5	24.5	23.5	23.5	17.5	16.5	17.0
21	20.5	19.0	20.0	28.0	25.5	27.0	23.5	22.5	23.0	16.5	15.5	16.0
22	21.5	20.0	20.5	28.0	26.5	27.0	23.5	21.0	21.5	16.5	16.0	16.0
23	21.5	20.0	20.5	29.0	26.5	28.0	24.5	20.0	21.5	16.0	15.5	15.5
24	21.5	19.5	20.5	26.5	25.5	26.0	22.0	20.5	21.0	15.5	14.0	15.0
25	22.0	19.5	21.0	27.5	25.5	26.5	21.0	20.5	20.5	14.0	11.0	12.5
26	22.5	20.5	21.5	26.5	23.5	25.0	21.0	20.5	20.5	11.5	10.0	11.0
27	22.5	20.0	21.0	25.0	23.5	24.0	26.0	20.5	22.0	11.0	10.5	10.5
28	23.0	21.0	22.0	25.0	23.0	24.0	26.0	21.5	23.5	10.5	10.0	10.5
29	23.0	21.0	22.0	24.5	23.5	24.0	24.5	22.5	23.0	10.5	9.5	10.0
30	23.0	21.0	22.0	24.5	23.0	23.5	22.5	20.5	21.5	10.5	10.0	10.0
31	---	---	---	23.5	22.5	23.0	20.5	19.5	20.0	---	---	---
MONTH	23.0	17.5	20.0	29.0	20.5	24.0	28.5	19.5	23.5	19.5	9.5	15.5

MISSISSIPPI RIVER MAIN STEM

05331578 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	---	---	---	10.7	10.5	10.6	13.0	12.8	12.9			
2	---	---	---	10.6	9.9	10.2	12.9	12.7	12.8			
3	---	---	---	10.8	10.1	10.5	13.0	12.7	12.9			
4	---	---	---	11.1	10.8	11.0	13.0	12.5	12.8			
5	7.0	6.8	6.9	11.2	10.9	11.1	12.5	12.0	12.3			
6	7.3	6.9	7.2	10.9	10.7	10.8	12.1	12.0	12.0			
7	7.5	7.1	7.3	10.9	10.0	10.4	13.5	11.7	12.3			
8	7.9	7.3	7.7	10.7	10.0	10.3	13.5	13.4	13.5			
9	8.4	7.9	8.2	11.7	10.7	11.3	13.7	13.4	13.5			
10	8.9	8.3	8.7	12.1	10.3	11.3	13.5	13.3	13.4			
11	9.2	8.9	9.0	11.2	11.0	11.1	13.4	13.2	13.3			
12	9.7	8.4	8.9	11.7	11.2	11.5	13.6	13.1	13.4			
13	8.8	8.3	8.6	12.1	11.7	11.9	13.6	13.4	13.5			
14	9.0	8.7	8.9	12.2	11.8	12.0	13.9	13.5	13.7			
15	9.1	8.9	9.0	12.1	11.9	12.0	14.1	13.9	14.0			
16	9.2	9.1	9.1	12.5	12.0	12.2	14.4	13.9	14.2			
17	9.5	9.1	9.3	12.7	12.0	12.4	14.6	12.2	13.8			
18	9.4	9.1	9.2	12.6	12.2	12.4	12.3	11.0	11.7			
19	10.7	9.1	10.0	12.6	12.0	12.4	11.1	10.7	10.9			
20	10.9	10.8	10.9	12.0	11.4	11.6	10.8	10.3	10.5			
21	11.0	10.7	10.9	12.4	11.8	12.1	10.6	10.2	10.4			
22	10.9	10.7	10.8	12.0	11.6	11.9	10.6	9.5	10.3			
23	11.1	10.8	11.0	12.3	11.9	12.1	14.5	9.5	11.3			
24	11.3	10.9	11.1	13.7	12.4	13.1	---	---	---			
25	11.3	10.8	11.1	13.8	13.5	13.7	---	---	---			
26	11.2	10.7	11.0	13.9	13.6	13.8	---	---	---			
27	11.1	10.6	10.9	14.0	13.7	13.8	---	---	---			
28	10.9	10.1	10.7	14.0	13.8	13.9	---	---	---			
29	11.1	10.8	10.9	14.1	12.8	13.7	---	---	---			
30	11.3	11.0	11.1	13.0	12.8	12.9	---	---	---			
31	11.2	10.5	10.9	---	---	---	---	---	---			
MONTH	---	---	---	14.1	9.9	11.9	---	---	---			
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1							---	---	---	13.1	12.6	12.9
2							---	---	---	13.2	11.9	12.6
3							---	---	---	12.5	11.8	12.2
4							---	---	---	12.3	11.7	12.1
5							---	---	---	12.4	12.1	12.2
6							---	---	---	12.4	12.0	12.2
7							---	---	---	13.2	11.5	12.3
8							---	---	---	14.3	11.7	13.0
9							---	---	---	14.5	11.0	12.8
10							---	---	---	13.2	11.4	12.7
11							---	---	---	14.3	13.1	13.4
12							---	---	---	14.4	13.3	13.8
13							---	---	---	13.9	13.3	13.7
14							---	---	---	14.1	13.0	13.5
15							---	---	---	13.1	12.0	12.4
16							---	---	---	11.0	10.4	10.7
17							---	---	---	11.8	10.9	11.3
18							---	---	---	11.8	11.0	11.4
19							---	---	---	11.7	11.1	11.4
20							12.1	11.2	11.5	11.9	11.1	11.4
21							11.7	11.3	11.5	11.4	10.8	11.1
22							11.9	11.4	11.8	10.5	9.7	10.2
23							11.9	11.3	11.6	9.5	9.0	9.2
24							11.6	11.2	11.4	10.5	9.3	9.8
25							12.4	11.2	11.9	10.6	10.0	10.3
26							12.1	11.4	11.8	11.5	10.7	11.1
27							11.6	11.3	11.4	12.0	11.3	11.8
28							12.7	11.4	12.3	12.6	11.9	12.2
29							13.4	12.1	12.5	12.7	11.0	11.7
30							13.7	12.9	13.3	11.8	10.0	10.8
31							---	---	---	10.7	9.7	10.2
MONTH							---	---	---	14.5	9.0	11.8

MISSISSIPPI RIVER MAIN STEM

0533158 MISSISSIPPI RIVER AT LOCK AND DAM 2 AT HASTINGS, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	10.1	9.5	9.8	7.0	6.4	6.7	8.5	6.3	7.0			
2	9.8	9.4	9.6	6.9	6.3	6.6	7.5	5.1	6.6			
3	9.7	9.0	9.4	6.7	6.1	6.4	7.6	6.1	6.8			
4	10.6	8.0	8.7	6.5	6.1	6.3	7.1	6.0	6.5			
5	8.5	8.0	8.3	6.4	6.0	6.2	6.4	5.6	6.0			
6	8.2	7.8	8.0	6.8	6.3	6.5	6.7	5.4	6.0			
7	8.3	7.9	8.1	6.7	6.2	6.4	6.8	5.3	6.1			
8	8.5	8.1	8.3	6.7	6.2	6.6	6.2	5.8	6.0			
9	8.5	8.2	8.3	6.7	6.3	6.5	6.4	5.5	5.9			
10	8.9	8.3	8.6	6.8	6.4	6.6	5.8	4.9	5.4			
11	8.9	8.5	8.6	6.8	6.2	6.5	6.0	5.0	5.5			
12	8.7	7.9	8.3	6.6	6.1	6.4	6.1	5.3	5.7			
13	7.5	7.4	7.5	6.4	6.1	6.3	5.9	5.4	5.7			
14	8.2	7.7	8.0	---	---	---	6.1	5.7	5.9			
15	8.4	7.9	8.1	---	---	---	6.2	5.1	5.8			
16	8.4	8.0	8.3	---	---	---	6.7	5.5	6.1			
17	8.4	8.0	8.2	---	---	---	6.7	6.3	6.5			
18	8.1	7.2	7.7	---	---	---	6.7	6.4	6.5			
19	7.8	6.9	7.3	---	---	---	6.9	6.4	6.7			
20	7.0	6.4	6.7	---	---	---	7.1	6.7	6.8			
21	6.8	6.4	6.6	---	---	---	7.4	6.5	7.0			
22	6.6	6.3	6.5	---	---	---	7.1	5.4	6.3			
23	6.7	6.3	6.5	---	---	---	8.0	6.4	6.9			
24	6.8	6.4	6.6	---	---	---	7.5	6.9	7.3			
25	6.8	5.7	6.2	---	---	---	7.6	7.4	7.5			
26	6.4	5.8	6.1	---	---	---	7.7	7.5	7.6			
27	6.9	6.3	6.6	---	---	---	7.7	6.9	7.4			
28	7.0	6.5	6.8	8.7	6.5	7.1	7.7	6.9	7.2			
29	7.1	6.6	6.8	7.2	6.4	6.8	7.2	6.5	6.8			
30	7.2	6.5	6.8	7.3	6.4	6.8	7.3	6.5	6.9			
31	---	---	---	7.1	6.4	6.7	---	---	---			
MONTH	10.6	5.7	7.7	---	---	---	8.5	4.9	6.5			

ST. CROIX RIVER BASIN

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 mi² (2,240 km²).

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.--17 years, 719 ft³/s (20.36 m³/s), 11.31 in/yr (287 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,200 ft³/s (487 m³/s) July 23, 1972, gage height, 15.38 ft (4.688 m); minimum, 25 ft³/s (0.71 m³/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 ft³/s (379 m³/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 3,600 ft³/s (102 m³/s) and maximum (*)

Date	Time	Discharge (ft ³ /s)	(m ³ /s)	Gage height (ft)	(m)
Apr. 7	1215	4,150	118	8.04	2.451
June 12	0830	*6,830	193	*9.59	2.923

Minimum discharge, 123 ft³/s (3.48 m³/s) Sept. 2; gage height 3.99 ft (1.216 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1360	533	1020	520	340	546	1600	2460	470	571	220	125
2	1580	520	988	515	325	502	2170	2360	406	517	263	130
3	1490	502	960	510	310	455	2880	2140	407	515	232	133
4	1320	478	945	505	272	427	3390	1870	377	496	210	135
5	1200	455	919	495	260	377	3730	1630	473	484	271	137
6	1110	449	830	480	242	335	4010	1510	626	460	265	137
7	1010	444	753	455	226	345	4120	1580	860	440	277	137
8	971	432	705	427	268	345	3990	2310	2030	409	298	152
9	902	427	683	416	285	324	3700	2140	2940	449	294	144
10	839	466	661	410	276	305	3320	1810	3540	497	266	139
11	1100	472	612	400	268	290	2940	1630	6150	465	240	139
12	1460	455	590	397	263	276	2630	1410	6510	406	225	153
13	1370	432	578	394	263	270	2530	1250	6140	341	207	168
14	1240	432	565	394	290	263	2450	1160	5610	334	201	166
15	1130	432	571	389	357	270	2280	1070	4380	314	190	157
16	1360	432	590	389	389	259	2140	1030	3480	298	180	151
17	1480	438	590	385	456	250	1930	1290	2810	293	175	145
18	1380	438	500	385	490	250	1730	1350	2330	277	165	142
19	1310	455	530	385	538	252	1520	1190	1870	268	156	142
20	1260	928	565	385	536	254	1340	1040	1530	251	155	139
21	1190	2060	570	385	536	254	1180	1000	1290	235	154	131
22	1100	2000	570	382	581	254	1050	1310	1180	226	149	131
23	1010	1680	565	380	610	259	937	1420	1160	223	144	157
24	928	1120	560	380	645	287	839	1290	1130	213	139	647
25	848	1170	555	380	650	320	747	1180	1050	203	132	1170
26	778	1210	550	376	640	412	711	1060	939	197	134	1060
27	728	1200	545	375	605	578	1280	932	856	198	138	929
28	683	1170	540	368	612	750	2390	793	813	185	134	813
29	632	1110	535	365	565	899	2370	681	737	178	134	707
30	585	1070	530	355	---	1030	2340	588	654	173	128	611
31	552	---	525	350	---	1160	---	526	---	171	125	---
TOTAL	33906	23410	20200	12732	12098	12798	68244	43010	62748	10287	6001	9227
MEAN	1094	780	652	411	417	413	2275	1387	2092	332	194	308
MAX	1580	2060	1020	520	650	1160	4120	2460	6510	571	298	1170
MIN	552	427	500	350	226	250	711	526	377	171	125	125
CFSM	1.27	.90	.76	.48	.48	.48	2.64	1.61	2.42	.39	.23	.36
IN.	1.46	1.01	.87	.55	.52	.55	2.94	1.85	2.70	.44	.26	.40
AC-FT	67250	46430	40070	25250	24000	25380	135400	85310	124500	20400	11900	18300

CAL YR 1983	TOTAL	323732	MEAN	887	MAX	3770	MIN	196	CFSM	1.03	IN	13.95	AC-FT	642100
WTR YR 1984	TOTAL	314661	MEAN	860	MAX	6510	MIN	125	CFSM	1.00	IN	13.56	AC-FT	624100

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 mi² (264 km²).

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.--10 years, 61.5 ft³/s (1.742 m³/s), 8.19 in/yr (208 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,840 ft³/s (52.1 m³/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 ft³/s (0.031 m³/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 ft³/s (14.2 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s)	(m ³ /s)	Gage height (ft)	(m)
June 12	0345	*1100	31.2	*5.46	1.664

Minimum discharge, 4.0 ft³/s (0.11 m³/s) Aug. 26, gage height, 1.55 ft (0.472 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	78	80	80	38	23	55	265	366	37	40	9.7	5.8		
2	80	80	81	37	23	12	292	320	34	47	10	6.6		
3	60	80	81	36	23	26	331	270	27	81	9.2	5.5		
4	43	80	82	35	23	32	356	222	28	74	8.6	7.1		
5	42	79	82	34	23	41	345	203	48	67	13	6.6		
6	45	79	83	33	23	60	327	183	65	56	17	5.7		
7	72	79	82	32	23	70	293	217	109	47	18	5.8		
8	74	78	82	32	23	66	264	287	276	40	19	6.6		
9	74	78	80	31	22	59	234	276	412	39	18	6.7		
10	78	78	79	31	22	53	205	238	603	39	17	7.3		
11	87	78	77	30	22	47	180	208	753	35	15	7.6		
12	84	78	74	30	35	43	194	185	938	31	12	15		
13	84	78	72	29	45	38	287	168	883	28	10	16		
14	82	78	70	29	45	36	324	138	566	26	10	14		
15	82	78	67	28	46	31	281	117	380	23	10	12		
16	84	77	65	28	45	29	240	108	278	21	11	9.7		
17	85	77	62	28	50	27	201	105	230	25	9.3	7.9		
18	87	77	60	27	56	26	174	96	187	20	9.5	8.5		
19	90	77	58	27	63	25	146	93	152	18	8.4	8.5		
20	90	77	56	26	72	25	122	81	135	17	6.7	9.2		
21	90	78	54	26	71	25	108	86	114	15	9.0	7.8		
22	90	78	52	26	76	25	93	106	116	13	9.8	5.8		
23	89	78	49	26	81	26	74	110	121	16	6.9	12		
24	88	78	48	25	82	32	62	100	108	14	5.5	100		
25	86	78	46	25	82	43	58	95	90	13	4.6	138		
26	85	78	44	25	82	70	84	80	80	14	4.5	132		
27	83	79	43	24	82	114	203	69	69	15	7.4	115		
28	83	79	42	24	80	152	412	61	59	13	8.0	96		
29	83	80	41	24	76	184	408	50	52	11	8.7	80		
30	82	80	40	24	---	203	390	42	45	8.9	6.4	67		
31	80	---	39	24	---	225	---	37	---	7.8	4.8	---		
TOTAL	2440	2352	1971	894	1419	1900	6953	4717	6995	914.7	317.0	925.7		
MEAN	78.7	78.4	63.6	28.8	48.9	61.3	232	152	233	29.5	10.2	30.9		
MAX	90	80	83	38	82	225	412	366	938	81	19	138		
MIN	42	77	39	24	22	12	58	37	27	7.8	4.5	5.5		
CFSM	.77	.77	.62	.28	.48	.60	2.28	1.49	2.28	.29	.10	.30		
IN.	.89	.86	.72	.33	.52	.69	2.54	1.72	2.55	.33	.12	.34		
AC-FT	4840	4670	3910	1770	2810	3770	13790	9360	13870	1810	629	1840		
CAL YR 1983	TOTAL	31917.2	MEAN	87.4	MAX	994	MIN	2.8	CFSM	.86	IN	11.64	AC-FT	63310
WTR YR 1984	TOTAL	31798.4	MEAN	86.9	MAX	938	MIN	4.5	CFSM	.85	IN	11.60	AC-FT	63070

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 mi² (598 km²).

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.--19 years, 99.9 ft³/s (2.829 m³/s), 5.87 in/yr (149 mm/yr); median of yearly mean discharges, 104 ft³/s (2.95 m³/s), 6.11 in/yr (155 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 745 ft³/s (21.1 m³/s) July 3, 1975, gage height, 7.65 ft (2.332 m); minimum, 1.9 ft³/s (0.054 m³/s) Sept. 19, 20, 21, 1976; minimum gage height, 1.98 ft (0.604 m) Oct. 3, 1971.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 421 ft³/s (11.9 m³/s) June 17, 18; maximum gage height, 6.93 ft (2.112 m) June 13, 17, 18; minimum discharge, 10 ft³/s (0.28 m³/s) Sept. 5, 6, 9; minimum gage height, 2.36 ft (0.719 m) Sept. 6, 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	87	96	87	80	268	213	270	168	228	77	12
2	30	86	95	87	80	270	219	270	155	213	68	11
3	30	82	95	86	79	273	221	260	136	205	64	11
4	29	81	95	86	79	276	233	253	120	192	59	11
5	30	80	95	86	79	275	245	264	125	179	58	10
6	30	79	95	86	78	272	244	267	127	164	59	10
7	31	78	94	86	78	270	241	297	139	150	53	11
8	32	77	93	86	78	268	237	340	233	137	65	12
9	32	81	93	85	78	260	232	346	259	131	69	11
10	34	87	93	85	78	250	226	349	269	154	79	11
11	53	89	92	85	78	233	220	349	282	154	75	11
12	56	90	92	84	80	223	221	343	353	143	64	20
13	55	92	92	84	88	200	228	350	413	130	56	16
14	57	95	92	84	95	175	224	344	399	127	52	15
15	61	99	91	84	104	167	219	331	396	118	41	14
16	73	100	91	84	111	161	212	322	402	107	33	14
17	77	101	90	83	117	154	204	319	416	102	29	15
18	75	105	90	83	124	148	199	305	417	94	27	14
19	78	108	90	83	136	140	192	289	407	88	26	15
20	88	124	90	82	153	133	187	268	397	83	39	15
21	93	133	90	82	155	129	178	254	384	79	15	16
22	94	131	89	82	162	132	167	257	379	78	12	19
23	95	121	89	82	189	132	157	245	378	98	11	22
24	97	114	89	81	213	133	148	229	365	88	11	42
25	96	109	89	81	234	139	140	220	347	76	11	47
26	95	106	88	81	257	150	135	204	327	55	11	46
27	95	102	88	80	265	162	153	192	309	36	13	44
28	95	100	88	80	268	174	209	180	284	77	13	43
29	91	98	88	80	268	186	226	167	260	65	14	42
30	91	97	88	80	---	195	249	160	243	61	14	42
31	89	---	87	80	---	203	---	166	---	82	16	---
TOTAL	2012	2932	2827	2585	3884	6151	6179	8410	8889	3694	1234	622
MEAN	64.9	97.7	91.2	83.4	134	198	206	271	296	119	39.8	20.7
MAX	97	133	96	87	268	276	249	350	417	228	79	47
MIN	29	77	87	80	78	129	135	160	120	36	11	10
CFSM	.28	.42	.40	.36	.58	.86	.89	1.17	1.28	.52	.17	.09
IN.	.32	.47	.46	.42	.63	.99	1.00	1.35	1.43	.59	.20	.10
AC-FT	3990	5820	5610	5130	7700	12200	12260	16680	17630	7330	2450	1230
CAL YR 1983	TOTAL	51164	MEAN 140	MAX 534	MIN 18	CFSM .61	IN 8.24	AC-FT 101500				
WTR YR 1984	TOTAL	49419	MEAN 135	MAX 417	MIN 10	CFSM .58	IN 7.96	AC-FT 98020				

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 mi² (16,160 km²).

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 except for period of no gage-height record, June 21 to July 31, which is fair. Diurnal fluctuation caused by St. Croix Falls Powerplant 1,500 ft (457 m) upstream.

AVERAGE DISCHARGE.--82 years, 4,268 ft³/s (120.9 m³/s), 9.29 in/yr (236 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 54,900 ft³/s (1,550 m³/s) May 8, 1950, gage height, 25.19 ft (7.678 m); minimum daily, 75 ft³/s (2.12 m³/s) July 17, 1910.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,400 ft³/s (1,000 m³/s) June 13, gage height, 16.45 ft (5.014 m); minimum daily, 2,460 ft³/s (69.7 m³/s) Aug. 14, 23.

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	14.0	29,900
		16.0	34,400

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4870	5190	7440	5140	3790	8160	9830	16400	5720	6150	3430	2710
2	5380	4980	7290	5080	3880	7640	11000	16800	5300	6080	2920	2880
3	5480	4700	6090	4630	3490	7240	12100	16500	4650	6060	3290	2650
4	5930	4690	5630	5110	3450	6920	13700	15900	4780	6250	2660	3030
5	5410	4670	6300	4340	3440	6510	14900	15400	4620	6190	2770	3010
6	5410	4670	6720	4790	3660	5850	15500	14100	4840	6130	3670	2650
7	5420	4350	6520	4650	3450	5430	16100	13800	6800	6090	4410	3000
8	4970	4420	6200	4420	3670	4990	16400	15100	9880	5740	4390	2610
9	4900	4610	6100	4730	3370	4360	16200	14800	12500	5480	4100	2670
10	4930	4660	5480	4870	3640	4600	15500	14400	15000	4880	3880	2850
11	5820	5110	5620	4670	3350	4050	14700	13500	18000	5640	3600	2890
12	7290	5090	4770	4320	3880	3540	13800	12700	26200	5690	3070	3140
13	8690	5340	4690	4230	4080	4000	13300	12400	34200	5440	3140	3190
14	9320	5000	4640	4150	4360	4150	12600	11400	32100	5560	2460	4150
15	8680	4730	5070	4230	4910	4080	12300	10700	30400	4640	3760	4170
16	8590	5140	5250	4130	5780	4300	11700	9770	28500	4600	2720	3870
17	8970	5210	5640	4320	5960	3790	11100	9280	26400	4620	2790	3280
18	9440	5220	6230	4310	6870	4060	10400	9570	23800	4470	2780	3260
19	9820	5110	5500	4550	7620	4360	9240	9410	21100	4110	2620	3490
20	9770	5350	5740	3970	7800	3990	8410	8340	18800	4040	3220	2900
21	9290	7180	5760	4180	8010	4100	7830	7830	16400	4030	2880	3020
22	8870	9820	5930	3970	8690	4140	7470	9560	14000	3560	2830	2900
23	8140	10900	6280	4100	9300	4420	6600	11300	12400	3350	2460	2550
24	7720	9320	5590	3650	9730	4000	6570	12100	11400	3650	2850	3710
25	7390	6620	6500	3900	10100	4740	6220	11900	12800	3390	2750	4380
26	6870	6150	6330	3540	10000	5930	5700	10400	9900	3520	3210	6450
27	7070	6360	5110	3820	9470	6470	5630	9020	8500	2960	2720	8020
28	6200	7590	5420	3650	9600	7240	9250	7880	7500	2980	3010	8230
29	6160	7230	5290	3770	9270	7980	12600	7210	5750	3200	2720	7370
30	5700	7250	5840	3680	---	8990	15500	6370	6440	2860	2980	6730
31	5270	---	5470	3760	---	9750	---	6110	---	2960	2820	---
TOTAL	217770	176660	180440	132660	174620	169780	342150	359950	438680	144320	96910	115760
MEAN	7025	5889	5821	4279	6021	5477	11410	11610	14620	4655	3126	3859
MAX	9820	10900	7440	5140	10100	9750	16400	16800	34200	6250	4410	8230
MIN	4870	4350	4640	3540	3350	3540	5630	6110	4620	2860	2460	2550
CFSM	1.13	.94	.93	.69	.97	.88	1.83	1.86	2.34	.75	.50	.62
IN.	1.30	1.05	1.08	.79	1.04	1.01	2.04	2.15	2.62	.86	.58	.69
AC-FT	431900	350400	357900	263100	346400	336800	678700	714000	870100	286300	192200	229600
CAL YR 1983 TOTAL	2339650			MEAN 6410								
WTR YR 1984 TOTAL	2549700			MEAN 6966								
					MAX 23300	MIN 2510	CFSM 1.03	IN 13.95	AC-FT 4641000			
					MAX 34200	MIN 2460	CFSM 1.12	IN 15.20	AC-FT 5057000			

ST. CROIX RIVER BASIN

05340500 ST. CROIX RIVER AT ST. CROIX FALLS, WI--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 04...		99	.15	.22	.50	.04	.02	<.01	10	89
JAN 18...		131	.68	.11	1.9	.04	.03	<.01	2	100
APR 11...		52	<.10	.06	3.2	.02	<.01	<.01	9	87
JUN 14...		82	.21	.04	.90	.19	.02	<.01	37	85
AUG 06...		115	.11	.02	1.1	.04	<.01	.02	8	85

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 04...	1010	30	2	24	<.5	<1	<1	<3	<1	390	<1
JAN 18...	1235	20	1	32	<.5	<1	1	<3	2	640	1
APR 11...	1115	10	1	20	<.5	<1	4	<3	1	390	2
JUN 14...	1250	70	1	28	<.5	<1	<1	<3	4	450	<1
AUG 06...	1310	<10	1	26	<.5	<1	4	<3	3	160	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 04...	<4	16	.6	10	<1	<1	<1	37	<6	<3
JAN 18...	<4	22	<.1	<10	1	<1	<1	42	<6	15
APR 11...	<4	20	.1	<10	<1	<1	<1	24	<6	5
JUN 14...	<4	76	2.5	<10	2	<1	<1	28	<6	13
AUG 06...	<4	29	1.6	<10	<1	<1	<1	46	<6	7

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.

REMARKS.--Letter K indicates non-ideal colony count.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	TEMPER- ATURE (DEG C) (00010)					
OCT									
03...	1140	6450	145	17.5					
04...	1010	6420	137	16.0					
NOV									
25...	1140	6480	118	.5					
JAN									
18...	1235	5360	188	.0					
FEB									
23...	1220	9110	140	1.0					
MAR									
19...	1100	6480	193	.5					
APR									
04...	1240	13400	120	4.5					
11...	1115	14500	98	6.0					
MAY									
01...	1345	16500	111	7.0					
JUN									
13...	1400	34500	78	20.0					
14...	1250	32200	82	19.0					
JUL									
31...	1200	3910	227	23.0					
AUG									
06...	1310	5540	168	24.5					

DATE	TIME	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)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ PER (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER (31673)
OCT									
04...	1010	141	7.7	7.4	--	3.1	740	36	210
JAN									
18...	1235	175	7.3	7.0	22.0	2.9	750	K13	58
APR									
11...	1115	87	7.4	7.1	11.5	2.8	741	K4	K8
JUN									
14...	1250	87	7.4	7.3	23.0	14	750	280	200
AUG									
06...	1310	169	8.0	7.7	32.0	1.3	742	30	130

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)
OCT									
04...	18	5.4	2.1	1.1	66	9.1	3.1	<.10	12
JAN									
18...	23	7.2	3.4	.90	81	10	3.5	<.10	15
APR									
11...	11	3.7	1.9	.90	39	4.1	3.3	<.10	9.1
JUN									
14...	12	3.7	1.6	1.1	39	12	2.3	<.10	6.4
AUG									
06...	22	7.0	2.9	.70	80	4.2	3.0	<.10	12

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 mi² (116,000 km²), 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.--56 years, 16,830 ft³/s (476.6 m³/s), 5.10 in/yr (130 mm/yr); median of yearly mean discharges, 15,300 ft³/s (433 m³/s), 4.64 in/yr (118 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 228,000 ft³/s (6,460 m³/s) Apr. 18, 1965, gage height, 43.11 ft (13.140 m); minimum daily, 1,380 ft³/s (39.1 m³/s) July 13, 1940; minimum gage height, 15.08 ft (4.596 m) Aug. 29, 1934, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 90,900 ft³/s (2,570 m³/s) June 17, gage height, 34.69 ft (10.574 m); minimum daily, 7,940 ft³/s (225 m³/s) Sept. 25; minimum gage height, 24.70 ft (7.529 m) Sept. 21.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12500	17700	20500	16800	12500	38800	46500	52200	28300	78300	15600	8700
2	12300	18000	20300	16500	12400	37900	49600	54600	26800	75000	15700	8200
3	13000	17500	19200	16300	12800	37400	54400	56000	25100	71400	15100	8840
4	13300	16800	18200	15500	12500	36500	60100	56400	24400	67000	15000	8600
5	13900	16500	17800	15900	12200	36500	64400	57200	24800	62800	14800	8910
6	13500	16200	19000	14800	11500	35700	67800	57500	24700	58200	14600	8850
7	13600	15800	19400	15600	11100	31100	70800	58500	24700	52800	14900	8250
8	13000	15400	20300	14600	11300	27600	71400	59500	28900	49100	17400	8720
9	13300	15800	18800	14900	11600	25000	71800	61400	32500	45800	18900	8020
10	13500	16100	18400	14600	10200	24600	71500	64100	36000	43100	19300	8200
11	12300	15400	18200	14800	11000	24100	70100	65800	41000	41700	18300	8490
12	13200	16400	18200	14000	11600	24400	68100	65000	49900	39600	16600	8270
13	16300	16600	19100	14200	11800	23800	66800	63400	64800	37900	15300	8610
14	18100	16800	17700	14200	12300	23800	64900	62900	78000	36800	14500	9310
15	20000	16200	18200	14500	13800	23700	63900	61100	84600	35300	14300	10500
16	19100	16600	18700	13900	14700	24000	62900	59300	88600	33300	14100	9940
17	20400	16400	17300	13800	16300	23100	62400	57400	90700	32900	12900	10200
18	20300	17000	16800	13600	17000	22700	62000	54700	90500	31200	12300	12100
19	22100	16900	17000	13100	18700	22600	62000	52800	89500	30100	11600	11600
20	21800	16800	16400	13900	21500	22700	61900	50400	88700	29200	11400	9720
21	22500	16400	17100	13400	22600	22300	61100	47100	88200	27600	10900	9360
22	22400	19000	18000	13300	25300	22700	60200	45300	88500	25900	10100	8860
23	22600	24400	18400	13400	28100	22100	58300	43800	89800	25300	10400	8190
24	21300	26500	18200	14000	30900	22100	55100	42000	89200	23400	9920	8240
25	20900	26700	17400	12900	32800	23500	52000	41900	88800	21700	9730	7940
26	21200	23200	18300	13200	34900	26100	49300	40500	87800	21200	9330	9230
27	20700	21300	18600	12400	35600	29200	47400	37800	85900	19400	9450	12700
28	20500	21000	17200	13000	36100	32600	46800	35100	84200	17900	9180	14400
29	19900	21600	17200	12500	37700	35400	46700	32800	81600	17500	9710	15400
30	20000	22700	16600	12600	---	38200	50200	30800	80000	16900	9850	15600
31	18600	---	17200	12300	---	42400	---	29100	---	15800	9590	---
TOTAL	546100	553700	563700	438500	550800	882600	1800400	1596400	1906500	1184100	410760	293950
MEAN	17620	18460	18180	14150	18990	28470	60010	51500	63550	38200	13250	9798
MAX	22600	26700	20500	16800	37700	42400	71800	65800	90700	78300	19300	15600
MIN	12300	15400	16400	12300	10200	22100	46500	29100	24400	15800	9180	7940
CFSM	.39	.41	.41	.32	.42	.64	1.34	1.15	1.42	.85	.30	.22
IN.	.45	.46	.47	.36	.46	.73	1.49	1.33	1.58	.98	.34	.24
AC-FT	1083000	1098000	1118000	869800	1093000	1751000	3571000	3166000	3782000	2349000	814700	583000
CAL YR 1983	TOTAL	10085900	MEAN	27630	MAX	84000	MIN	10600	CFSM .62	IN 8.37	AC-FT	20010000
WTR YR 1984	TOTAL	10727510	MEAN	29310	MAX	90700	MIN	7940	CFSM .65	IN 8.91	AC-FT	21280000

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 mi² (285 km²).

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.--12 years (water years 1943, 1974-84), 51.2 ft³/s (1.450 m³/s), 6.32 in/yr (161 mm/yr), 37,100 acre-ft/yr (45.7 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,030 ft³/s (57.5 m³/s) Sept. 18, 1942; maximum gage height, 7.72 ft (2.353 m) Aug. 8, 1984; minimum daily discharge, 8.4 ft³/s (0.24 m³/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 ft³/s (176 m³/s) from rating extended above 2,100 ft³/s (59.5 m³/s).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 200 ft³/s (5.66 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 25	0515	236 6.68	5.23 1.594	May 3	0445	309 8.75	5.75 1.753
Mar. 29	2030	295 8.35	5.68 1.731	July 12	0615	312 8.84	5.98 1.823
Apr. 15	0230	205 5.81	5.21 1.588	Aug 8	1700	*860 24.4	*7.72 2.353

Minimum discharge, 29 ft³/s (0.82 m³/s) Jan. 27, gage height 2.40 ft (0.732 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	42	50	40	32	107	245	166	62	62	46	54
2	37	43	50	40	33	98	246	248	60	60	44	55
3	38	42	48	42	32	91	232	303	57	59	44	53
4	37	41	48	41	32	90	210	264	58	57	43	55
5	37	41	49	44	32	81	189	216	90	53	43	53
6	36	41	49	44	30	78	168	178	93	52	45	51
7	36	41	47	44	31	77	147	170	82	50	143	51
8	35	39	46	44	37	76	128	178	114	50	571	51
9	35	47	45	44	31	72	116	168	148	50	449	49
10	36	57	45	43	31	73	109	143	127	87	228	49
11	62	56	45	43	31	70	104	123	157	227	130	49
12	64	52	46	43	39	70	112	110	149	292	108	73
13	59	49	46	43	43	71	150	112	147	176	97	81
14	53	51	47	43	44	68	193	116	123	109	89	65
15	48	54	44	42	48	67	201	110	109	93	82	58
16	46	54	44	42	59	69	175	106	104	86	76	53
17	44	52	44	40	74	67	144	127	122	96	75	51
18	43	50	43	37	90	66	119	121	146	85	75	49
19	44	55	43	35	113	67	106	109	154	75	72	48
20	52	74	43	34	133	70	97	97	113	69	70	45
21	56	73	43	34	150	72	90	90	99	64	72	45
22	54	67	42	34	165	67	84	91	95	61	74	44
23	53	65	42	34	193	67	82	84	119	63	68	44
24	51	53	42	34	197	76	80	80	117	56	69	46
25	49	55	42	33	216	100	77	77	95	54	68	46
26	48	54	42	33	182	156	76	73	86	60	67	46
27	46	52	41	33	141	226	90	69	80	58	65	46
28	46	51	41	34	122	273	101	68	74	52	63	46
29	44	51	41	32	110	285	100	66	69	49	59	45
30	43	51	41	32	---	282	117	65	66	48	56	45
31	43	---	41	33	---	255	---	64	---	46	56	---
TOTAL	1413	1553	1380	1194	2471	3387	4088	3992	3115	2499	3247	1546
MEAN	45.6	51.8	44.5	38.5	85.2	109	136	129	104	80.6	105	51.5
MAX	64	74	50	44	216	285	246	303	157	292	571	81
MIN	35	39	41	32	30	66	76	64	57	46	43	44
CFSM	.42	.47	.41	.35	.78	.99	1.24	1.17	.95	.73	.96	.47
IN.	.48	.53	.47	.40	.84	1.15	1.38	1.35	1.05	.85	1.10	.52
AC-FT	2800	3080	2740	2370	4900	6720	8110	7920	6180	4960	6440	3070
CAL YR 1983	TOTAL	34456	MEAN 94.4	MAX 508	MIN 34	CFSM .86	IN 11.65	AC-FT 68340				
WTR YR 1984	TOTAL	29885	MEAN 81.7	MAX 571	MIN 30	CFSM .74	IN 10.11	AC-FT 59280				

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, 1984): Maximum, 997 microsiemens Jan. 7, 1982; minimum, 236 microsiemens 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, 1984): Maximum, 30.0°C July 13, 1984; minimum 0.0°C many days during winter.

DISSOLVED OXYGEN (water years 1979-82, 1984): Maximum, 14.6 mg/L Nov. 21, 1981; minimum, 1.5 mg/L Nov. 14, 1979.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 921 microsiemens Jan. 6; minimum, 391 microsiemens Mar. 28.

WATER TEMPERATURES: Maximum, 30.0°C JULY 13; minimum, 0.0°C several days during winter period.

DISSOLVED OXYGEN: Maximum 14.3 mg/L Feb. 28; minimum 4.1 mg/L July 7, 12.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG.C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	899	767	811	818	722	755	742	677	706	729	729	729
2	865	746	811	837	745	788	745	682	708	790	673	717
3	823	745	786	850	758	800	737	663	702	822	682	740
4	816	708	766	824	684	760	759	702	726	---	---	---
5	818	728	758	740	645	685	784	699	743	886	782	840
6	794	690	733	753	673	714	776	713	747	921	832	873
7	766	663	722	767	692	723	759	697	727	891	800	854
8	783	667	713	749	631	698	764	705	731	866	776	822
9	776	644	708	664	546	602	758	702	734	851	779	820
10	767	670	717	614	543	576	798	697	747	859	772	812
11	706	583	642	646	577	610	795	734	761	845	765	802
12	651	577	606	654	583	617	780	713	749	864	783	822
13	668	601	625	668	585	630	780	716	748	885	807	845
14	700	632	656	699	641	674	798	684	746	887	803	837
15	732	625	661	702	662	682	708	631	674	865	800	838
16	739	647	690	769	661	710	728	667	692	854	743	811
17	754	649	703	774	712	743	741	675	711	858	788	811
18	797	680	727	806	732	773	745	688	714	861	793	820
19	786	673	731	819	710	756	739	677	703	848	786	817
20	751	601	673	769	686	732	700	650	675	863	782	821
21	685	632	657	738	665	712	679	630	657	871	769	824
22	703	618	661	713	666	690	726	642	679	850	751	806
23	669	589	625	718	615	665	724	665	694	828	760	799
24	679	598	638	756	636	683	742	678	708	866	771	808
25	671	600	634	728	670	695	739	654	697	859	779	817
26	694	609	641	737	661	700	702	634	665	861	782	817
27	719	618	659	737	673	710	699	635	669	818	757	791
28	694	628	655	714	658	695	706	635	670	812	713	756
29	702	630	666	728	652	693	719	651	686	779	681	734
30	701	666	683	731	661	688	721	660	689	740	698	720
31	777	739	770	---	---	---	733	655	690	802	707	744
MONTH	899	577	694	850	543	699	798	630	708	---	---	---

VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	811	725	759	584	506	557	604	575	587	672	497	561
2	819	753	783	537	496	510	597	523	565	683	530	638
3	835	750	781	---	---	---	563	513	536	714	584	679
4	809	701	759	---	---	---	558	510	530	726	579	653
5	861	752	778	---	---	---	561	526	541	768	588	728
6	804	697	758	---	---	---	590	534	556	791	765	774
7	771	698	738	---	---	---	577	539	562	780	756	770
8	804	704	746	---	---	---	589	529	570	551	536	546
9	793	716	742	---	---	---	592	538	570	585	538	558
10	829	708	761	---	---	---	612	582	599	620	582	600
11	852	740	786	---	---	---	631	557	598	642	595	618
12	816	645	730	---	---	---	585	520	555	631	609	619
13	680	592	636	---	---	---	569	524	548	615	580	597
14	702	646	677	---	---	---	527	514	521	600	470	563
15	693	654	677	---	---	---	551	515	531	618	537	580
16	703	615	655	---	---	---	575	543	558	599	447	544
17	641	596	614	---	---	---	617	565	586	614	408	532
18	604	572	589	---	---	---	620	580	600	597	566	583
19	---	---	---	---	---	---	650	618	634	637	591	614
20	---	---	---	---	---	---	701	654	678	645	604	623
21	567	529	554	---	---	---	798	686	629	619	507	577
22	---	---	---	---	---	---	775	605	690	614	541	585
23	---	---	---	617	568	587	809	620	715	616	547	578
24	---	---	---	588	551	572	830	635	785	612	476	543
25	---	---	---	564	482	527	811	592	677	612	553	590
26	---	---	---	513	466	486	863	599	719	625	539	596
27	---	---	---	469	404	427	867	585	753	624	539	581
28	593	547	575	529	391	471	660	301	427	638	569	607
29	614	556	575	514	457	493	544	321	340	628	568	596
30	---	---	---	558	500	525	614	475	544	642	594	610
31	---	---	---	594	541	563	---	---	---	691	531	600
MONTH	---	---	---	---	---	---	867	301	590	791	408	608
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	629	490	566	737	442	659	---	---	---	682	591	636
2	642	491	572	698	640	669	---	---	---	665	584	607
3	598	439	501	696	640	672	---	---	---	650	588	607
4	694	489	604	713	642	661	---	---	---	640	587	619
5	687	565	615	692	445	650	---	---	---	634	564	594
6	694	631	671	---	---	---	723	645	674	625	576	601
7	713	651	678	---	---	---	668	323	439	652	591	621
8	690	551	596	---	---	---	347	258	285	631	584	613
9	587	434	570	---	---	---	446	293	363	628	575	604
10	---	---	---	---	---	---	558	460	519	631	576	604
11	---	---	---	---	---	---	589	558	572	654	599	622
12	---	---	---	---	---	---	604	573	586	615	493	568
13	---	---	---	---	---	---	630	589	607	602	517	571
14	---	---	---	---	---	---	641	612	627	647	565	589
15	628	580	612	---	---	---	644	599	627	621	564	586
16	622	571	602	---	---	---	653	599	629	627	571	594
17	601	577	586	---	---	---	646	618	631	642	585	609
18	599	576	588	---	---	---	655	619	638	672	610	636
19	624	589	608	---	---	---	652	614	632	692	613	646
20	629	606	617	---	---	---	648	619	632	639	600	620
21	629	610	621	---	---	---	649	608	627	681	604	622
22	660	567	638	---	---	---	660	594	635	637	603	620
23	610	534	559	---	---	---	690	633	653	638	601	618
24	625	567	596	---	---	---	679	623	657	730	603	647
25	659	612	635	---	---	---	688	640	663	638	601	619
26	658	616	638	---	---	---	698	645	674	638	599	614
27	652	616	637	---	---	---	704	619	662	639	589	618
28	656	628	645	---	---	---	672	632	650	638	603	622
29	692	647	669	---	---	---	657	613	635	638	591	616
30	710	645	674	---	---	---	637	592	614	636	528	607
31	---	---	---	---	---	---	626	577	597	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	730	493	612

VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	8.7	8.5	8.6	7.8	7.7	7.8	8.2	8.2	8.2
2	---	---	---	8.8	8.5	8.6	7.9	7.6	7.8	8.5	8.3	8.4
3	---	---	---	8.5	8.2	8.3	7.8	7.5	7.6	8.8	8.3	8.5
4	8.1	7.7	7.9	8.4	8.0	8.2	8.1	7.7	7.9	---	---	---
5	8.1	7.4	7.7	8.2	8.0	8.1	8.1	7.9	8.0	7.9	7.7	7.8
6	7.9	7.5	7.7	8.3	8.1	8.2	8.1	7.8	7.9	7.7	7.5	7.6
7	7.8	7.6	7.7	8.5	7.8	8.2	7.9	7.7	7.8	7.6	7.4	7.5
8	8.0	7.5	7.7	8.3	8.0	8.1	7.9	7.4	7.8	7.4	7.2	7.3
9	7.8	7.2	7.5	8.0	7.8	7.8	7.9	7.7	7.8	7.3	7.1	7.2
10	7.8	7.6	7.7	7.9	7.8	7.8	8.1	7.8	8.0	7.2	7.0	7.1
11	7.7	7.5	7.7	8.0	7.8	7.9	8.2	8.0	8.1	7.2	7.1	7.1
12	7.6	7.3	7.4	7.9	7.7	7.8	8.6	8.0	8.3	7.3	7.1	7.2
13	7.5	7.2	7.4	8.0	7.9	7.9	8.6	8.5	8.5	7.5	7.3	7.4
14	7.8	7.3	7.5	8.1	8.0	8.0	8.8	8.6	8.7	7.6	7.4	7.5
15	7.8	7.5	7.6	8.2	8.1	8.1	8.7	8.4	8.6	7.5	7.3	7.4
16	8.0	7.6	7.8	8.2	8.0	8.1	8.5	8.3	8.4	7.7	7.4	7.5
17	8.2	7.5	7.8	8.2	8.0	8.1	8.4	8.3	8.4	7.5	7.4	7.5
18	8.2	7.8	8.0	8.3	8.1	8.2	8.4	8.1	8.2	7.4	7.2	7.3
19	8.1	8.0	8.0	8.3	8.2	8.3	8.3	7.8	8.1	7.4	7.2	7.3
20	8.1	7.9	8.0	8.3	8.1	8.1	8.2	7.8	8.0	7.4	7.0	7.2
21	8.4	8.0	8.2	8.1	8.0	8.1	8.3	8.1	8.2	7.3	7.2	7.2
22	8.5	8.3	8.4	8.0	7.9	7.9	8.3	8.1	8.2	7.4	7.2	7.3
23	8.4	8.2	8.3	7.9	7.5	7.7	8.1	7.8	8.0	7.7	7.3	7.5
24	8.5	8.2	8.3	7.6	7.4	7.5	8.1	7.8	8.0	7.9	7.5	7.7
25	8.6	8.1	8.3	7.7	7.4	7.5	8.0	7.9	8.0	8.0	7.8	7.9
26	8.8	8.2	8.5	7.8	7.7	7.8	8.0	7.9	8.0	8.0	7.8	7.8
27	8.9	8.3	8.6	8.0	7.8	7.9	8.1	8.0	8.0	7.8	7.5	7.6
28	8.7	8.4	8.5	8.0	7.8	7.9	8.2	8.1	8.1	7.9	7.5	7.7
29	8.7	8.2	8.4	7.9	7.8	7.8	8.2	8.1	8.1	7.8	7.5	7.7
30	8.6	8.1	8.3	7.8	7.6	7.7	8.2	8.1	8.1	7.8	7.6	7.6
31	8.4	8.3	8.4	---	---	---	8.3	8.1	8.2	7.9	7.6	7.7
MONTH	---	---	---	8.8	7.4	8.0	8.8	7.4	8.1	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	8.0	7.6	7.8	8.0	7.7	7.8	7.7	7.1	7.4	7.6	7.4	7.5
2	8.0	7.8	7.9	8.1	7.5	7.9	8.4	7.0	7.8	7.5	7.3	7.4
3	8.1	7.8	7.9	---	---	---	8.0	7.7	7.9	7.5	7.3	7.4
4	7.9	7.7	7.8	---	---	---	8.6	7.7	8.0	7.6	7.3	7.5
5	7.7	7.3	7.5	---	---	---	8.5	7.8	8.1	7.7	7.4	7.5
6	7.5	7.2	7.4	---	---	---	8.7	7.9	8.3	7.7	7.5	7.6
7	7.6	7.5	7.6	---	---	---	8.7	8.2	8.4	7.5	7.5	7.5
8	7.9	7.6	7.7	---	---	---	8.5	8.2	8.4	8.0	7.8	7.9
9	8.2	7.7	7.9	---	---	---	8.5	7.6	7.9	8.0	7.8	7.9
10	8.2	7.9	8.0	---	---	---	7.6	7.5	7.6	8.0	7.7	7.9
11	8.4	8.2	8.3	---	---	---	7.6	7.5	7.6	8.0	7.8	7.9
12	8.4	8.1	8.3	---	---	---	7.6	7.5	7.5	7.9	7.8	7.9
13	---	---	---	---	---	---	7.5	7.5	7.5	7.9	7.8	7.8
14	---	---	---	---	---	---	7.5	7.4	7.5	7.9	7.8	7.8
15	---	---	---	---	---	---	7.6	7.4	7.5	7.9	7.8	7.9
16	---	---	---	---	---	---	7.7	7.5	7.6	7.9	7.8	7.8
17	---	---	---	---	---	---	7.7	7.5	7.6	7.9	7.7	7.8
18	8.6	8.3	8.4	---	---	---	7.7	7.5	7.6	7.9	7.7	7.8
19	8.3	8.2	8.3	---	---	---	7.6	7.5	7.6	7.9	7.7	7.8
20	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.8	7.9
21	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.8	7.9
22	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.8	7.9
23	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.8	7.9
24	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.9	7.9
25	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.8	7.9
26	---	---	---	---	---	---	7.7	7.6	7.6	7.9	7.9	7.9
27	---	---	---	---	---	---	7.7	7.5	7.6	7.9	7.9	7.9
28	7.9	7.7	7.8	---	---	---	7.8	7.6	7.7	8.0	7.9	7.9
29	8.0	7.6	7.8	---	---	---	7.7	7.6	7.7	7.9	7.8	7.9
30	---	---	---	7.7	6.9	7.3	7.7	7.6	7.6	8.0	7.8	7.9
31	---	---	---	8.0	7.3	7.6	---	---	---	8.0	7.9	7.9
MONTH	---	---	---	---	---	---	8.7	7.0	7.7	8.0	7.3	7.8

VERMILLION RIVER BASIN

05345000 VERRMILLION RIVER NEAR EMPIRE, MN--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.0	7.9	7.9				---	---	---	7.8	7.5	7.6
2	8.0	7.9	7.9				---	---	---	7.9	7.7	7.8
3	8.0	7.9	8.0				---	---	---	7.8	7.4	7.7
4	8.0	7.7	7.8				---	---	---	7.9	7.4	7.7
5	7.7	7.6	7.6				---	---	---	7.9	7.8	7.8
6	7.7	7.6	7.6				7.6	7.4	7.5	8.0	7.8	7.9
7	7.7	7.6	7.7				7.7	7.5	7.6	8.1	7.8	8.0
8	7.6	7.4	7.5				7.7	7.5	7.6	8.1	7.8	7.9
9	7.5	7.4	7.4				7.8	7.6	7.7	7.9	7.7	7.8
10	7.5	7.4	7.5				7.8	7.6	7.7	7.8	7.8	7.8
11	7.6	7.4	7.5				7.9	7.7	7.8	7.8	7.7	7.7
12	---	---	---				7.9	7.7	7.8	7.8	7.7	7.7
13	---	---	---				8.0	7.8	7.9	7.8	7.8	7.8
14	---	---	---				8.0	7.8	7.9	7.7	7.6	7.7
15	---	---	---				8.0	7.8	7.9	7.7	7.6	7.6
16	---	---	---				8.1	7.9	8.0	7.6	7.6	7.6
17	---	---	---				8.1	8.0	8.0	7.8	7.6	7.7
18	---	---	---				7.9	7.5	7.7	7.8	7.7	7.8
19	---	---	---				7.7	7.5	7.6	7.9	7.7	7.9
20	---	---	---				7.8	7.7	7.7	7.9	7.3	7.6
21	---	---	---				8.0	7.7	7.9	8.0	7.3	7.7
22	---	---	---				8.0	7.7	7.8	8.1	7.9	8.0
23	---	---	---				7.8	7.7	7.7	8.0	7.8	7.9
24	---	---	---				7.7	7.6	7.7	8.1	7.9	8.0
25	---	---	---				7.9	7.6	7.7	8.3	7.1	7.8
26	---	---	---				7.9	7.8	7.8	7.4	7.0	7.1
27	---	---	---				8.0	7.9	7.9	7.4	7.0	7.2
28	---	---	---				7.9	7.7	7.8	7.4	7.0	7.2
29	---	---	---				7.9	7.4	7.7	7.4	7.3	7.3
30	---	---	---				7.5	7.4	7.4	7.4	7.3	7.3
31	---	---	---				7.5	7.4	7.5	---	---	---
MONTH	---	---	---				---	---	---	8.3	7.0	7.7

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	18.0	15.0	16.5	11.0	9.0	10.0	2.0	1.0	1.5	1.0	1.0	1.0
2	18.0	15.5	16.5	12.0	11.0	11.5	2.0	1.0	1.5	3.0	2.0	2.5
3	16.5	15.5	16.0	11.0	8.0	9.5	2.0	.0	1.0	4.0	2.0	3.0
4	14.5	13.0	13.5	8.0	7.0	7.5	3.5	2.0	2.5	---	---	---
5	15.0	12.0	13.5	8.0	6.0	7.0	3.0	1.0	2.0	5.5	3.5	4.5
6	13.0	11.0	12.0	9.0	8.0	8.5	2.0	.5	1.5	5.0	3.5	4.5
7	12.5	11.5	12.0	10.5	7.5	9.0	1.0	.0	.5	5.0	3.0	4.5
8	13.5	11.0	12.0	10.0	8.0	9.0	1.0	.0	.5	4.5	2.5	3.0
9	12.0	9.0	10.5	8.0	5.0	6.0	1.0	.0	.5	3.5	2.5	3.0
10	11.5	10.5	10.5	4.5	4.0	4.5	1.5	.5	1.0	2.0	1.0	1.0
11	12.0	11.0	11.5	5.0	3.5	4.5	2.5	1.5	2.0	1.0	1.0	1.0
12	10.5	8.0	9.5	4.5	3.0	4.0	2.5	.5	1.0	2.5	1.0	1.5
13	9.0	7.5	8.5	5.0	3.5	4.5	2.0	1.0	1.5	3.5	2.0	3.0
14	10.0	8.0	8.5	7.0	5.0	6.0	3.0	2.0	2.5	3.0	2.0	2.5
15	9.5	8.0	8.5	6.5	6.5	6.5	1.5	.0	.5	2.5	1.0	1.5
16	10.0	8.5	9.0	6.5	5.5	6.0	.5	.0	.5	2.0	1.0	1.5
17	9.5	7.0	8.5	6.5	5.0	5.5	.5	.5	.5	1.5	1.0	1.0
18	10.0	8.5	9.0	8.0	6.0	7.0	1.0	.5	.5	1.0	.5	1.0
19	9.0	6.0	7.0	8.5	7.5	8.0	1.0	.5	.5	1.0	1.0	1.0
20	7.5	7.0	7.5	8.5	6.0	7.0	1.0	.0	.5	1.0	.5	1.0
21	8.0	7.0	7.5	6.0	5.5	5.5	.5	.5	.5	1.0	1.0	1.0
22	8.5	7.5	8.0	5.5	4.5	5.0	.5	.0	.5	1.0	1.0	1.0
23	7.5	6.5	6.5	4.5	1.0	2.5	.5	.0	.5	3.0	1.0	2.0
24	9.0	6.0	7.5	2.5	.5	2.0	.5	.0	.5	5.0	2.0	3.5
25	9.5	7.5	8.5	3.0	1.0	2.0	.5	.5	.5	5.0	3.5	4.0
26	10.0	7.5	8.5	3.0	2.5	3.0	.5	.5	.5	5.0	3.0	4.0
27	11.0	8.0	9.5	3.0	1.5	2.5	.5	.5	.5	3.0	1.5	2.0
28	11.0	9.0	10.0	2.0	.0	1.5	.5	.5	.5	3.5	2.0	3.0
29	9.0	7.0	8.0	2.5	1.5	2.0	.5	.5	.5	3.0	1.5	2.5
30	8.5	6.5	7.5	2.0	.5	1.5	.5	.5	.5	3.0	1.0	2.0
31	9.0	8.0	8.5	---	---	---	1.0	.5	.5	4.5	2.0	3.0
MONTH	18.0	6.0	10.0	12.0	.0	5.5	3.5	.0	1.0	---	---	---

VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	5.5	3.0	4.0	5.5	2.5	4.0	7.5	4.5	6.0	9.5	3.5	6.5
2	5.5	4.5	5.0	5.5	3.0	4.0	8.5	5.0	6.5	11.0	7.5	9.0
3	6.5	4.0	5.0	---	---	---	7.0	5.5	6.5	14.0	9.5	11.5
4	4.5	3.0	4.0	---	---	---	8.5	4.5	6.5	13.0	12.0	12.5
5	2.5	1.0	1.0	---	---	---	9.0	5.5	7.5	14.0	11.0	12.5
6	1.0	.5	.5	---	---	---	10.0	6.5	8.0	14.5	12.5	13.5
7	1.0	.5	.5	---	---	---	8.5	7.0	7.5	14.0	12.5	13.5
8	3.0	.5	1.5	---	---	---	7.5	6.5	7.0	14.0	11.5	13.0
9	4.0	1.0	2.5	---	---	---	8.0	6.0	7.0	13.0	10.5	12.0
10	4.5	2.0	3.5	---	---	---	8.0	7.0	7.5	14.0	11.0	12.5
11	5.5	4.0	4.5	---	---	---	7.5	6.5	7.0	15.5	12.0	13.5
12	5.0	3.0	4.5	---	---	---	7.0	6.0	6.5	14.0	11.5	13.0
13	4.5	3.5	4.5	---	---	---	7.5	6.5	7.0	13.0	11.5	12.5
14	6.5	4.5	5.5	---	---	---	7.5	6.0	7.0	15.5	10.5	12.5
15	6.5	5.0	6.0	---	---	---	10.0	6.5	8.0	16.0	12.5	14.5
16	5.5	4.5	5.0	---	---	---	11.0	7.5	9.5	14.5	11.5	13.0
17	4.5	4.0	4.5	---	---	---	10.5	7.5	9.0	16.0	11.5	14.0
18	4.0	2.0	3.0	---	---	---	10.5	7.0	9.0	18.0	14.5	16.0
19	2.5	1.0	2.0	---	---	---	11.0	8.0	9.5	18.5	16.0	17.0
20	---	---	---	---	---	---	12.0	8.5	10.0	18.5	15.0	16.5
21	4.0	2.5	3.5	---	---	---	11.0	9.0	10.0	17.5	15.5	16.5
22	4.5	2.5	4.0	---	---	---	9.0	6.5	7.0	17.5	15.0	16.5
23	---	---	---	7.5	5.0	6.5	10.5	6.0	8.0	17.0	13.5	15.5
24	---	---	---	7.5	4.5	6.0	12.0	8.0	10.0	16.0	14.0	15.0
25	---	---	---	6.5	3.5	5.0	11.0	9.0	10.0	15.5	14.0	14.5
26	---	---	---	5.0	2.0	3.5	15.0	9.5	12.0	15.0	12.0	13.5
27	---	---	---	4.0	1.5	2.0	15.5	12.0	14.0	13.0	12.0	12.5
28	4.0	2.0	3.0	5.5	1.0	3.0	11.0	7.5	8.5	15.0	10.5	12.5
29	5.0	1.5	3.0	3.0	1.0	2.0	8.5	4.0	7.0	15.5	11.5	13.5
30	---	---	---	5.5	.0	2.5	5.5	1.5	3.5	16.5	12.0	14.0
31	---	---	---	7.5	2.5	5.0	---	---	---	18.5	13.5	16.0
MONTH	---	---	---	---	---	---	15.5	1.5	8.0	18.5	3.5	13.5
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	19.0	16.0	17.5	18.5	15.0	16.5	---	---	---	14.5	13.0	14.0
2	19.0	15.5	17.0	20.0	16.0	18.0	---	---	---	14.0	13.0	13.5
3	19.0	14.5	16.5	19.5	16.5	18.0	---	---	---	15.5	12.0	13.5
4	17.0	14.5	15.5	19.5	16.5	18.0	---	---	---	14.5	12.0	13.5
5	20.0	15.5	17.5	19.0	16.0	17.5	---	---	---	14.0	10.5	12.5
6	22.0	19.0	20.0	17.5	14.5	16.0	22.0	18.5	21.0	12.5	11.0	11.5
7	21.0	18.5	20.0	18.0	11.5	14.5	21.5	19.5	20.5	15.5	11.5	13.0
8	21.0	17.5	19.5	19.5	14.0	16.5	25.0	21.0	23.0	14.5	12.5	13.5
9	20.0	18.5	19.0	17.5	12.5	15.0	24.0	22.0	23.0	12.5	11.0	11.5
10	19.0	17.5	18.0	17.5	15.5	16.5	21.5	19.0	20.0	12.5	10.0	11.0
11	18.5	17.0	17.5	21.5	16.5	19.0	19.5	17.5	18.5	13.5	10.0	11.5
12	27.0	17.0	22.5	27.0	19.5	22.0	19.0	15.5	17.5	15.0	11.5	13.0
13	25.5	23.0	24.0	30.0	23.0	26.5	18.0	14.5	16.0	15.5	13.5	14.5
14	---	---	---	29.0	22.5	25.5	17.5	14.0	16.0	13.5	10.5	11.5
15	18.5	16.5	18.0	27.5	18.0	22.0	18.0	14.5	16.0	11.5	8.5	10.0
16	17.5	16.5	16.5	26.5	16.0	20.0	17.5	14.0	16.0	12.0	8.0	10.0
17	16.5	16.0	16.5	---	---	---	17.0	13.0	15.0	12.5	8.5	10.5
18	20.0	17.0	19.0	---	---	---	18.5	15.5	16.5	15.0	10.5	12.5
19	19.0	17.0	18.0	---	---	---	18.0	14.5	16.0	16.5	11.5	14.0
20	18.5	16.0	17.5	---	---	---	17.0	14.0	15.5	15.0	10.5	12.5
21	18.0	16.5	17.5	---	---	---	16.0	14.0	15.0	15.0	10.0	12.5
22	19.0	16.0	17.5	---	---	---	16.0	15.5	16.0	12.0	10.5	11.0
23	18.5	16.5	17.5	---	---	---	16.0	13.0	14.5	12.0	10.0	11.0
24	18.5	15.5	17.0	---	---	---	16.5	13.0	14.5	11.5	9.5	10.5
25	19.0	15.0	17.0	---	---	---	17.0	14.0	15.5	9.5	5.0	7.0
26	20.5	16.5	18.0	---	---	---	18.0	15.0	16.5	7.0	5.0	6.0
27	19.0	16.0	17.5	---	---	---	20.5	16.0	18.0	9.0	5.0	6.0
28	19.0	15.5	17.0	---	---	---	21.0	17.0	19.0	9.5	5.5	6.5
29	18.0	14.5	16.5	---	---	---	19.0	16.5	18.0	9.0	5.0	6.5
30	19.0	14.5	16.5	---	---	---	17.0	14.5	15.5	9.0	5.0	6.5
31	---	---	---	---	---	---	15.0	12.5	14.0	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	16.5	5.0	11.0

VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	9.1	8.2	8.5	10.4	9.7	10.1	11.3	10.8	11.1	12.0	12.0	12.0
2	8.8	8.2	8.6	10.7	9.5	9.9	11.5	11.2	11.3	12.5	11.8	12.1
3	8.7	8.2	8.3	11.0	10.0	10.6	11.8	11.4	11.6	12.1	11.7	11.9
4	9.7	9.4	9.5	11.3	10.6	10.9	12.0	11.6	11.8	---	---	---
5	10.5	9.3	9.8	11.0	10.2	10.7	12.2	11.8	12.0	12.4	11.7	12.1
6	10.7	10.2	10.5	11.1	9.9	10.6	11.9	11.2	11.6	12.5	11.7	12.0
7	10.2	10.0	10.1	11.0	10.1	10.6	11.5	10.7	11.2	12.7	11.6	12.1
8	10.5	10.0	10.3	10.6	10.1	10.3	12.2	10.4	11.5	13.3	12.2	12.8
9	11.8	10.2	11.1	10.9	10.2	10.6	11.8	11.2	11.6	13.2	12.5	12.7
10	10.9	10.2	10.7	12.7	10.8	11.9	11.6	10.9	11.2	13.1	12.8	12.9
11	10.1	9.6	9.8	12.3	11.8	12.1	11.0	10.5	10.8	13.4	12.5	12.9
12	11.6	9.9	10.9	12.2	11.6	11.9	11.3	10.6	10.9	13.2	12.5	12.8
13	11.8	11.3	11.6	12.5	11.4	12.0	11.0	10.2	10.7	12.9	12.3	12.5
14	11.6	11.2	11.4	11.6	10.4	11.0	10.9	9.9	10.4	13.0	12.2	12.5
15	11.6	10.9	11.2	10.9	10.3	10.5	11.1	10.5	10.8	13.0	12.3	12.6
16	11.2	10.8	11.0	10.8	10.2	10.5	10.9	10.3	10.6	12.9	12.3	12.5
17	11.4	10.6	11.0	11.4	10.2	10.8	10.6	10.0	10.3	12.9	12.2	12.5
18	11.3	10.5	10.8	10.6	9.9	10.3	10.6	10.2	10.4	12.4	11.6	12.1
19	10.8	10.4	10.6	10.0	9.6	9.8	10.7	10.4	10.6	12.5	11.4	12.0
20	10.5	10.2	10.4	10.0	9.6	9.8	10.8	10.5	10.6	12.5	11.6	12.0
21	10.9	10.0	10.5	10.6	10.1	10.3	11.0	9.4	10.2	12.3	11.1	11.6
22	10.2	9.8	10.1	10.7	10.3	10.5	11.0	10.0	10.6	12.3	11.5	11.8
23	10.8	9.9	10.4	11.0	10.1	10.6	10.4	9.6	10.0	12.6	11.7	12.1
24	10.4	9.8	10.2	11.6	10.8	11.2	11.3	9.3	9.8	12.5	11.8	12.1
25	10.3	9.7	10.0	11.4	10.8	11.2	10.5	9.6	9.9	12.5	11.8	12.1
26	9.9	9.3	9.7	11.8	10.8	11.2	10.9	9.9	10.3	12.4	11.7	12.0
27	10.6	9.2	9.9	11.5	11.1	11.3	11.2	10.2	10.7	12.8	11.9	12.4
28	10.0	9.5	9.8	11.4	10.6	11.0	12.4	10.9	11.5	13.1	11.5	12.2
29	10.5	9.9	10.2	10.9	10.4	10.7	12.2	11.5	11.8	13.0	12.2	12.6
30	11.6	9.9	10.9	12.1	10.7	11.0	12.0	11.4	11.6	13.6	12.3	13.0
31	11.2	10.5	10.8	---	---	---	12.5	11.1	11.6	13.1	12.3	12.8
MONTH	11.8	8.2	10.3	12.7	9.5	10.8	12.5	9.3	10.9	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	12.9	11.9	12.4	14.2	13.6	13.9	12.9	12.1	12.6	12.6	10.7	12.0
2	12.9	11.5	12.2	14.2	13.6	13.9	12.1	11.1	11.6	11.0	10.4	10.7
3	12.9	11.9	12.3	---	---	---	12.1	11.0	11.5	10.9	9.5	10.3
4	13.5	11.9	12.6	---	---	---	12.0	11.2	11.7	10.4	9.0	9.7
5	13.2	12.1	12.7	---	---	---	11.9	11.0	11.4	11.3	9.6	10.3
6	12.7	11.9	12.3	---	---	---	11.7	10.8	11.2	10.8	9.6	10.2
7	13.0	12.6	12.7	---	---	---	11.8	10.8	11.4	9.8	9.4	9.5
8	13.0	12.6	12.8	---	---	---	11.8	11.2	11.5	11.4	10.0	10.7
9	13.1	12.2	12.8	---	---	---	11.7	11.2	11.5	11.0	9.4	10.4
10	12.9	11.8	12.4	---	---	---	11.3	10.9	11.1	10.0	8.9	9.4
11	12.6	11.5	11.9	---	---	---	11.2	10.8	11.0	9.3	8.7	9.0
12	12.0	11.1	11.6	---	---	---	11.4	10.7	11.1	9.7	8.7	9.2
13	12.7	11.1	12.0	---	---	---	11.2	10.7	10.9	9.6	9.0	9.3
14	12.4	11.6	12.1	---	---	---	11.5	10.7	11.1	11.2	9.0	10.1
15	12.1	11.1	11.6	---	---	---	11.5	10.7	11.1	10.5	9.5	10.1
16	11.7	11.1	11.3	---	---	---	11.3	10.3	10.8	9.9	9.3	9.7
17	11.5	11.1	11.3	---	---	---	11.2	10.3	10.7	10.8	9.1	10.1
18	12.2	11.2	11.7	---	---	---	11.1	10.1	10.7	10.1	9.0	9.6
19	12.3	11.9	12.1	---	---	---	11.0	10.4	10.7	9.6	8.9	9.2
20	---	---	---	---	---	---	10.9	10.2	10.6	9.8	9.1	9.5
21	13.6	11.6	13.2	---	---	---	10.9	10.2	10.6	9.4	9.0	9.3
22	13.8	13.1	13.6	---	---	---	11.4	10.8	11.1	9.3	8.9	9.1
23	---	---	---	12.0	11.0	11.7	12.4	10.8	11.3	9.3	8.5	9.0
24	---	---	---	11.4	9.9	11.0	11.1	10.1	10.8	9.9	8.4	9.4
25	---	---	---	9.9	8.5	9.2	11.2	9.5	10.2	9.9	9.6	9.8
26	---	---	---	11.7	8.4	10.1	10.7	9.2	10.1	10.3	9.7	10.0
27	---	---	---	11.9	11.4	11.8	9.2	8.7	9.0	10.7	10.3	10.4
28	14.3	13.9	14.0	12.9	11.0	12.1	10.8	9.4	10.3	10.5	9.7	10.2
29	14.2	13.6	13.9	13.3	12.0	12.7	12.1	10.0	11.2	10.1	9.1	9.7
30	---	---	---	13.7	12.7	13.2	13.3	12.2	12.8	9.2	8.3	8.9
31	---	---	---	13.2	12.3	12.8	---	---	---	8.2	7.1	7.8
MONTH	---	---	---	---	---	---	13.3	8.7	11.1	12.6	7.1	9.8

VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	9.0	7.0	8.1	7.7	6.6	7.0	---	---	---	10.5	10.2	10.3
2	8.8	8.4	8.6	8.6	6.6	7.6	---	---	---	10.6	10.2	10.5
3	9.7	8.4	9.0	8.1	7.6	7.8	---	---	---	10.9	10.2	10.5
4	9.3	8.3	9.0	7.8	7.2	7.6	---	---	---	10.3	9.6	10.0
5	8.0	7.0	7.7	8.1	7.4	7.8	---	---	---	10.4	9.8	10.1
6	7.4	6.7	7.0	8.0	7.6	7.7	8.9	8.6	8.7	10.2	9.9	10.1
7	8.2	6.5	7.4	9.1	4.1	7.3	8.7	6.5	7.9	9.9	9.0	9.5
8	7.2	6.2	6.9	9.4	7.8	8.7	7.4	6.0	6.4	9.8	9.1	9.4
9	7.0	6.2	6.7	8.9	7.8	8.4	6.8	5.9	6.5	10.4	9.7	10.2
10	7.3	6.4	6.9	8.2	6.9	7.7	8.4	6.5	7.9	10.5	10.1	10.3
11	9.7	6.4	7.1	6.8	5.7	6.4	9.0	8.4	8.8	10.6	10.0	10.3
12	10.7	8.9	9.6	7.5	4.1	6.3	9.6	8.9	9.2	10.0	9.0	9.6
13	9.8	7.4	8.8	7.5	6.1	6.8	9.3	8.8	9.1	9.4	9.0	9.2
14	---	---	---	8.7	7.3	7.9	9.2	8.6	8.9	10.4	9.4	10.1
15	8.8	8.2	8.5	9.6	6.0	8.0	9.1	8.5	8.7	11.1	10.5	10.8
16	8.5	8.2	8.4	8.5	6.1	7.5	9.0	8.5	8.7	11.4	10.6	11.0
17	8.3	8.1	8.2	---	---	---	8.9	7.9	8.3	11.1	10.1	10.6
18	8.2	7.4	7.8	---	---	---	8.3	8.0	8.2	10.1	9.3	9.8
19	8.2	7.4	7.9	---	---	---	8.6	8.2	8.3	9.6	8.3	9.2
20	8.6	8.0	8.3	---	---	---	8.7	8.2	8.4	9.9	8.3	9.1
21	8.7	8.3	8.5	---	---	---	8.4	7.9	8.2	10.0	8.5	9.3
22	8.6	7.8	8.4	---	---	---	8.7	8.1	8.4	8.7	8.4	8.5
23	8.1	7.6	7.9	---	---	---	9.0	8.6	8.9	10.2	8.6	9.7
24	8.6	7.8	8.3	---	---	---	9.2	8.6	8.9	10.6	8.8	10.1
25	8.7	7.7	8.2	---	---	---	8.8	8.2	8.5	11.8	10.1	10.8
26	7.7	7.2	7.5	---	---	---	8.3	7.7	8.1	12.2	10.7	11.7
27	8.0	7.2	7.5	---	---	---	9.0	7.5	8.3	12.3	10.6	11.6
28	8.0	7.6	7.8	---	---	---	8.7	8.1	8.4	12.1	11.8	11.9
29	8.2	7.4	7.7	---	---	---	9.5	8.2	8.7	12.6	11.8	12.2
30	7.7	6.7	7.4	---	---	---	10.3	9.7	10.0	12.6	11.8	12.2
31	---	---	---	---	---	---	10.8	10.1	10.5	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	12.6	8.3	10.3

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 mi² (1,145 km²).

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.--19 years, 267 ft³/s (7,561 m³/s), 8.20 in/yr (208 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,990 ft³/s (170 m³/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 ft³/s (0.28 m³/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 ft³/s (42.5 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 17	----	2,430 68.8	ice jam	Apr. 14	1400	1,660 47.0	7.19 2.192
Feb. 18	1030	ice jam ----	*12.19 3.716	May 3	0330	*3,590 102	9.46 2.883
Mar. 29	0615	2,500 70.8	8.29 2.527				

Minimum discharge, 34 ft³/s (0.96 m³/s) Sept. 21, gage height, 3.86 ft (1.177 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	290	275	315	107	90	725	1910	1530	335	269	98	41
2	262	264	310	109	92	635	1880	2730	325	248	93	41
3	246	249	310	110	92	565	1840	3380	305	288	88	41
4	230	238	305	110	92	520	1690	2680	301	272	86	42
5	218	228	295	110	88	510	1530	2040	330	238	88	42
6	199	228	290	110	79	405	1390	1620	313	213	91	39
7	190	221	275	107	80	415	1250	1420	297	195	84	39
8	183	211	265	105	80	380	1110	1260	578	182	115	44
9	172	207	255	104	85	365	990	1100	494	180	143	41
10	164	275	240	103	90	345	896	950	394	296	118	37
11	291	286	225	101	105	330	814	818	342	446	93	39
12	364	286	205	100	150	335	871	706	358	379	84	131
13	393	278	190	99	280	325	1280	823	474	280	77	95
14	345	334	175	97	490	313	1640	781	482	265	75	72
15	304	447	160	95	875	286	1540	680	451	288	71	59
16	275	480	130	94	1700	280	1330	615	417	268	69	51
17	255	461	127	93	2370	285	1120	584	595	515	67	48
18	238	419	122	91	2190	295	935	539	1030	313	67	46
19	224	419	118	89	1850	295	784	503	937	249	63	43
20	415	504	113	88	1710	297	681	464	934	213	59	42
21	709	533	112	86	1580	283	606	426	774	186	63	40
22	760	504	112	85	1420	251	556	623	602	169	59	39
23	681	490	107	84	1440	319	526	627	857	152	59	44
24	584	440	103	85	1430	541	494	575	866	141	55	44
25	484	485	100	86	1450	855	455	585	787	133	53	47
26	424	440	100	87	1360	1450	426	541	577	166	51	48
27	380	406	100	87	1180	1960	693	493	449	136	48	50
28	354	315	100	88	990	2190	1180	436	381	123	48	47
29	313	330	100	88	840	2420	1290	396	329	113	46	45
30	286	320	103	88	---	2130	1280	368	299	103	44	45
31	278	---	105	89	---	1920	---	349	---	100	41	---
TOTAL	10511	10573	5567	2975	24278	22225	32987	30642	15613	7119	2296	1482
MEAN	339	352	180	96.0	837	717	1100	988	520	230	74.1	49.4
MAX	760	533	315	110	2370	2420	1910	3380	1030	515	143	131
MIN	164	207	100	84	79	251	426	349	297	100	41	37
CFSM	.77	.80	.41	.22	1.89	1.62	2.49	2.24	1.18	.52	.17	.11
IN.	.88	.89	.47	.25	2.04	1.87	2.78	2.58	1.31	.60	.19	.12
AC-FT	20850	20970	11040	5900	48160	44080	65430	60780	30970	14120	4550	2940
CAL YR 1983	TOTAL	206202	MEAN 565	MAX 4790	MIN 41	CFSM 1.28	IN 17.35	AC-FT	409000			
WTR YR 1984	TOTAL	166268	MEAN 454	MAX 3380	MIN 37	CFSM 1.03	IN 13.99	AC-FT	329800			

NOTE.--No gage-height record Dec. 19 to Feb. 6.

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 mi² (785 km²).

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 ft³/s (154 m³/s) July 1, 1983, gage height, 14.93 ft (4.551 m); minimum discharge, 10 ft³/s (0.28 m³/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 ft³/s (864 m³/s). This is the highest known stage since at least 1908.

EXTREMES FOR CURRENT PERIOD.--Peak discharges above base of 1,300 ft³/s (36.8 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 17	1100	1,520	43.0	8.08	2.463		
Mar. 29	0900	1,370	38.8	7.67	2.338		
				May 2	0945	*1,820	51.5
							*8.77 2.673

Minimum discharge, 47 ft³/s (1.33 m³/s) Sept. 22, gage height, 3.16 ft (0.963 m); minimum gage height, 3.15 ft (0.960 m), Aug. 31, Sept. 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	153	186	238	130	98	382	872	1130	222	156	93	55
2	147	180	236	130	100	353	834	1650	214	150	91	60
3	153	173	176	132	104	324	848	1460	204	162	93	60
4	145	169	243	135	102	321	695	933	200	156	94	66
5	139	162	226	141	85	309	618	735	204	145	91	59
6	131	160	205	141	88	262	605	634	194	137	90	56
7	128	160	167	140	90	252	553	718	197	130	138	56
8	125	160	184	134	91	274	490	624	217	146	142	68
9	121	230	197	131	96	224	452	525	192	173	108	56
10	120	276	186	112	98	228	426	473	185	225	94	56
11	178	245	191	116	123	222	404	439	201	227	87	56
12	175	213	190	119	291	224	498	399	255	159	85	250
13	163	201	188	118	432	234	745	532	215	132	85	113
14	152	217	192	114	481	226	782	442	201	132	83	88
15	155	243	180	108	602	254	656	383	186	202	78	73
16	151	234	134	111	1200	264	531	372	226	183	77	64
17	143	217	148	105	1480	254	458	372	344	169	77	61
18	136	209	153	101	1220	245	407	362	469	154	78	61
19	172	232	148	97	890	238	374	348	410	138	76	57
20	448	306	144	91	689	236	350	323	307	131	73	54
21	666	345	147	85	605	230	326	303	269	123	100	53
22	438	314	151	85	565	228	314	371	294	118	81	50
23	353	363	144	88	627	245	316	326	306	112	76	70
24	306	358	134	91	583	304	301	296	267	109	71	58
25	276	314	124	96	580	412	276	339	227	107	70	56
26	252	291	122	98	550	782	274	315	209	111	70	54
27	236	271	124	98	478	1200	605	282	193	105	68	52
28	222	276	129	98	438	1030	669	271	180	100	67	56
29	203	276	131	98	390	1240	484	253	169	97	63	53
30	193	217	131	98	---	865	872	239	162	94	60	50
31	190	---	130	98	---	762	---	228	---	94	56	---
TOTAL	6570	7198	5193	3439	13176	12624	16035	16077	7119	4377	2615	2021
MEAN	212	240	168	111	454	407	535	519	237	141	84.4	67.4
MAX	666	363	243	141	1480	1240	872	1650	469	227	142	250
MIN	120	160	122	85	85	222	274	228	162	94	56	50
CFSM	.70	.79	.55	.37	1.50	1.34	1.77	1.71	.78	.47	.28	.22
IN.	.81	.88	.64	.42	1.62	1.55	1.97	1.97	.87	.54	.32	.25
AC-FT	13030	14280	10300	6820	26130	25040	31810	31890	14120	8680	5190	4010
CAL YR 1983	TOTAL	122806	MEAN 336	MAX 2420	MIN 71	CFSM 1.11	IN 15.08	AC-FT 243600				
WTR YR 1984	TOTAL	96444	MEAN 264	MAX 1650	MIN 50	CFSM .87	IN 11.84	AC-FT 191300				

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 mi² (3,630 km²).

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.--9 years, 859 ft³/s (24.33 m³/s), 8.33 in/yr (212 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,800 ft³/s (476 m³/s) July 8, 1978, gage height, 13.70 ft (4.176 m); minimum daily, 140 ft³/s (3.96 m³/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 ft³/s (935 m³/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 ft³/s (99.1 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage Height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 19	0500	4,190 119	7.25 2,210	May 4	1200	*6,550 185	*9.14 2,786
Mar. 30	1630	4,810 136	7.92 2,414	July 11	1700	3,540 100	6.68 2,036

Minimum discharge, 499 ft³/s (14.1 m³/s) Sept. 3, 4, 29, 30; minimum gage height, 2.80 ft. (0.853 m) Sept. 3, 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1060	1010	1110	650	700	1800	3680	3020	1260	1050	714	513		
2	996	1060	1120	650	700	1740	3750	3580	1210	1020	759	513		
3	977	964	1110	650	700	1640	3760	5330	1140	990	773	510		
4	951	932	1090	660	700	1540	3700	6320	1090	964	701	500		
5	914	908	1090	660	700	1440	3330	4720	1100	958	681	510		
6	901	895	1120	670	700	1370	2960	3400	1110	932	681	515		
7	901	871	1090	680	700	1300	2760	3110	1060	901	680	510		
8	841	871	1020	680	700	1280	2530	2850	1080	883	832	518		
9	847	877	1020	660	700	1400	2300	2660	1100	872	900	515		
10	812	932	1010	650	730	1330	2100	2400	1060	1490	871	514		
11	817	1010	1040	640	800	1230	1960	2170	1040	3220	787	513		
12	788	1060	990	630	950	1200	1900	1990	1070	2180	733	563		
13	883	1040	983	620	1100	1200	2000	1920	1140	1650	695	685		
14	908	1030	977	620	1400	1200	2500	1970	1110	1360	676	748		
15	914	1030	990	620	1700	1200	2970	2000	1080	1200	654	684		
16	908	1070	920	610	2100	1270	2820	1850	1120	1330	632	626		
17	889	1100	800	600	2640	1300	2460	1770	1210	1340	626	593		
18	853	1120	750	590	3850	1200	2100	1760	1560	1170	631	563		
19	823	1130	740	590	4030	1170	1900	1750	1760	1150	607	554		
20	908	1150	740	580	3380	1140	1760	1680	1930	1090	583	547		
21	1020	1210	730	610	2970	1120	1640	1620	1800	1010	575	539		
22	1810	1340	730	640	2700	1120	1540	1570	1670	950	579	535		
23	1880	1450	720	660	2540	1130	1460	1640	1760	889	588	545		
24	1650	1530	710	684	2480	1200	1420	1680	1720	826	564	546		
25	1440	1440	700	720	2390	1300	1380	1640	1870	804	560	545		
26	1360	1320	690	730	2360	1800	1320	1600	1620	803	556	532		
27	1270	1380	680	730	2280	2500	1500	1560	1440	774	551	526		
28	1210	1360	670	730	2120	3940	2600	1470	1310	752	543	538		
29	1110	1240	660	720	1950	4010	3220	1410	1180	731	545	503		
30	1060	1160	660	720	---	4580	3060	1360	1090	708	526	505		
31	1020	---	660	710	---	4100	---	1310	---	695	515	---		
TOTAL	32721	33490	27320	20364	50770	53750	72380	73110	39690	34692	20318	16508		
MEAN	1056	1116	881	657	1751	1734	2413	2358	1323	1119	655	550		
MAX	1880	1530	1120	730	4030	4580	3760	6320	1930	3220	900	748		
MIN	788	871	660	580	700	1120	1320	1310	1040	695	515	500		
CFSM	.75	.80	.63	.47	1.25	1.24	1.72	1.68	.95	.80	.47	.39		
IN.	.87	.89	.73	.54	1.35	1.43	1.92	1.94	1.05	.92	.54	.44		
AC-FT	64900	66430	54190	40390	100700	106600	143600	145000	78730	68810	40300	32740		
CAL YR 1983	TOTAL	535360	MEAN	1467	MAX	10300	MIN	523	CFSM	1.05	IN	14.23	AC-FT	1062000
WTR YR 1984	TOTAL	475113	MEAN	1298	MAX	6320	MIN	500	CFSM	.93	IN	12.62	AC-FT	942400

WHITEWATER RIVER BASIN

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 mi² (262 km²).

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.--19 years (water years 1940-41, 1968-84), 46.8 ft³/s (1.325 m³/s), 6.29 in/yr (160 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,100 ft³/s (456 m³/s) June 21, 1974, gage height, 16.32 ft (4.974 m) from floodmark; minimum, 11 ft³/s (0.31 m³/s) Feb. 21, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 199 ft³/s (5.64 m³/s) July 10, gage height, 4.90 ft (1.494 m); no peak above base of 600 ft³/s (17.0 m³/s); minimum discharge, 25 ft³/s (0.71 m³/s) Feb. 5, gage height, 3.83 ft (1.167 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	59	69	37	27	45	120	150	66	54	52	45
2	56	59	69	36	28	45	121	143	65	54	54	45
3	56	58	66	36	28	45	125	129	61	56	59	45
4	57	56	71	36	29	46	117	120	60	59	58	45
5	56	54	71	36	28	47	110	113	60	59	57	45
6	55	55	68	36	27	48	108	107	60	59	56	45
7	54	56	61	36	27	50	106	120	62	56	66	44
8	54	56	65	35	27	51	99	109	67	53	67	44
9	53	61	66	35	27	53	93	99	62	54	60	44
10	52	72	63	35	27	55	92	95	60	90	55	43
11	60	66	63	34	28	58	88	94	64	111	53	43
12	65	62	63	33	29	59	93	86	75	71	53	85
13	60	60	63	32	31	60	123	94	64	63	50	74
14	57	63	63	31	40	57	114	92	59	60	49	53
15	56	81	63	30	43	59	102	84	59	68	49	48
16	56	73	54	30	111	62	94	81	60	65	49	46
17	54	68	58	31	144	63	88	82	64	66	64	43
18	53	68	56	31	96	62	84	82	68	63	56	43
19	56	68	54	30	74	61	81	82	64	59	50	43
20	85	76	53	29	62	62	79	81	60	57	48	43
21	98	73	50	29	54	60	76	77	60	54	48	42
22	80	68	47	29	50	56	74	84	66	54	49	42
23	73	88	46	29	61	58	72	81	79	54	49	42
24	67	107	44	30	58	64	74	74	68	54	48	43
25	66	95	42	31	55	73	69	76	62	54	48	43
26	65	88	41	30	50	118	69	76	60	56	48	41
27	64	84	40	28	45	161	124	71	59	56	48	40
28	63	84	39	28	45	122	120	69	59	54	48	43
29	60	84	38	29	45	144	90	68	57	53	48	43
30	59	74	38	27	---	115	143	66	54	52	47	44
31	59	---	37	27	---	114	---	66	---	52	45	---
TOTAL	1905	2116	1721	986	1396	2173	2948	2851	1884	1870	1631	1389
MEAN	61.5	70.5	55.5	31.8	48.1	70.1	98.3	92.0	62.8	60.3	52.6	46.3
MAX	98	107	71	37	144	161	143	150	79	111	67	85
MIN	52	54	37	27	27	45	69	66	54	52	45	40
CFSM	.61	.70	.55	.32	.48	.69	.97	.91	.62	.60	.52	.46
IN.	.70	.78	.63	.36	.51	.80	1.09	1.05	.69	.69	.60	.51
AC-FT	3780	4200	3410	1960	2770	4310	5850	5650	3740	3710	3240	2760

CAL YR 1983	TOTAL	26578	MEAN	72.8	MAX	622	MIN	29	CFSM	.72	IN	9.79	AC-FT	52720
WTR YR 1984	TOTAL	22870	MEAN	62.5	MAX	161	MIN	27	CFSM	.62	IN	8.42	AC-FT	45360

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 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE LAB (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 , 1983											
24...	1045	66	680	620	8.1	8.1	10.0	5.0	4.1	743	12.6
JAN , 1984											
17...	1100	42	505	620	8.4	7.5	-22.0	.5	2.2	751	14.3
MAR											
14...	1210	57	540	587	7.9	8.4	1.0	2.0	2.0	728	14.6
APR											
24...	1030	74	585	580	8.1	7.9	15.0	9.5	1.1	730	13.8
JUL											
17...	1215	59	565	536	8.1	7.9	24.0	17.0	45	730	--
AUG											
22...	1500	49	520	577	7.4	8.2	21.0	16.5	1.0	738	9.8

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- LINTY 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 , 1983											
24...	101	260	K2900	86	26	6.1	2.2	285	20	15	.20
JAN , 1984											
17...	101	K24	78	83	28	7.0	1.4	280	19	15	.20
MAR											
14...	111	2	24	78	26	6.6	1.4	230	18	16	<.10
APR											
24...	126	--	86	76	25	6.5	1.4	259	18	16	.10
JUL											
17...	--	K3600	1800	73	24	6.8	2.6	258	16	16	.10
AUG											
22...	104	570	390	75	27	6.7	1.7	270	20	14	.20

WHITewater RIVER BASIN

05376000 NORTH FORK WHITewater RIVER NEAR ELBA, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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, SU- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SU- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT , 1983											
24...	16	364	5.5	.090	.20	.180	.160	.160	21	3.7	83
JAN , 1984											
17...	16	369	5.3	.540	.90	.190	.170	.150	--	--	--
MAR											
14...	14	355	5.1	.060	.20	.170	.150	.150	--	--	--
APR											
24...	10	343	4.6	.130	.60	.120	.110	.100	22	4.4	80
JUL											
17...	16	385	4.3	.020	.70	.280	.240	.240	190	30	96
AUG											
22...	15	365	--	--	--	--	--	--	--	--	--

DATE	TIME	ALUM- INIUM, 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 , 1984											
14...	1210	<10	1	71	<.5	<1	<1	<3	<1	4	<1
AUG											
22...	1500	10	1	78	1.0	<1	<1	<3	<1	8	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)
MAR , 1984										
14...	10	18	.1	<10	<1	<1	<1	84	<6	5
AUG										
22...	<4	30	.3	<10	<1	<1	1	85	<6	17

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 , 1984									
22...	1500	<8.1	.5	<5.1	.6	<4.4	.5	.09	.8

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 mi² (702 km²).

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 good except those for winter period, which are fair.

AVERAGE DISCHARGE.--9 years (water years 1976-84), 162 ft³/s (4.588 m³/s), 8.12 in/yr (206 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,400 ft³/s (436 m³/s) July 6, 1978, gage height, 12.88 ft (3.926 m), present datum; minimum daily, 53 ft³/s (1.50 m³/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 ft³/s (544 m³/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, 483 ft³/s (13.7 m³/s) Apr. 27, gage height, 3.39 ft (1.033 m), no peak above base of 2,000 ft³/s (56.6 m³/s); minimum recorded discharge, 148 ft³/s (4.19 m³/s) Sept. 19, 20, 27, but may have been less during period of no gage height record Dec. 16 to Jan. 25; minimum recorded gage height 1.93 ft (0.588 m), Jan. 26, but may have been less during period of no gage height record Dec. 16 to Jan. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	177	189	198	163	169	204	257	412	213	204	202	153
2	184	189	200	162	169	197	262	370	214	204	202	153
3	182	184	200	162	168	194	265	339	213	204	200	153
4	182	185	198	163	161	196	254	311	212	206	202	155
5	181	185	195	170	165	194	245	294	215	204	194	155
6	178	186	191	173	165	188	244	275	213	202	192	151
7	173	183	182	173	165	188	239	306	213	200	198	153
8	170	184	184	173	165	188	234	285	234	200	218	154
9	169	188	185	173	165	190	229	262	219	200	192	151
10	169	208	182	174	163	193	229	252	214	260	184	152
11	178	201	185	174	163	195	226	247	213	312	178	152
12	190	192	184	175	174	184	231	240	242	271	176	204
13	184	186	183	175	186	190	255	248	224	258	174	185
14	181	190	186	175	194	189	251	249	215	253	172	163
15	180	213	186	175	204	193	246	237	212	261	167	157
16	181	213	182	175	266	195	238	232	211	252	165	155
17	175	207	180	175	340	196	233	233	260	252	186	152
18	177	206	178	175	306	196	231	232	246	246	176	149
19	180	209	176	176	277	195	228	229	236	239	163	149
20	206	219	175	175	248	197	227	226	224	233	157	148
21	234	212	173	170	235	198	224	223	220	229	157	150
22	215	202	171	168	226	189	222	228	238	228	157	151
23	208	222	170	165	235	193	225	229	244	224	151	153
24	202	252	170	160	236	200	223	224	232	221	150	156
25	196	230	170	157	236	209	219	227	222	219	150	153
26	195	220	168	154	228	242	217	227	218	218	150	152
27	192	214	167	164	216	307	349	220	212	214	150	150
28	191	214	166	169	209	263	299	217	210	212	150	155
29	188	212	165	168	202	293	258	215	208	210	150	156
30	186	200	165	170	---	261	425	215	206	206	150	157
31	188	---	164	170	---	253	---	214	---	206	150	---
TOTAL	5792	6095	5579	5251	6036	6470	7485	7918	6653	7048	5363	4677
MEAN	187	203	180	169	208	209	250	255	222	227	173	156
MAX	234	252	200	176	340	307	425	412	260	312	218	204
MIN	169	183	164	154	161	184	217	214	206	200	150	148
CFSM	.69	.75	.66	.62	.77	.77	.92	.94	.82	.84	.64	.58
IN.	.80	.84	.77	.72	.83	.89	1.03	1.09	.91	.97	.74	.64
AC-FT	11490	12090	11070	10420	11970	12830	14850	15710	13200	13980	10640	9280

CAL YR 1983 TOTAL 74133 MEAN 203 MAX 1230 MIN 120 CFSM .75 IN 10.18 AC-FT 147000
WTR YR 1984 TOTAL 74367 MEAN 203 MAX 425 MIN 148 CFSM .75 IN 10.21 AC-FT 147500

NOTE.--No gage-height record Dec. 16 to Jan. 25.

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, February 1984 to current year (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, 634 ft³/s (18.0 m³/s) June 16, 1984, gage height, 7.23 ft (2.204 m); minimum discharge, 7.3 ft³/s (0.21 m³/s) Aug. 12, 1982, gage height, 1.96 ft (0.597 m).

EXTREMES FOR CURRENT PERIOD.--February to September 1984: Maximum discharge during period, 634 ft³/s (18.0 m³/s) June 16, gage height, 7.23 ft (2.204 m); minimum, 10 ft³/s (0.28 m³/s) Apr. 9, part of each day Sept. 5-9, 11, 12; minimum gage height, 2.06 ft (0.628 m) Apr. 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	14	14	15	12	13	13	12
2					---	14	14	14	11	13	12	12
3					---	13	14	14	11	13	12	11
4					---	14	14	14	11	13	12	12
5					---	14	14	13	12	13	12	11
6					---	14	12	13	12	13	12	11
7					---	14	11	14	39	12	14	11
8					---	14	11	13	37	13	16	11
9					---	14	11	13	14	13	13	11
10					---	14	11	13	13	19	12	11
11					---	14	11	13	14	14	12	11
12					---	13	12	13	14	13	12	39
13					---	12	12	14	13	13	12	16
14					---	13	13	13	13	14	12	15
15					16	15	13	13	13	14	12	15
16					16	14	12	13	50	13	12	15
17					15	14	12	13	37	13	12	14
18					15	13	13	13	16	13	12	14
19					17	13	13	13	15	13	12	14
20					15	14	13	12	15	13	12	14
21					15	14	13	13	14	13	12	14
22					15	13	14	13	15	13	13	14
23					15	14	13	12	14	13	12	14
24					15	14	13	13	14	12	12	14
25					15	14	13	14	14	13	12	14
26					15	15	13	13	14	13	12	14
27					14	14	14	12	14	12	12	14
28					14	14	13	12	13	12	12	13
29					14	14	16	12	13	12	12	13
30					---	14	19	12	13	12	11	13
31					---	14	---	11	---	13	11	---
TOTAL					---	428	391	403	510	406	379	417
MEAN					---	13.8	13.0	13.0	17.0	13.1	12.2	13.9
MAX					---	15	19	15	50	19	16	39
MIN					---	12	11	11	11	12	11	11
AC-FT					---	849	776	799	1010	805	752	827

GARVIN BROOK BASIN

05378230 STOCKTON VALLEY CREEK AT STOCKTON, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: February to September 1982, February to September 1984.

INSTRUMENTATION.--Sediment pumping sampler since March 1982.

REMARKS.--Records fair. Sediment observer collects suspended-sediment samples weekly (more often during runoff events). An automatic sampler was used to collect samples during runoff events.

COOPERATION.--Minnesota Pollution Control Agency.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,480 mg/L June 8, 1984; minimum daily mean, 10 mg/L Sept. 20-27, 1982.

SEDIMENT LOADS: Maximum daily, 1,380 tons (1,250 tonnes) June 7, 1984; minimum daily, 0.24 tons (0.22 tonnes) Sept. 21-27, 1982.

EXTREMES FOR CURRENT PERIOD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,480 mg/L June 8; minimum daily mean, 16 mg/L Mar. 22.

SEDIMENT LOADS: Maximum daily, 1,380 tons (1,250 tonnes) June 7; minimum daily, 0.55 tons (0.50 tonnes) Mar. 13.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TUR- BID- ITY (NTU) (00076)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	SOLIDS, VOLA- TILE, SUS- PENDE (MG/L) (00535)	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)
JUN								
07...	2150	65	500	3130	273	1.0	.13	5.0
07...	2222	182	800	7420	543	.70	.69	17
07...	2235	311	2000	19800	1520	.70	2.6	29
07...	2340	388	1400	11800	940	.75	1.4	21
08...	0105	183	400	4870	520	.66	1.4	18
08...	0310	51	1300	5140	587	3.5	1.6	15

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	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)
JUN											
07...	2208	81	5640	24	31	31	43	91	96	99	100
07...	2230	260	26300	28	31	38	57	95	98	100	--
07...	2243	401	26700	27	31	35	51	90	93	98	100
08...	0012	312	9930	29	36	44	62	91	94	97	100
08...	0209	86	5670	38	48	65	80	97	98	100	--
16...	2320	622	11700	32	39	48	64	94	97	99	100
17...	0120	116	5320	38	47	61	76	98	99	100	--
17...	0420	35	1980	43	48	--	65	99	--	--	--
17...	0720	26	931	65	73	--	83	98	--	--	--

GARVIN BROOK BASIN

05378230 STOCKTON VALLEY CREEK AT STOCKTON, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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									---	---	17	.64
2									---	---	17	.64
3									---	---	17	.60
4									---	---	17	.64
5									---	---	17	.64
6									---	---	17	.64
7									---	---	17	.64
8									---	---	17	.64
9									---	---	17	.64
10									---	---	17	.64
11									---	---	17	.64
12									---	---	17	.60
13									---	---	17	.55
14									---	---	17	.60
15									17	.73	17	.69
16									17	.73	17	.64
17									17	.69	17	.64
18									17	.69	17	.60
19									17	.78	17	.60
20									17	.69	17	.64
21									17	.69	17	.64
22									17	.69	16	.56
23									17	.69	17	.64
24									17	.69	19	.72
25									17	.69	20	.76
26									17	.69	21	.85
27									17	.64	22	.83
28									17	.64	23	.87
29									17	.64	23	.87
30									---	---	23	.87
31									---	---	23	.87
TOTAL											---	21.04
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	23	.87	50	2.0	36	1.2	20	.70	20	.70	22	.71
2	24	.91	40	1.5	57	1.7	36	1.3	20	.65	22	.71
3	24	.91	30	1.1	66	2.0	34	1.2	38	1.2	22	.65
4	24	.91	20	.76	60	1.8	33	1.2	32	1.0	22	.71
5	24	.91	20	.70	55	1.8	32	1.1	26	.84	22	.65
6	24	.78	20	.70	48	1.6	31	1.1	30	.97	22	.65
7	24	.71	20	.76	1580	1380	31	1.0	86	4.1	22	.65
8	24	.71	17	.60	2480	489	30	1.1	128	6.5	22	.65
9	24	.71	17	.60	31	1.2	30	1.1	29	1.0	22	.65
10	24	.71	17	.60	29	1.0	131	7.5	29	.94	22	.65
11	24	.71	17	.60	30	1.1	88	3.3	29	.94	30	.89
12	24	.78	17	.60	30	1.1	41	1.4	28	.91	976	236
13	26	.84	36	1.4	29	1.0	36	1.3	28	.91	77	3.3
14	28	.98	29	1.0	29	1.0	50	2.1	28	.91	68	2.8
15	30	1.1	17	.60	29	1.0	48	1.8	28	.91	62	2.5
16	30	.97	30	1.1	1060	1140	46	1.6	27	.87	53	2.1
17	32	1.0	36	1.3	1220	354	44	1.5	27	.87	46	1.7
18	35	1.2	36	1.3	66	2.9	42	1.5	24	.78	40	1.5
19	36	1.3	36	1.3	29	1.2	40	1.4	22	.71	35	1.3
20	36	1.3	36	1.2	29	1.2	38	1.3	20	.65	30	1.1
21	36	1.3	37	1.3	29	1.1	37	1.3	18	.58	29	1.1
22	36	1.4	65	2.3	47	1.9	35	1.2	17	.60	28	1.1
23	36	1.3	38	1.2	29	1.1	33	1.2	18	.58	26	.98
24	36	1.3	65	2.3	28	1.1	30	.97	18	.58	25	.95
25	36	1.3	75	2.8	27	1.0	28	.98	19	.62	24	.91
26	36	1.3	43	1.5	25	.95	26	.91	19	.62	23	.87
27	40	1.5	36	1.2	24	.91	24	.78	20	.65	22	.83
28	40	1.4	36	1.2	23	.81	21	.68	21	.68	20	.70
29	185	8.0	36	1.2	21	.74	20	.65	21	.68	20	.70
30	270	14	36	1.2	20	.70	20	.65	21	.62	20	.70
31	---	---	36	1.1	---	---	20	.70	22	.65	---	---
TOTAL	---	51.11	---	37.02	---	3396.11	---	44.52	---	33.22	---	268.71

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 November 1983, January 1984 to current year (partial winter records in 1984).

GAGE.--Water-stage recorder and broad-crested weir.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 803 ft³/s (22.7 m³/s) June 8, 1984, gage height, 4.73 ft (1.442 m); minimum 15 ft³/s (0.42 m³/s) Mar. 9, 1982, gage height, 0.75 ft (0.229 m), result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 803 ft³/s (22.7 m³/s) June 8, gage height, 4.73 ft (1.442 m); minimum recorded discharge, 24 ft³/s (0.68 m³/s) June 18, but may have been less during winter period, gage height, 0.98 ft (0.299 m) caused by gate closure at dam in Stockton.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	40		---	34	37	39	45	36	37	34	35
2	36	40		---	34	37	39	44	35	37	34	34
3	38	39		---	34	36	39	43	35	37	35	34
4	36	38		---	34	37	39	42	35	37	34	34
5	36	38		---	34	37	38	42	38	37	34	35
6	36	38		---	30	36	38	42	36	37	35	34
7	36	39		---	31	36	36	45	43	36	36	35
8	35	38		---	32	36	36	42	172	36	51	36
9	35	44		---	33	36	35	42	39	36	37	34
10	36	46		---	33	36	36	42	37	48	35	36
11	49	41		---	34	36	37	41	38	41	35	35
12	49	39		---	40	36	40	40	42	36	35	88
13	40	40		---	40	37	40	43	35	35	36	40
14	39	42		---	39	36	41	41	34	36	35	38
15	41	43		---	40	40	42	40	34	39	35	36
16	41	41		---	44	37	39	40	35	37	36	35
17	39	40		---	41	37	37	40	111	37	37	35
18	39	40		---	40	37	38	40	44	35	37	35
19	44	43		---	45	37	37	40	41	35	36	34
20	51	44		---	42	39	37	40	40	35	36	34
21	46	42		---	40	40	36	40	40	34	36	33
22	44	---		---	42	38	36	40	41	34	36	34
23	43	---		---	41	38	39	39	40	34	36	34
24	42	---		---	40	39	37	37	39	34	36	35
25	41	---		---	40	40	37	42	37	34	36	33
26	41	---		34	39	41	37	38	37	34	35	32
27	41	---		34	38	39	41	37	37	34	36	33
28	41	---		34	38	39	38	37	36	34	36	33
29	40	---		33	37	39	40	36	37	34	35	33
30	40	---		33	---	39	56	36	36	34	35	33
31	40	---		34	---	39	---	36	---	34	34	---
TOTAL	1250	---		---	1089	1167	1160	1252	1340	1118	1114	1090
MEAN	40.3	---		---	37.6	37.6	38.7	40.4	44.7	36.1	35.9	36.3
MAX	51	---		---	45	41	56	45	172	48	51	88
MIN	35	---		---	30	36	35	36	34	34	34	32
AC-FT	2480	---		---	2160	2310	2300	2480	2660	2220	2210	2160

GARVIN BROOK BASIN

05378235 GARVIN BROOK NEAR MINNESOTA CITY, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March to September 1982, March to September 1984.

INSTRUMENTATION.--Sediment pumping sampler since March 1982.

REMARKS.--In addition to automatic sampler, suspended-sediment samples were collected weekly, plus extra samples were taken during periods of higher runoff. Daily sediment load was estimated based on water discharge records and available sediment samples.

COOPERATION.--Minnesota Pollution Control Agency.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 3,020 mg/L June 8, 1984; minimum daily mean, 14 mg/L Mar. 1-25, 1984.

SEDIMENT LOADS: Maximum daily, 2,740 tons (2,490 tonnes) June 8, 1984; minimum daily, 1.3 tons (1.2 tonnes) Apr. 12, 1982.

EXTREMES FOR CURRENT PERIOD.--March to September 1984.

SEDIMENT CONCENTRATIONS: Maximum daily mean during period, 3,020 mg/L June 8; minimum daily mean, 14 mg/L Mar. 1-25.

SEDIMENT LOADS: Maximum daily during period, 2,740 tons (2,490 tonnes) June 8; minimum daily, 1.4 tons (1.3 tonnes) Mar. 1-14, 16-19, 22, 23.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TUR- BID- ITY (NTU) (00076)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	SOLIDS, VOLA- TILE, SUS- PENDE (MG/L) (00535)	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)
JUN								
07...	2255	105	300	1650	167	--	--	--
07...	2300	109	--	--	--	1.5	.19	4.2
08...	0031	371	1200	7560	650	1.6	.67	12
08...	0047	531	1700	9780	837	1.4	1.2	17
08...	0252	683	1500	5720	613	1.8	1.8	10
08...	0405	405	1200	4110	433	1.8	1.0	6.3
08...	0603	183	100	2440	280	1.9	.80	6.2
SEP								
12...	0511	44	85	795	78	.37	.01	2.7
12...	0711	58	100	830	88	.54	<.01	3.8
12...	0911	83	85	966	80	.63	<.01	3.1
12...	1111	252	150	2470	178	.99	.33	5.3
12...	1330	166	--	740	90	.93	.33	4.7
12...	2215	45	150	1060	98	.69	.40	6.3

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SED- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	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)
JUN											
07...	2200	1000	5980	--	33	41	47	64	99	100	--
08...	0005	186	2930	--	34	40	46	56	97	100	--
08...	0320	572	7070	--	17	29	51	71	96	98	100
08...	0520	234	4460	--	42	55	64	84	97	99	100
08...	0920	130	3550	--	52	66	79	87	99	100	--
17...	0112	201	3180	--	19	23	26	32	90	99	100
17...	0430	233	3530	--	52	60	76	86	98	99	100
17...	0730	102	786	--	82	84	--	85	98	--	--
17...	1030	70	1250	--	59	76	--	90	99	--	--
SEP											
12...	0711	58	1870	99	--	--	--	--	--	--	--
12...	1111	252	2340	95	--	--	--	--	--	--	--
12...	1232	210	2510	88	--	--	--	--	--	--	--
12...	1430	122	1650	86	--	--	--	--	--	--	--

GARVIN BROOK BASIN

05378235 GARVIN BROOK NEAR MINNESOTA CITY, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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											14	1.4
2											14	1.4
3											14	1.4
4											14	1.4
5											14	1.4
6											14	1.4
7											14	1.4
8											14	1.4
9											14	1.4
10											14	1.4
11											14	1.4
12											14	1.4
13											14	1.4
14											14	1.4
15											14	1.5
16											14	1.4
17											14	1.4
18											14	1.4
19											14	1.4
20											14	1.5
21											14	1.5
22											14	1.4
23											14	1.4
24											14	1.5
25											14	1.5
26											25	2.8
27											30	3.2
28											22	2.3
29											24	2.5
30											26	2.7
31											28	2.9
TOTAL											---	51.9
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	30	3.2	107	13	98	9.5	51	5.1	71	6.5	29	2.7
2	32	3.4	99	12	97	9.2	51	5.1	67	6.2	30	2.8
3	34	3.6	92	11	97	9.2	51	5.1	67	6.3	32	2.9
4	35	3.7	83	9.4	97	9.2	51	5.1	67	6.2	33	3.0
5	35	3.6	77	8.7	100	10	51	5.1	67	6.2	34	3.2
6	36	3.7	69	7.8	100	9.7	51	5.1	67	6.3	36	3.3
7	36	3.5	84	10	415	96	58	5.6	90	8.7	37	3.5
8	36	3.5	53	6.0	3020	2740	80	7.8	365	59	37	3.6
9	36	3.4	51	5.8	280	29	115	11	100	10	37	3.4
10	36	3.5	51	5.8	120	12	410	64	50	4.7	37	3.6
11	36	3.6	52	5.8	240	25	130	14	44	4.2	37	3.5
12	50	5.4	52	5.6	380	43	125	12	44	4.2	1180	396
13	36	3.9	68	7.9	90	8.5	100	9.5	44	4.3	470	51
14	36	4.0	63	7.0	90	8.3	90	8.7	44	4.2	65	6.7
15	36	4.1	71	7.7	90	8.3	90	9.5	44	4.2	36	3.5
16	36	3.8	78	8.4	115	11	90	9.0	44	4.3	34	3.2
17	36	3.6	85	9.2	1640	806	90	9.0	44	4.4	32	3.0
18	36	3.7	92	9.9	420	50	90	8.5	44	4.4	30	2.8
19	36	3.6	99	11	350	39	90	8.5	44	4.3	28	2.6
20	36	3.6	103	11	280	30	90	8.5	44	4.3	26	2.4
21	36	3.5	108	12	230	25	90	8.3	44	4.3	25	2.2
22	36	3.5	113	12	200	22	90	8.3	44	4.3	28	2.6
23	36	3.8	112	12	150	16	90	8.3	52	5.1	30	2.8
24	36	3.6	109	11	112	12	90	8.3	35	3.4	33	3.1
25	36	3.6	110	12	104	10	90	8.3	23	2.2	36	3.2
26	36	3.6	109	11	95	9.5	90	8.3	24	2.3	39	3.4
27	60	6.6	107	11	85	8.5	90	8.3	25	2.4	41	3.7
28	78	8.0	105	10	76	7.4	88	8.1	25	2.4	44	3.9
29	112	13	104	10	65	6.5	84	7.7	26	2.5	42	3.7
30	257	40	102	9.9	55	5.3	80	7.3	27	2.6	40	3.6
31	---	---	100	9.7	---	---	75	6.9	28	2.6	---	---
TOTAL	---	163.6	---	293.6	---	4085.1	---	304.3	---	197.0	---	538.9

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 mi² (13.36 km²).

PERIOD OF RECORD.--Water years 1959-66 (annual maximums), 1967-70 (peaks above base), October 1970 to current year.

GAGE.--Water-stage recorder, crest-stage gage, and v-notch weir. 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.

AVERAGE DISCHARGE.--14 years (water years 1971-84), 2.33 ft³/s (0.066 m³/s), 6.13 in/yr (156 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,500 ft³/s (42.5 m³/s) July 5, 1978, gage height, 18.10 ft (5.517 m) from high-water mark in well; minimum observed, 0.12 ft³/s (0.003 m³/s) Aug. 5, 1960.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 30 ft³/s (0.85 m³/s) Sept. 12; maximum gage height, 11.43 ft (3.484 m) Aug. 7, Sept. 12, no peak above base of 100 ft³/s (2.83 m³/s); minimum discharge, 1.2 ft³/s (0.034 m³/s) Jan. 20, 21, gage height, 10.12 ft (3.085 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.8	2.2	1.5	1.2	2.1	2.2	3.0	1.8	1.8	1.9	2.0
2	1.6	1.7	2.2	1.5	1.2	2.0	2.2	2.8	1.8	1.9	1.9	1.9
3	1.8	1.7	2.1	1.6	1.3	2.0	2.1	2.6	1.8	2.0	2.0	1.9
4	1.7	1.7	2.1	1.6	1.3	2.0	2.1	2.5	1.8	2.0	2.0	2.0
5	1.7	1.7	2.1	1.6	1.3	2.0	2.1	2.5	1.8	1.9	2.1	1.9
6	1.6	1.7	2.1	1.6	1.3	1.9	2.1	2.4	1.8	2.0	2.1	1.8
7	1.7	1.7	2.0	1.6	1.2	1.9	2.1	2.9	2.2	1.9	5.0	1.8
8	1.6	1.7	1.9	1.7	1.2	2.0	2.1	2.3	2.3	2.0	3.7	2.0
9	1.6	2.3	1.9	1.7	1.2	1.9	2.1	2.3	1.8	2.0	2.3	1.9
10	1.6	2.0	1.9	1.6	1.2	1.8	2.0	2.3	1.9	4.1	2.2	1.8
11	2.6	1.8	2.0	1.6	1.3	1.8	2.1	2.2	2.3	2.3	2.2	1.8
12	2.0	1.8	2.0	1.6	2.4	1.8	2.6	2.2	2.6	2.1	2.2	6.8
13	1.8	1.8	2.0	1.6	2.0	1.8	2.5	2.6	2.1	2.1	2.2	2.4
14	1.8	2.0	2.0	1.5	2.0	1.8	2.5	2.2	1.9	2.3	2.1	2.3
15	1.9	1.9	2.0	1.5	2.3	2.3	2.3	2.2	1.9	2.3	2.1	2.2
16	1.8	1.8	1.9	1.5	2.4	2.2	2.2	2.2	2.6	2.8	2.1	2.2
17	1.8	1.9	1.8	1.4	2.5	1.9	2.2	2.2	2.8	2.6	2.2	2.1
18	1.7	1.9	1.8	1.4	2.4	2.0	2.2	2.2	2.8	2.2	2.1	2.1
19	2.3	2.2	1.7	1.3	3.1	1.9	2.2	2.2	2.2	2.1	2.0	2.1
20	2.6	2.2	1.7	1.2	2.5	1.9	2.2	2.1	2.1	2.0	1.9	2.0
21	2.2	2.2	1.8	1.2	2.3	1.9	2.1	2.1	2.0	2.0	1.9	2.0
22	2.1	2.2	1.7	1.3	2.5	2.0	2.2	2.3	2.0	2.0	2.0	2.0
23	2.0	4.7	1.6	1.3	2.4	2.2	2.2	2.0	2.0	1.9	1.9	2.2
24	1.9	3.2	1.7	1.3	2.3	2.2	2.1	2.1	1.9	1.9	1.9	2.1
25	1.8	2.8	1.6	1.3	2.2	2.7	2.1	2.2	1.8	2.0	1.9	2.0
26	1.8	2.6	1.6	1.3	2.2	2.6	2.0	2.0	1.8	2.1	1.8	2.0
27	1.8	2.5	1.6	1.3	2.1	2.4	2.6	2.0	1.8	2.0	1.8	2.0
28	1.8	2.5	1.6	1.3	2.1	2.3	2.1	2.0	1.8	1.9	1.9	2.0
29	1.8	2.3	1.6	1.3	2.1	2.2	3.0	1.9	1.8	1.9	1.8	2.0
30	1.8	2.2	1.6	1.2	---	2.2	4.2	1.8	1.8	1.9	1.8	2.0
31	1.8	---	1.5	1.2	---	2.2	---	1.8	---	1.9	1.8	---
TOTAL	57.6	64.5	57.3	44.6	55.5	63.9	68.7	70.1	61.0	65.9	66.8	65.3
MEAN	1.86	2.15	1.85	1.44	1.91	2.06	2.29	2.26	2.03	2.13	2.15	2.18
MAX	2.6	4.7	2.2	1.7	3.1	2.7	4.2	3.0	2.8	4.1	5.0	6.8
MIN	1.6	1.7	1.5	1.2	1.2	1.8	2.0	1.8	1.8	1.8	1.8	1.8
CFSM	.36	.42	.36	.28	.37	.40	.44	.44	.39	.41	.42	.42
IN.	.42	.46	.41	.32	.40	.46	.50	.51	.44	.48	.48	.47
AC-FT	114	128	114	88	110	127	136	139	121	131	132	130
CAL YR 1983	TOTAL 781.0	MEAN 2.14	MAX 10	MIN 1.5	CFSM .42	IN 5.63	AC-FT 1550					
WTR YR 1984	TOTAL 741.2	MEAN 2.03	MAX 6.8	MIN 1.2	CFSM .39	IN 5.34	AC-FT 1470					

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 mi² (153,300 km²), 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.--56 years, 27,200 ft³/s (770.3 m³/s), 6.24 in/yr (158 mm/yr).

EXTREMES FOR PERIOD OF RECORD---Maximum discharge, 268,000 ft³/s (7,590 m³/s) Apr. 19, 1965, gage height, 20.77 ft (6.331 m) from floodmark; minimum, 1,940 ft³/s (54.9 m³/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 ft³/s (4,870 m³/s), from information by Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 106,000 ft³/s (3,000 m³/s) June 21-23; maximum gage height, 12.10 ft (3.688 m) June 22; minimum discharge, 10,800 ft³/s (306 m³/s) Aug. 22, gage height, 5.11 ft (1.558 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	27600	30900	45700	28000	21600	56800	61300	72600	48500	94200	23700	17600		
2	27400	30500	41500	28000	20700	58000	63500	74800	46800	91900	21700	15600		
3	25800	30200	39500	28800	20500	58800	67300	79100	44000	89200	25300	14700		
4	23700	29400	35200	29600	20800	58500	70200	85900	40200	87700	28500	14900		
5	24300	28400	34300	29600	21500	56800	72200	91500	39600	86400	25700	14700		
6	24900	27900	33800	29600	21600	52400	75900	92800	38600	82100	24700	15500		
7	26400	28100	34000	29600	21500	48400	80400	91800	38500	77500	24800	15600		
8	27400	27600	31600	29500	21400	47000	83500	89700	42500	73700	27500	17200		
9	26800	27700	27600	29100	21300	47300	86600	86700	43400	67900	32200	18100		
10	25800	27500	24000	29100	21300	44500	88800	85100	43500	67400	32500	18400		
11	26400	27700	22000	28100	21200	34600	90400	84700	46300	67800	29800	18400		
12	29500	28600	23900	27500	22000	34200	91900	85700	53600	67400	27300	20900		
13	33000	28300	28900	26800	24400	36700	93000	87600	59400	64800	26200	22000		
14	37100	28900	32600	26500	26000	39200	93200	87900	60400	59100	25500	23300		
15	40000	30200	36600	26600	29200	41300	92000	87600	66400	59000	24100	22700		
16	40600	30900	39800	25600	33400	40400	90100	86600	77100	56100	22700	21800		
17	42200	31100	38500	25000	38400	38800	87200	85400	88600	53700	21800	20500		
18	42800	30900	26000	25000	41000	37000	84200	83900	97400	52500	20200	20200		
19	41300	30800	21500	23900	43100	33400	83300	81600	103000	49700	20700	20700		
20	40600	32100	26700	23200	42500	31900	82600	78400	105000	46800	18900	21100		
21	41300	32400	31100	23200	41000	32400	81100	76600	106000	46300	13900	20600		
22	41000	32500	31500	23000	61700	32400	80500	73700	106000	43300	11100	17600		
23	41200	34300	30700	23000	62000	31700	78600	71900	106000	40800	14700	14600		
24	41000	41600	29800	23000	61000	32700	77000	69000	104000	39200	16600	13400		
25	40200	47500	29400	22900	58500	35300	74600	65900	103000	36200	18300	14400		
26	37600	51100	28600	22900	56000	36100	72400	64100	101000	35200	18600	17700		
27	36700	54400	28100	22900	57200	36400	70400	63200	100000	34000	19300	21700		
28	36300	59700	25400	22900	55800	41500	70700	61400	99000	32900	19300	26100		
29	35700	57600	25800	22900	54600	50300	71100	58800	97400	31200	18100	26200		
30	33600	53400	26900	23000	---	55800	71600	52000	96000	27700	18100	25200		
31	32000	---	27600	22100	---	60200	---	50300	---	25000	17900	---		
TOTAL	1050200	1052200	958600	800900	1041200	1340800	2385600	2406300	2201200	1786700	689700	571400		
MEAN	33880	35070	30920	25840	35900	43250	79520	77620	73370	57640	22250	19050		
MAX	42800	59700	45700	29600	62000	60200	93200	92800	106000	94200	32500	26200		
MIN	23700	27500	21500	22100	20500	31700	61300	50300	38500	25000	11100	13400		
CFSM	.57	.59	.52	.44	.61	.73	1.34	1.31	1.24	.97	.38	.32		
IN.	.66	.66	.60	.50	.65	.84	1.50	1.51	1.38	1.12	.43	.36		
AC-FT	2083000	2087000	1901000	1589000	2065000	2659000	4732000	4773000	4366000	3544000	1368000	1133000		
CAL YR 1983	TOTAL	16262600	MEAN	44560	MAX	137000	MIN	17700	CFSM	.75	IN	10.22	AC-FT	32260000
WTR YR 1984	TOTAL	16284800	MEAN	44490	MAX	106000	MIN	11100	CFSM	.75	IN	10.23	AC-FT	32300000

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT DISCHARGE: September 1975 to current year.

SEDIMENT LOADS: Maximum daily 65,300 tons (59,200 tonnes) July 2, 1978; minimum daily, 17 tons (15 tonnes) Feb. 1, 2, 1984.

SEDIMENT LOADS: Maximum daily, 15,000 tons (13,600 tonnes) Apr.29; minimum daily, 17 tons (15 tonnes) Feb. 1, 2.

[illegible]

MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

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- PENDEDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT , 1983											
24...	12	210	1.2	.250	.30	.140	.100	.080	17	1850	86
JAN , 1984											
17...	14	263	1.7	.390	4.2	.110	.080	.110	2	135	100
APR											
24...	11	321	3.3	.070	.90	.100	.040	.030	17	--	83
JUL											
17...	15	369	2.1	<.010	2.0	.140	.140	.100	36	5300	98
AUG											
23...	--	--	--	--	--	--	--	--	14	605	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)
OCT , 1983											
24...	1400	20	1	58	<.5	<1	<1	<3	3	67	1
JAN , 1984											
17...	1230	10	1	56	<.5	<1	<1	<3	2	170	3
APR											
24...	1300	<10	1	58	<.5	<1	<1	<3	1	25	3
JUL											
17...	1430	10	2	72	<.5	<1	<1	<3	2	10	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)
OCT , 1983										
24...	7	10	<.1	<10	2	<1	<1	88	<6	14
JAN , 1984										
17...	9	86	.2	<10	2	<1	<1	100	<6	9
APR										
24...	16	4	.1	<10	1	1	<1	160	<6	9
JUL										
17...	25	8	.1	<10	1	1	<1	180	<6	30

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	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)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
AUG										
23...	16000	4	0	3	37	73	88	95	99	100

MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

SPECIFIC CONDUCTANCE, (MICROSIEMENS/CM AT 25 DEG.C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	300	320	300	---	---	380	440	480	450	460	520	400
2	300	320	320	---	400	---	470	470	450	490	520	400
3	300	320	330	---	---	380	490	470	450	500	520	400
4	300	320	330	---	---	380	480	440	440	510	520	410
5	310	320	340	400	---	---	450	450	440	520	520	410
6	310	320	340	---	---	420	440	450	440	520	520	410
7	310	320	350	---	---	415	430	440	430	520	500	410
8	310	320	350	---	---	420	420	440	420	520	500	400
9	310	330	350	---	380	420	420	420	430	520	480	---
10	300	340	340	---	---	420	430	400	440	520	480	---
11	300	330	340	---	---	---	420	400	420	530	500	300
12	320	320	330	400	---	430	440	410	420	530	500	310
13	290	320	330	---	---	430	430	410	440	530	500	310
14	280	320	360	---	---	420	430	410	450	530	500	310
15	270	320	360	---	---	420	430	420	470	530	500	---
16	260	320	---	---	350	420	440	410	460	540	500	300
17	260	330	---	350	---	410	450	410	450	550	500	300
18	280	330	---	---	---	410	460	420	400	540	500	300
19	300	330	---	400	---	430	450	430	390	540	500	360
20	300	330	---	---	---	430	450	420	350	540	450	310
21	310	340	---	---	---	440	450	420	330	540	450	310
22	310	340	400	---	---	440	450	420	330	540	450	310
23	310	330	---	---	330	430	460	430	330	530	470	310
24	380	300	---	---	---	440	460	440	330	530	440	380
25	330	290	---	---	---	440	470	430	350	540	420	380
26	320	300	---	400	---	470	480	430	370	540	420	380
27	320	290	---	---	---	480	480	430	390	540	400	400
28	310	280	---	---	---	470	490	450	400	530	400	360
29	310	280	400	---	---	465	490	450	420	530	410	320
30	310	280	---	---	---	450	480	450	440	530	420	340
31	320	---	---	---	---	450	---	460	---	520	410	---
MEAN	305	317	---	---	---	---	453	433	411	526	475	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18.0	10.0	.5	---	---	1.5	4.0	8.0	19.0	23.0	26.0	21.0
2	18.0	11.0	.5	---	.0	---	5.0	9.0	19.0	23.0	27.0	21.0
3	17.0	10.0	.0	---	---	1.5	5.0	10.0	19.0	23.0	27.0	20.0
4	15.0	8.5	.0	---	---	1.5	5.0	11.0	20.0	23.0	26.0	19.0
5	15.0	8.0	1.0	.0	---	---	5.0	11.0	20.0	23.0	26.0	19.0
6	14.0	8.0	1.0	---	---	1.0	6.0	11.0	22.0	22.0	27.0	19.0
7	13.0	9.0	.0	---	---	1.0	6.0	11.0	22.0	21.0	29.0	20.0
8	13.0	10.0	.0	---	---	1.0	7.0	10.0	22.0	21.0	26.0	20.0
9	13.0	9.0	.5	---	---	1.0	7.0	10.0	20.0	22.0	26.0	---
10	13.5	8.0	.5	---	---	.5	7.0	11.0	20.0	23.0	26.0	---
11	13.0	6.0	1.0	---	---	---	8.0	12.0	20.0	22.0	25.0	19.0
12	11.0	5.0	1.0	.0	---	.0	8.0	12.0	21.0	23.5	25.0	18.5
13	11.0	5.0	.5	---	---	.0	8.0	13.0	22.0	24.0	25.0	19.0
14	10.0	5.0	.5	---	---	1.0	8.0	13.0	22.0	24.0	25.0	19.0
15	10.0	5.0	.5	---	---	1.0	8.0	14.0	20.0	25.0	25.0	---
16	10.0	5.0	---	---	1.5	1.5	8.0	14.0	20.0	25.0	25.0	17.0
17	10.0	4.0	---	.5	---	1.0	9.0	14.0	21.0	22.5	25.0	17.0
18	10.0	5.0	---	---	---	1.0	9.0	15.0	21.0	21.0	25.0	17.0
19	11.0	5.0	---	.0	---	1.5	9.0	16.0	22.0	23.0	25.0	18.0
20	10.0	5.0	---	---	---	2.0	9.0	17.0	22.0	24.0	24.0	19.0
21	10.0	4.0	---	---	---	2.0	9.0	17.0	21.5	25.0	24.0	19.0
22	10.0	4.0	.0	---	---	2.0	10.0	17.5	22.0	25.0	23.0	19.0
23	10.0	4.0	---	---	2.0	3.0	10.0	17.0	22.0	25.0	23.0	19.0
24	8.0	2.5	---	---	---	3.0	10.5	17.0	22.0	25.0	21.0	19.0
25	9.0	2.0	---	---	---	4.0	11.0	17.0	22.0	25.0	21.0	17.0
26	10.0	2.0	---	.0	---	4.0	13.0	17.0	22.0	24.5	21.0	15.5
27	10.0	1.0	---	---	---	4.0	14.5	16.0	22.0	24.5	21.0	15.5
28	11.0	1.0	---	---	---	4.0	14.5	16.0	22.0	24.0	23.0	15.5
29	10.0	.5	.0	---	---	4.0	9.0	16.0	22.0	24.0	24.0	15.5
30	9.0	.5	---	---	---	3.0	8.0	17.0	23.0	24.0	24.0	15.5
31	10.0	---	---	---	---	3.0	---	18.0	---	24.0	22.5	---
MEAN	11.5	5.5	---	---	---	---	8.5	14.0	21.0	23.5	24.5	---

MISSISSIPPI RIVER MAIN STEM

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN CONCEN- TRATION (MG/L)		MEAN CONCEN- TRATION (MG/L)		MEAN CONCEN- TRATION (MG/L)		MEAN CONCEN- TRATION (MG/L)		MEAN CONCEN- TRATION (MG/L)		MEAN CONCEN- TRATION (MG/L)	
	LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)	
OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	13	969	9	751	9	1110	1	76	0	17	10	1530
2	12	888	8	659	7	784	1	76	0	17	10	1570
3	11	766	9	734	6	640	1	78	0	22	9	1430
4	12	768	9	714	5	475	1	80	1	56	10	1580
5	12	787	8	613	3	278	1	80	1	58	12	1840
6	14	941	7	527	2	183	1	80	1	58	11	1560
7	13	927	8	607	2	184	1	80	1	58	8	1050
8	13	962	9	671	1	85	1	80	1	58	7	888
9	14	1010	10	748	5	373	1	79	1	58	8	1020
10	14	975	12	891	1	65	1	79	1	58	7	841
11	14	998	12	897	1	59	1	76	1	57	6	561
12	16	1270	8	618	2	129	1	74	1	59	5	462
13	16	1430	8	611	2	156	1	72	1	66	4	396
14	16	1600	6	468	3	264	1	72	1	70	4	423
15	18	1940	6	489	2	198	1	72	1	79	5	558
16	21	2300	9	751	2	215	1	69	3	271	6	654
17	18	2050	6	504	2	208	2	135	5	518	8	838
18	18	2080	7	584	2	140	1	67	8	886	7	699
19	16	1780	6	499	1	58	0	19	10	1160	3	271
20	17	1860	9	780	1	72	0	19	11	1260	3	258
21	15	1670	11	962	1	84	0	19	11	1220	4	350
22	15	1660	12	1050	1	85	0	19	11	1830	5	437
23	16	1780	9	833	1	83	0	19	12	2010	3	257
24	16	1770	15	1680	1	80	0	19	12	1980	4	353
25	12	1300	14	1800	1	79	0	19	12	1900	5	477
26	11	1120	12	1660	1	77	0	19	11	1660	5	487
27	10	991	13	1910	1	76	0	19	11	1700	5	491
28	15	1470	14	2260	1	69	0	19	11	1660	9	1010
29	18	1740	21	3270	1	70	0	19	10	1470	15	2040
30	14	1270	16	2310	1	73	0	19	---	---	16	2410
31	9	778	---	---	1	75	0	18	---	---	21	3410
TOTAL	---	41850	---	30851	---	6527	---	1671	---	20316	---	30151
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	20	3310	45	8820	17	2230	27	6870	14	896	11	523
2	21	3600	33	6660	21	2650	24	5960	12	703	10	421
3	24	4360	29	6190	19	2260	23	5540	22	1500	8	318
4	23	4360	32	7420	17	1850	25	5920	19	1460	11	443
5	25	4870	28	6920	18	1920	21	4900	12	833	12	476
6	29	5940	29	7270	18	1880	21	4660	10	667	10	418
7	31	6730	35	8680	18	1870	23	4810	9	603	11	463
8	27	6090	45	10900	22	2520	23	4580	13	965	10	464
9	24	5610	34	7960	26	3050	24	4400	12	1040	12	586
10	24	5750	23	5280	25	2940	27	4910	14	1230	13	646
11	28	6830	22	5030	24	3000	43	7870	14	1130	14	696
12	31	7690	23	5320	27	3910	70	12700	12	885	15	846
13	28	7030	23	5440	28	4490	43	7520	11	778	15	891
14	22	5540	20	4750	28	4570	31	4950	13	895	15	944
15	23	5710	19	4490	28	5020	29	4620	12	781	14	858
16	31	7540	20	4680	30	6250	39	5910	11	674	13	765
17	23	5420	24	5530	31	7420	36	5220	12	706	11	609
18	23	5230	22	4980	33	8680	30	4250	12	654	11	600
19	17	3820	18	3970	33	9180	24	3220	8	447	10	559
20	19	4240	19	4020	30	8500	20	2530	9	459	10	570
21	17	3720	18	3720	32	9160	18	2250	10	375	11	612
22	19	4130	18	3580	29	8300	18	2100	9	270	11	523
23	18	3820	20	3880	35	10000	16	1760	11	437	11	434
24	17	3530	21	3910	32	8990	17	1800	12	538	12	434
25	19	3830	23	4090	34	9460	15	1470	11	544	11	428
26	23	4500	26	4500	31	8450	15	1430	17	854	11	526
27	50	9500	24	4100	35	9450	13	1190	13	677	13	762
28	65	12400	18	2980	33	8820	16	1420	21	1090	14	987
29	78	15000	21	3330	27	7100	17	1430	11	538	13	920
30	64	12400	21	2950	26	6740	13	972	11	538	13	885
31	---	---	17	2310	---	---	15	1010	10	483	---	---
TOTAL	---	182500	---	163660	---	170660	---	128172	---	23650	---	18607
TOTAL LOAD FOR YEAR:			818615 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 mi² (1,593 km²).

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.--49 years (water years 1912-14, 1916-17, 1941-84), 357 ft³/s (10.11 m³/s), 7.88 in/yr (200 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,100 ft³/s (626 m³/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 ft³/s (0.82 m³/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 ft³/s (99.1 m³) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 17	1230	3,660 104	6.49 1.978	Mar. 27	1600	*3,680 104	*6.60 2.012

Minimum discharge, 188 ft³/s (5.32 m³/s) Dec. 17, gage height, 0.99 ft (0.302 m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	491	520	641	340	250	841	1510	3150	535	508	317	241
2	471	513	657	330	250	789	1590	2510	515	484	314	241
3	479	500	590	330	250	714	1500	1910	493	476	307	241
4	471	482	635	320	250	696	1430	1520	480	488	303	241
5	451	471	635	320	250	681	1190	1270	468	454	302	240
6	432	467	582	310	250	570	1130	1110	445	432	311	238
7	420	461	505	310	250	520	1100	1130	512	410	322	238
8	409	453	507	300	250	550	1000	1200	1380	402	627	250
9	399	476	538	300	250	500	901	1040	835	402	434	253
10	395	566	510	290	260	500	845	935	669	420	347	256
11	428	615	564	290	290	490	808	870	592	799	319	253
12	507	586	526	280	358	500	808	801	620	616	308	443
13	483	548	512	280	557	490	1330	794	623	506	301	463
14	467	538	523	280	804	502	1740	766	549	464	298	328
15	459	567	515	270	978	530	1640	703	524	526	290	286
16	463	585	350	270	1910	622	1320	664	647	595	285	265
17	447	594	240	270	3540	613	1090	661	2450	592	288	259
18	432	568	240	270	3070	579	941	663	2620	530	296	250
19	435	573	320	260	2120	563	837	645	1980	470	284	244
20	621	632	440	260	1520	567	769	613	1220	451	274	238
21	1450	816	430	260	1250	551	710	585	986	430	277	233
22	1310	838	420	260	1150	511	668	596	1090	410	281	230
23	1010	889	410	260	1360	503	668	621	1360	380	272	230
24	865	1090	400	260	1390	558	647	596	1340	364	267	236
25	767	979	390	250	1380	820	607	721	930	359	263	233
26	698	913	380	250	1350	2120	579	873	781	355	259	227
27	648	841	380	250	1210	3220	673	763	695	348	256	227
28	614	820	370	250	1030	2600	1020	675	622	337	254	227
29	571	773	360	250	904	2400	935	620	573	330	249	227
30	545	669	350	250	---	2010	1780	581	537	324	245	227
31	528	---	350	250	---	1440	---	556	---	317	240	---
TOTAL	18166	19343	14270	8670	28681	28550	31766	30142	27071	13979	9390	7765
MEAN	586	645	460	280	989	921	1059	972	902	451	303	259
MAX	1450	1090	657	340	3540	3220	1780	3150	2620	799	627	463
MIN	395	453	240	250	250	490	579	556	445	317	240	227
CFSM	.95	1.05	.75	.46	1.61	1.50	1.72	1.58	1.47	.73	.49	.42
IN.	1.10	1.17	.86	.52	1.73	1.73	1.92	1.82	1.64	.85	.57	.47
AC-FT	36030	38370	28300	17200	56890	56630	63010	59790	53700	27730	18630	15400
CAL YR 1983	TOTAL	288088	MEAN 789	MAX 7170	MIN 178	CFSM 1.28	IN 17.43	AC-FT 571400				
WTR YR 1984	TOTAL	237793	MEAN 650	MAX 3540	MIN 227	CFSM 1.06	IN 14.38	AC-FT 471700				

IOWA RIVER BASIN

05457000 CEDAR RIVER NEAR AUSTIN, MN

LOCATION.--Lat 43°38'11", long 92°58'26", in NE¼SE¼ sec.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 mi² (1,100 km²).

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 period, which are fair.

AVERAGE DISCHARGE.--45 years (water years 1910-14, 1945-84), 208 ft³/s (5.891 m³/s), 6.65 in/yr (169 mm/yr); median of yearly mean discharges, 199 ft³/s (5.64 m³/s), 6.36 in/yr (162 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft³/s (351 m³/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 ft³/s (39.6 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Feb. 17	2330	2,920	82.7	May 2	1500	3,330	94.3
Mar. 27	1045	*3,410	96.6	June 18	1200	1,470	41.6
Apr. 14	0445	1,960	55.5	June 23	1415	1,990	56.4
Apr. 28	0545	3,060	86.7	July 15	0815	1,420	40.2
							5.90
							1.798

Minimum discharge, 63 ft³/s (1.78 m³/s) Feb. 5, Sept. 21, 30; minimum gage height, 2.29 ft (0.698 m) Feb. 5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	216	257	292	144	101	478	1720	3020	266	248	121	69
2	207	252	305	137	100	420	1650	3200	259	227	117	66
3	211	240	270	133	100	375	1580	2510	237	224	112	67
4	203	230	270	132	100	375	1350	1710	230	218	109	68
5	195	221	264	131	100	344	1140	1230	239	204	104	67
6	181	213	236	131	100	276	1050	976	227	190	104	65
7	173	210	221	131	100	324	920	979	236	176	121	68
8	169	210	218	131	101	273	784	923	305	173	141	78
9	160	262	224	131	101	289	733	753	292	181	129	71
10	157	328	218	130	103	279	691	630	267	402	114	73
11	229	334	210	127	112	239	626	562	270	784	104	71
12	338	293	216	124	162	248	737	489	347	459	98	131
13	336	274	218	121	216	233	1660	485	392	314	97	102
14	294	312	221	119	282	224	1890	446	358	354	96	84
15	268	401	201	117	545	224	1490	398	337	1210	93	77
16	256	405	152	115	2030	233	1070	381	364	681	93	71
17	239	362	176	114	2730	239	809	382	979	515	94	69
18	225	336	268	112	2570	242	643	397	1420	381	93	71
19	236	334	257	110	1690	245	540	382	1330	298	87	71
20	518	447	243	109	1230	242	476	349	831	260	85	69
21	1160	524	233	108	1030	226	426	322	591	230	104	65
22	997	459	210	107	944	219	399	420	537	207	93	69
23	673	434	190	106	979	291	388	402	1650	190	89	73
24	511	364	173	106	944	719	361	374	1100	175	84	73
25	427	324	160	105	961	1450	332	500	634	164	81	73
26	378	289	158	104	988	2440	314	491	485	170	76	67
27	344	251	155	104	772	3260	1440	387	402	161	79	69
28	321	227	153	103	626	2710	2680	356	341	148	77	71
29	289	236	154	103	507	2890	1590	321	301	137	76	67
30	264	260	153	102	---	2050	1860	295	267	131	71	65
31	262	---	150	101	---	1570	---	277	---	127	70	---
TOTAL	10437	9289	6569	3648	20324	23627	31349	24347	15494	9339	3012	2200
MEAN	337	310	212	118	701	762	1045	785	516	301	97.2	73.3
MAX	1160	524	305	144	2730	3260	2680	3200	1650	1210	141	131
MIN	157	210	150	101	100	219	314	277	227	127	70	65
CFSM	.79	.73	.50	.28	1.65	1.79	2.46	1.85	1.21	.71	.23	.17
IN.	.91	.81	.57	.32	1.78	2.07	2.74	2.13	1.36	.82	.26	.19
AC-FT	20700	18420	13030	7240	40310	46860	62180	48290	30730	18520	5970	4360
CAL YR 1983	TOTAL	185459	MEAN 508	MAX 6870	MIN 76	CFSM 1.20	IN 16.23	AC-FT 367900				
WTR YR 1984	TOTAL	159635	MEAN 436	MAX 3260	MIN 65	CFSM 1.03	IN 13.97	AC-FT 316600				

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 mi² (3,160 km²), 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.--49 years (water years 1936-84), 313 ft³/s (8.864 m³/s), 3.48 in/yr (88 mm/yr); median of yearly mean discharges, 236 ft³/s (6.684 m³/s), 2.63 in/yr (67 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,700 ft³/s (445 m³/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 ft³/s (14.2 m³/s) and maximum (*):

Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)	Date	Time	Discharge (ft ³ /s) (m ³ /s)	Gage height (ft) (m)
Apr. 13	1530	*7770 220	*16.31 4.791	June 22	1800	5,080 144	14.53 4.429
May. 6	1245	3400 96.3	12.77 3.892	Aug. 4	1915	822 23.3	6.52 1.987

Minimum daily discharge, 41 ft³/s (1.161 m³/s) Feb. 9-11; minimum gage height, 3.27 ft (0.997 m) Oct. 9, 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	91	62	260	86	53	250	2600	2830	1120	3970	448	131		
2	96	66	275	84	52	250	3300	3100	1040	3420	493	115		
3	87	66	280	84	51	245	4390	3120	990	3070	612	105		
4	77	68	285	84	49	240	5090	3160	958	2850	783	109		
5	73	67	290	84	48	240	5390	3300	967	2610	795	111		
6	67	68	295	84	46	240	5680	3380	944	2390	723	105		
7	63	74	290	84	44	235	5790	3300	925	2200	645	102		
8	61	69	280	84	42	235	5890	3150	963	2050	606	103		
9	52	79	255	84	41	230	6200	3000	993	1950	558	102		
10	54	84	240	82	41	230	6260	3130	1080	1830	516	100		
11	76	77	225	78	41	230	6150	3330	1160	1700	501	89		
12	72	80	205	76	43	230	6660	3250	1680	1580	525	121		
13	72	86	184	74	47	235	7560	3080	2000	1510	537	137		
14	71	108	170	70	55	240	7520	2870	2340	1480	498	135		
15	67	128	165	68	68	245	7310	2650	2520	1490	427	115		
16	70	149	150	68	85	250	7240	2450	3020	1420	392	102		
17	64	151	140	68	120	250	6710	2320	3820	1330	375	93		
18	64	154	135	67	300	255	6120	2200	3890	1270	363	86		
19	69	200	130	67	270	260	5520	2080	3980	1210	359	84		
20	79	261	128	67	250	265	5090	1950	4010	1190	349	83		
21	83	321	120	65	240	290	4600	1840	4100	1130	311	77		
22	84	322	117	65	230	390	4100	1740	4500	1040	272	73		
23	91	302	112	63	230	625	3520	1620	4900	936	242	71		
24	88	215	107	62	235	976	3200	1530	4980	837	210	71		
25	85	180	103	59	250	1370	2890	1470	4980	753	182	63		
26	77	250	98	57	270	1580	2700	1380	4950	693	161	64		
27	77	205	98	57	280	1570	2690	1280	4860	630	151	64		
28	75	170	98	56	270	1630	2810	1270	4720	579	145	68		
29	71	165	97	55	260	1730	2760	1270	4570	525	137	61		
30	66	185	96	54	---	1880	2640	1270	4330	477	153	58		
31	63	---	92	54	---	2420	---	1270	---	439	139	---		
TOTAL	2285	4412	5520	2190	4011	19316	148380	73590	85290	48559	12608	2798		
MEAN	73.7	147	178	70.6	138	623	4946	2374	2843	1566	407	93.3		
MAX	96	322	295	86	300	2420	7560	3380	4980	3970	795	137		
MIN	52	62	92	54	41	230	2600	1270	925	439	137	58		
CFSM	.06	.12	.15	.06	.11	.51	4.05	1.95	2.33	1.28	.33	.08		
IN.	.07	.13	.17	.07	.12	.59	4.52	2.24	2.60	1.48	.38	.09		
AC-FT	4530	8750	10950	4340	7960	38310	294300	146000	169200	96320	25010	5550		
CAL YR 1983	TOTAL	394116	MEAN	1080	MAX	5090	MIN	51	CFSM	.89	IN	12.02	AC-FT	781700
WTR YR 1984	TOTAL	408959	MEAN	1117	MAX	7560	MIN	41	CFSM	.92	IN	12.47	AC-FT	811200

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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 1984

Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
Mississippi River basin						
05220673	Moose River near Hill City, MN	Lat 46°53'19", long 93°35'34", in SE¼SE¼ sec.23, T.51 N., R.26 W., Aitkin County, Hydrologic Unit 07010103, at Culvert on Township Road, 7.5 miles south of Hill City, 1 mile east of U.S. Highway 169.	-	1984	9-11-84	6.5
05228000	Little Willow River near Aitkin, MN	Lat 45°34'37", long 93°45'00", in SE¼SE¼ sec.4, T.47 N., R.27 W., Aitkin County, Hydrologic Unit 07010104, at Culvert on County Highway 22, 4 miles northwest of Aitkin, 1 mile upstream from mouth.	-		9-11-84	0
05242985	Bender Creek near Hunterville, MN	Lat 46°49'47", long 94°50'17", in NW¼SE¼ sec.27, T.139 N., R.33 W., Hubbard County, Hydrologic Unit 07010106, at Culvert on road at first Crow Wing Lake inlet, 4.5 miles northeast at Hunterville.	-	1974-76	8-16-84	0.19
05242990	Crow Wing River near Hunterville, MN	Lat 46°49'23", long 94°52'18", in NW¼SW¼ sec.28, T.139 N., R.33 W., Hubbard County, Hydrologic Unit 07010106, at outlet of first Crow Wing Lake, at County Highway 109, 7 miles east of Hubbard, 3.4 miles northeast of Hunterville.	-	1955, 1974-76	8-16-84	66
05243100	Shell River near Park Rapids, MN	Lat 46°51'45", long 95°11'30" in NW¼NE¼ sec.14, T.139 N., R.36 W., Becker County, Hydrologic Unit 07010106, at bridge on County Highway 42, 8.8 miles northwest of Hubbard, 7.5 miles southwest of Park Rapids.	-	1974-76, 1984	8-16-84	0.46
05243248	Kettle Creek near Menahga, MN	Lat 46°46'38", long 95°09'48" in SW¼SW¼ sec.7, T.138 N., R.35 W., Wadena County, Hydrologic Unit 07010106, at Culvert on county road, 2 miles upstream from mouth, 3.5 miles northwest of Menahga.	-	1975, 1984	8-16-84	1.1

*See footnotes at end of the table."

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1984-continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
Mississippi River basin-Continued						
05243250	Blueberry River at Menahga, MN	Lat 46°45'31", long 95°06'01" in NW¼NW¼ sec.22, T.138 N., R.35 W., Wadena County, Hydrologic Unit 07010106, at bridge on U.S. Highway 71 in Menahga.	-	1974-76, 8-16-84 1984	3.4	
05243712	Fishhook River near Park Rapids, MN	Lat 46°52'42", long 95°02'02", in SW¼SW¼ sec.6, T.139 N., R.34 W., Hubbard County, Hydrologic Unit 07010106, site 0.1 mile upstream from mouth, 3.2 mile south of Park Rapids.	-	1975-76, 8-16-84 1984	11.0	
05243720	Straight River at Osage, MN	Lat 46°55'14", long 95°15'08", on line between secs.20 and 29, T.140 N., R.36 W., Becker County, Hydrologic Unit 07010106, at outlet of Straight Lake at State Highway 34 at Osage.	-	1943, 8-16-84 1974-76 1984	14	
05243990	Big Swamp Creek near Nimrod, MN	Lat 46°40'07", long 94°51'15", in SW¼NE¼ sec.21, T.137 N., R.33 W., Wadena County, Hydrologic Unit 07010106, at bridge on county road, 2.4 miles northeast of Nimrod.	-	1974-76, 8-16-84 1984	3.2	
05244295	Farnham Creek near Aldrich, MN	Lat 46°30'27", long 94°47'34", in SE¼NW¼ sec.13, T.135 N., R.33 W., Wadena County, Hydrologic Unit 07010106, at bridge on County Highway 30, 0.5 mile upstream from mouth, 11.6 miles northeast of Aldrich.	-	1974-76, 8-15-84 1984	2.4	
Nokasippi River basin						
05261351	Nokasippi River near Brainerd, MN	Lat 46°15'45", long 94°06'44", in NW¼SE¼ sec.27, T.44 N., R.30 W., Crow Wing County, Hydrologic Unit 07010104, at bridge on State Highway 25, 7.8 miles southeast of Brainerd.	69.9	1969-70, 9-13-84 1974, 1977, 1980, 1984	4.30	
05261440	Daggett Brook near Crow Wing, MN	Lat 46°13'42", long 94°07'15", on line between secs.3 and 10, T.43 N., R.30 W., Crow Wing County, Hydrologic Unit 07010104, at bridge on county road, 9.1 miles southeast of Crow Wing.	47.7	1969-70, 9-13-84 1974, 1977, 1980, 1984	1.43	
Platte River basin						
05267810	Big Mink Creek Near Pierz, MN	Lat 46°00'22", long 94°10'00", on line secs.29 and 30, T.41 N., R.30 W., Morrison County, Hydrologic Unit 07010201, at bridge on county road, 3.6 miles northwest of Pierz.	18.6	1969-70, 9-14-84 1975-77, 1979-80, 1984	1.42	
05267830	Little Mink Creek near Pierz, MN	Lat 45°59'12", long 94°11'15", on line between sec.31, T.41 N., R.30 W., and sec.36, T.41 N., R.31 W., Morrison County, Hydrologic Unit 07010201, at concrete culvert on County Highway 255, 4.1 miles west of Pierz.	18.8	1969, 9-14-84 1975-77, 1979-80, 1984	0.58	

*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 1984-continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
Minnesota River basin						
	Dog Creek near Kasota, MN	Lat 44°17'26", long 93°54'09", in NE¼SW¼ sec.36, T.110 N., R.26 W., LeSueur County, Hydrologic Unit 07020007, at culvert on County Road 18, 3 miles east of Kasota, 3.5 miles southeast of St. Peter.	-	1984	8-17-84	1.44
	Shanaska Creek at Kasota, MN	Lat 44°17'19", long 93°57'18", in middle of sec.33, T.110 N., R.26 W., LeSueur County, Hydrologic Unit 07020007, at culvert on State Highway 22, on east edge of Kasota, 2.5 miles south of St. Peter.	-	1984	8-30-84	1.89
	Cherry Creek near Ottawa, MN	Lat 44°21'28", long 93°54'32" in SE¼SE¼ sec.2, T.110 N., R.26 W., LeSueur County,Hydrologic Unit 07020007, at culvert on County Highway 20, 3.3 miles southeast of Ottawa.	-	1969, 1984	8-30-84	0.27
05326400	Rush River near Henderson, MN	Lat 44°29'57", long 93°54'18", in NW¼NW¼, SEC.24, T.112 N., R. 26 W., Sibley County, Hydrologic Unit 07020012, at bridge on State Highway 93, 0.4 mile upstream from mouth, 2 miles south of Henderson.	a397	1970-71, 1979-80, 1984	8-30-84	34.8
St. Croix River basin						
05336280	Moose River at Barnum, MN	Lat 46°30'15", long 92°41'32", in NE¼NW¼ sec.1, T.46 N., R.19 W., Carlton County, Hydrologic Unit 07030003, at bridge on County Highway 61, at Barnum.	76.1	1967, 1971, 1974-76, 1979-80, 1984	9-11-84	2.48
05336360	Willow River near Kerrick, MN	Lat 46°21'38", long 92°38'41", in NW¼NE¼ sec.29, T.45 N., R.18 W., Pine County, Hydrologic Unit 07030003, at bridge on County Highway 46, 3 miles northwest of Kerrick.	-	1967, 1979-80, 1984	9-11-84	3.70
05336365	Hay Creek near Kerrick, MN	Lat 46°21'38", long 92°40'29", in NW¼NW¼ sec.30 T.45 N., R.18 W., Pine County, Hydrologic Unit 07030003, at bridge on County Highway 46, 4.5 miles northwest of Kerrick.	-	1967, 1979-80, 1984	9-11-84	0.16
Cannon River basin						
05352900	Maple Creek at Owatonna, MN	Lat 44°05'42", long 93°13'24", in NW¼NW¼ sec.10, T.107 N., R.20 W., Steele County, Hydrologic Unit 07040002, 0.3 mile upstream from mouth, at Elm Street bridge in Owatona.	39.0	1969-71, 1974, 1976, 1979-80, 1984	9-10-84	1.41
05355060	Spring Creek near Cannon Falls, MN	Lat 44°30'21", long 92°59'40", in NE¼SW¼ sec.16, T.112 N., R.18 W., Goodhue County, Hydrologic Unit 07040002, at bridge on county road, 0.5 mile upstream from mouth, 4.4 miles west of Cannon Falls.	11.3	1969-72, 1974-76, 1979-80, 1984	8-31-84	1.06

"See footnotes at end of the table."

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1984-continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
Cannon River basin--Continued						
05355080	Prairie Creek near Cannon Falls, MN	Lat 44°29'10", long 92°59'14", on line between secs.21 and 28, T.112 N., R.18 W., Goodhue County, Hydrologic Unit 07040002, at bridge on State Highway 19, 4.5 miles southwest of Cannon Falls.	79.0	1966-70, 1974, 1976, 1980, 1984	8-31-84	15.8
Spring Creek basin						
05355260	Spring Creek near Red Wing, MN	Lat 44°33'42", long 92°36'42", on line between secs.27 and 28, T.113 N., R.15 W., Goodhue County, Hydrologic Unit 07040002, at bridge on County Highway 53, 4 miles west of Red Wing.	23.1	1969-71, 1974, 1976, 1977, 1980, 1984	8-31-84	7.30
Wells Creek basin						
05355350	Wells Creek near Frontenac, MN	Lat 44°30'32", long 92°19'26", in NE¼NW¼ sec.13, T.112 N., R.13 W., Goodhue County, Hydrologic Unit 07040001, at bridge on county road leading to Old Frontenac, 1.2 miles south of Old Frontenac, 1.6 miles east of Frontenac.	68.9	1968-71, 1974, 1976-77, 1980, 1984	8-30-84	33.6
Hay Creek basin						
05355280	Hay Creek at Red Wing, MN	Lat 44°33'09", long 92°33'46", in SE¼SNW¼ sec.36, T.113 N., R.15 W., Goodhue County Hydrologic Unit 07040001, at bridge on county road in Red Wing, 1.9 miles upstream from mouth.	45.6	1939-41, 1969-71, 1974, 1976-77, 1980, 1984	8-31-84	29.3
Miller Creek basin						
05355360	Miller Creek near Lake City, MN	Lat 44°25'51", long 92°16'35", in NW¼SE¼ sec.8, T.111 N., R.12 W., Wabasha County Hydrologic Unit 07040001, at bridge on County Highway 9, 1.3 miles south of Lake City.	14.6	1969-71, 1974, 1976-77, 1980, 1984	8-30-84	5.53
Zumbro River basin						
05373130	North Branch Middle Fork Zumbro River at Pine Island, MN	Lat 44°12'10", long 92°38'45", in SW¼NW¼ sec.32, T.109 N., R.15 W., Goodhue County, Hydrologic Unit 07040004, at bridge on Main Street in Pine Island, 0.3 mile upstream from Middle Fork Zumbro River.	58.6	1967, 1970-71, 1974-75, 1977, 1980, 1984	8-31-84	9.23
05373850	North Fork Zumbro River at Mazeppa, MN	Lat 44°16'00", long 92°32'58", in NW¼NW¼ sec.7, T.109 N., R.14 W., Wabasha County, Hydrologic Unit 07040004, at bridge on County Highway 1, at the southwest edge of Mazeppa.	174	1969-71, 1974, 1977, 1980, 1984	8-30-84	48.3
05373950	Trout Brook near Mazeppa, MN	Lat 44°16'34", long 92°31'16", in SW¼NE¼ sec.5, T.109 N., R.14 W., Wabasha County, Hydrologic Unit 07040004, at bridge on State Highway 60, 1.3 miles east of Mazeppa.	53.8	1969-71, 1974, 1977, 1980, 1984	8-30-84	19.6

"See footnotes at end of the table."

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1984-continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
Zumbro River basin--Continued						
05373995	Cold Creek at Zumbro Falls, MN	Lat 44°17'18", long 92°16'02", in SE¼NE¼ sec.36, T.110 N., R.14 W., Wabasha County, Hydrologic Unit 07040004, at triple box culvert on State Highway 60, 0.2 mile upstream from mouth, 0.6 mile northwest of Zumbro Falls.	45.9	1916, 1969-71, 1974, 1977, 1979-80, 1984	8-30-84	20.2
05374500	Zumbro River at Thielman, MN	Lat 44°17'15", long 92°11'15", in sec. 36, T.110 N., R.12 W., Wabasha County, Hydrologic Unit 07040004, 0.2 mile upstream from highway bridge 1 mile upstream from West Indian Creek.	1320	1938-56, 1958-62, 1984	8-31-84,	443
05374520	West Indian Creek at Theilman, MN	Lat 44°17'21", long 92°10'58", in SE¼NW¼ sec.31, T.110 N., R.11 W., Wabasha County, Hydrologic Unit 07040004, at bridge on County Highway 4, 0.3 mile upstream from mouth, 0.5 mile east of Theilman.	26.4	1970-71, 1974, 1977, 1980, 1984	8-31-84	13.2
Gorman Creek basin						
05375000	Gorman Creek near Kellogg, MN	Lat 44°17'34", long 91°59'21", on between secs.34 and 35, T.110 N., R.10 W., Wabasha County, Hydrologic Unit 07040003, on U.S. Highway 61, 1.1 miles southeast of Kellogg.	16.6	1969-71, 1974, 1977, 1979-80, 1984	8-31-84	3.16
Upper Iowa River basin						
05387250	Little Iowa River near LeRoy, MN	Lat 43°31'57", long 92°31'06", in SW¼SE¼ sec.21, T.101 N., R.14 W., Mower County, Hydrologic Unit 07060002, at bridge on county road in Lake Louise State Park, 1.7 miles northwest of LeRoy.	26.8	1969, 1974, 1976, 1980, 1984	9-11-84	1.42
05387270	Beaver Creek near LeRoy, MN	Lat 43°30'28", long 92°23'25", in SE¼NE¼ sec.33, T.101 N., R.13 W., Fillmore County, Hydrologic Unit 07060002, at bridge on State Highway 56, 1.5 miles northwest of Chester, Iowa, 5.8 miles east of LeRoy.	26.4	1971, 1976, 1984	9-11-84	1.39
Iowa River basin						
05455900	Cedar River near Blooming Prairie, MN	Lat 43°51'47", long 93°00'24", on line between secs.29 and 32, T.105 N., R.18 W., Dodge County, Hydrologic Unit 07080201, at bridge on County Highway 2, 2.1 miles east of Blooming Prairie.	81.6	1971, 1974, 1976, 1984	9-10-84	3.20
05455930	Roberts Creek near Lansing, MN	Lat 43°45'32", long 92°56'59", on line between secs.1 and 2, T.103 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on county road, 0.4 mile upstream from mouth, 1.4 miles northeast of Lansing.	39.9	1969, 1971, 1974, 1976, 1980	9-11-84	2.32
05455960	Wolf Creek at Austin, MN	Lat 43°41'28", long 92°57'36", in SW¼SE¼ sec.26, T.103 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on County Highway 25, in Todd Park at Austin, 0.3 mile upstream from mouth.	10.6	1969, 1971, 1974, 1976, 1980, 1984	9-11-84	2.30

"See footnotes at end of the table."

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at low-flow partial-record stations during water year 1984-continued

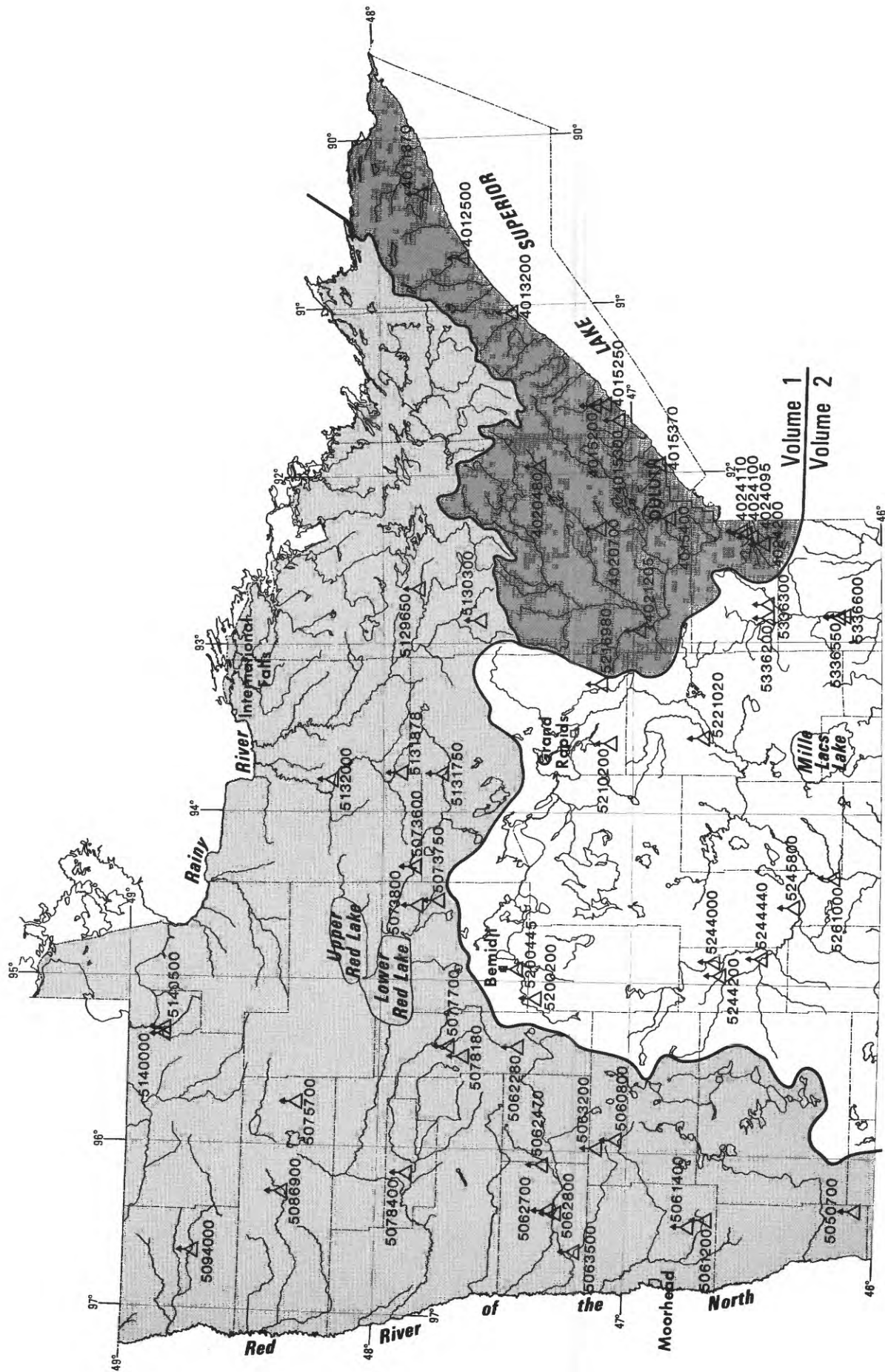
Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
Iowa River basin--Continued						
05456500	Turtle Creek near Austin, MN	Lat 43°41'05", long 93°02'15", in NE¼NW¼, sec.31, T.103 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on county road, 3 miles west of Austin.	144	1946, 1947-51#, 1969, 1971, 1984	9-11-84	14.3
05457160	Rose Creek near Austin, MN	Lat 43°36'48", long 92°58'10", on line between secs.26 and 27, T.102 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on County Highway 29, 0.3 mile upstream from mouth, 3.8 miles south of Austin.	65.8	1969, 1971, 1974, 1976, 1980, 1984	9-11-84	7.32
05457220	Woodbury Creek near Lyle, MN	Lat 43°30'37", long 93°00'34", on line between sec.32 and 33, T.101 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on State Highway 105, 3.3 miles west of Lyle.	40.4	1971, 1974, 1976, 1984	9-11-84	3.64
05457280	Otter Creek at Lyle, MN	Lat 43°30'00", long 92°55'52", in SE¼SE¼, sec.36, T.101 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on county road on Minn.-Iowa border in Lyle.	38.3	1971, 1974, 1984	9-11-84	6.38
05457780	Little Cedar River near Johnsburg, MN	Lat 43°30'00", long 92°44'57", in SE¼SE¼, sec.33, T.101 N., R.16 W., Mower County, Hydrologic Unit 07080201, at bridge on county road on Minn.-Iowa border, 1.1 miles southeast of Johnsburg.	48.0	1971, 1974, 1976, 1984	9-11-84	5.85
05458970	Shell Rock River at Gordonsville, MN	Lat 43°30'51", long 93°16'06", on line between secs. 29 and 32, T.101 N., R.20 W., Freeborn County, Hydrologic Unit 07080202, at bridge on County Highway 1, 0.8 mile west of Gordonsville.	191	1971, 1974, 1976, 1980, 1984	8-16-84	47.9
05458975	Goose Creek near Gordonsville, MN	Lat 43°30'13", long 93°16'24", in NE¼SE¼, sec.31, T.101 N., R.20 W., Freeborn County, Hydrologic Unit 07080202, at bridge on County Highway 1, 0.2 mile upstream from mouth, 1.1 miles southwest of Gordonsville.	53.8	1971, 1974, 1976, 1980, 1984	8-16-84	7.92
05459040	Lime Creek near Emmons, MN	Lat 43°30'00", long 93°33'29", in SW¼SE¼, sec.35, T.101 N., R.23 W., Freeborn County, Hydrologic Unit 07080203, at bridge on County Highway 60, 3.5 miles west of Emmons.	58.4	1971, 1974, 1976, 1980, 1984	8-16-84	17.6

Operated as continuous-record gaging station.

a Approximately.



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 1984

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /s)
Mississippi River main stem							
05200200	Hennepin Creek near Becida, MN	Lat 47°23'52", long 95°05'12" 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, 1.5 miles upstream from mouth.	41.4	1979-84	6- 9-84	a15.21	77
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	1973-84	6- 9-84	11.42	411
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	1961-84	6- 8-84	5.17	61
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 south-east of Warba.	3.95	1961-84	6- 8-84	5.83	38
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.	445	1972-84	6-10-84	12.54	1,550
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#, 1982-84	6-12-84	4.07	1,120
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	1961-84	6- 9-84	c5.32	110

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /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	1972-84	6-11-84	c13.46	1,580
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	1979-84	5-10-79 3-29-80 8-26-81 4-15-82 6-14-83 5- 7-84	12.43 e12.02 11.80 12.71 13.08 11.47	h180 h72 h118 200 285 47
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#, 1972-84	6-14-84	1143.46	15,100
Platte River basin							
05267900	Hillman Creek near Pierz,	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, 1.5 miles east of Pierz.	46.7	1964-84	4-27-84	13.61	430
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, 6.6 miles upstream from mouth.	335	1929-36#, 1972-84	6-14-84	2.10	1,160
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	1960-84	6-12-84	19.48	1,200
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, 1962-84	6-12-84	12.19	376
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	1964-84	4-27-84	7.43	35
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	1964-84	6-12-84	c12.90	220

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft ³ /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.	-	1972-84	6-14-84	d15.74	26,700
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	1964-84	6-12-84	5.03	124
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	1960-84	6-11-84	12.20	159
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	1960-84	6- 7-84	17.32	21
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	1973-84	6-22-84	10.59	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	1962-84	3-25-84	5.57	37
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	1961-84	6-12-84	7.29	125
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	1962-84	6-12-84	d7.85	9.5
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	1961-84	4- 2-84	14.28	53

"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 ²)	Period of Record	Date	Annual maximum	
						Gage height (feet)	Dis-charge (ft ³ /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#, 1980-84	4- 2-84	e12.69	4,200
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	1964-84	6-12-84	7.32	18
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	1960-84	6- 8-84	15.19	122
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	1960-84	6- 8-84	9.33	76
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	1961-84	6-11-84	8.45	104
Minnesota River Basin							
f	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.	g14.4	1982-84	3-29-84	6.37	160
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	1960-84	6-10-84	c14.40	440
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	1979-84	6- 5-84	11.25	72

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft ³ /s)
Minnesota River basin--Continued							
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	1962-84	6- 7-84	8.21	20
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	1959-84	6-15-84	16.61	310
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	1960-84	6-10-84	c15.27	400
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	1960-84	6-20-84	c8.98	21
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#, 1981-84	6-12-84	18.65	2500
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#, 1965-84	6-23-84	7.96	87
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	1972-84	6-13-84	10.35	1050
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	1966-84	6-23-85	6.00	78
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	1959-84	6-12-84	11.98	250

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /s)
Minnesota River basin--Continued							
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	1959-84	6-21-84	9.56	250
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	1966-84	5- 7-83 6-12-84	6.01 6.25	g69 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	1973-84	5- 8-83 6-25-84	28.79 29.12	g7,900 8,500
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	1979-84	5-30-80 4-28-81 3-21-82 7- 1-83 6-22-84	17.82 18.17 17.48 16.17 17.56	h465 h500 h325 h340 450
05317850	Poster Creek near Alden, MN	Lat 43°39'31", long 93°35'30" 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	1959-84	7- 1-83 7-10-84	c7.63 c7.75	h98 i108
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	1973-84	5- 1-84	9.75	690
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	1960-84	6-17-84	7.10	275
05318300	Watonwan 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	1960-84	6-12-83	c16.13	108
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	1979-84	4- 2-84	15.61	550

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /s)
Minnesota River basin--Continued							
05320200	Le Sueur River tributary near Mankato, MN	Lat 44°07'29", long 93°57'33", in SE½SW¼ sec.28, T.108 N., R.26 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 22, 0.2 mile up-stream from mouth, and 1.5 miles southeast of Mankato Airport.	.073	1959-84	6- 4-84	19.30	5.5
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 up-stream from mouth, and 6.3 miles north of Mapleton.	7.25	1959-84	5- 1-84	15.10	98
05320400	Maple River tributary near Mapleton, MN	Lat 43°55'18", long 94°01'17", in SE½SW¼ sec.1, T.105 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 30, 0.9 mile up-stream from mouth, and 3.3 miles west of Mapleton.	6.22	1959-84	6-22-84	21.57	1854
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	1972-84	5-30-80 6-26-81 3-18-82 3- 1-83 6-22-84	10.76 11.13 11.20 12.73 10.90	h2,440 h2,800 h2,880 h4,550 2,240
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	1979-84	8- 5-84	17.43	†
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	1960-84	6- 4-84	7.83	74
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	1960-84	3-26-84	11.57	330
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	1960-84	3-26-84	11.03	148
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	1960-84	6- 4-84	13.12	34

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /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#, 1971-84	6-11-84	d5.35	310
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	1960-84	6-12-84	d16.78	48
05338200	Mission Creek near Hinckley, MN	Lat 45°59'52", long 92°56'44", in SW¼SW¼ sec.25, T.42 N., R.21 W., Pine County, Hydrologic Unit 07030004, at culvert on U.S. Highway 23, 1.2 miles south of Hinckley.	3.84	1960-84	6-12-84	14.24	55
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#, 1982-84	6-15-84	8.22	7,860
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	1960-84	8-28-79 11- 5-79 7-15-81 7- 7-82 7- 1-83 4-27-84	17.90 15.25 17.56 16.50 20.19 16.56	h 73 h 7.8 h 62 h 33 h160 34
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	1960-84	4-27-84	6.86	90
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	1980-84	5- 4-84	903.99	4,900
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	1960-84	7-10-84	c12.42	68
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#, 1973-84	5- 5-84	8.40	5,740

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /s)
Zumbro River basin							
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.	22.2	1979-84	4-27-84	d12.50	315
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	1962-84	7-10-84	7.91	21
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	1960-84	5- 2-84	10.89	390
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	1960-84	7- 9-84	9.74	228
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	1966-84	4-27-84	13.59	40
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#, 1973-84	4-30-84	2.03	157
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#, 1965-84	7-10-84	10.57	204
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	1962-84	7-10-84	13.50	1320
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	1962-84	4-30-84	17.61	700

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /s)
Root River basin--Continued							
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	1959-84	6- 9-84	14.25	150
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.	6297	1973-84	6-17-84	10.24	4,900
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	1959-84	6- 9-84	15.78	382
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	1959-84	6- 9-84	13.55	1,330
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#, 1980-84	6-17-84	4.44	900
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	1979-84	6-17-84	15.66	1,430
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	1962-84	4-30-84	19.31	126
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	1961-84	6-22-84	18.58	135

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Date	Annual maximum Gage height (feet)	Dis-charge (ft ³ /s)
Des Moines River basin--Continued							
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	1961-84	6-22-84	19.00	94
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	1960-84	6-17-84	c5.13	27
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	1960-84	6-12-84	c13.55	12
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	1960-84	6-12-84	d6.86	87
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	1960-84	6-16-84	13.26	350
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	1979-84	6-21-84	a16.94	450
06482950	Mound Creek near Hardwick, MN	Lat 43°48'18", long 96°12'47", in SE¼SE¼ sec.15, T.104 N., R.45 W., Rock County, Hydrologic Unit 10170204, at culvert on county highway, 2.2 miles north-west of Hardwick.	2.47	1959-84	6-14-84	d11.11	219
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	1959-84	6-17-84	7.72	86
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*, 1972-84	6-25-84	10.53	10,000

"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 1984--Continued

Station No.	Station name	Location	Drainage area (mi ²)	Period of Record	Annual maximum		
					Date	Gage height (feet)	Dis-charge (ft ³ /s)
Big Sioux River basin--Continued							
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	1966-84	6-17-84	7.26	240
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	1962-84	6-23-84	9.74	1,400

Operated as a continuous-record gaging station.

† Discharge not determined.

a Affected by beaver dam.

b approximately.

c Backwater from aquatic growth or debris.

d Affected by shifting control.

e Backwater from ice.

f Operated as a miscellaneous water-quality site.

g Revised.

h Not previously published.

i Estimated.

j Adjusted for inflow to storage.

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 1984

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /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, 1983	6-29-84	1,710
Crow Wing River basin						
Straight River	Fish Hook River	Lat 46°58'58", long 95°17'24", in NE¼SE¼ sec.31, T.141 N., R.36 W., Becker County, Hydrologic Unit 07010106, at culvert on township road, 4.5 miles east of Ponsford, 4.5 miles north of Osage, in Two Inlets State Forest.	-	-	5-22-84 6- 5-84 7- 9-84 8-15-84 9-18-84	4.9 14 2.6 1.6 1.2
Mississippi River main stem						
Mississippi River	Gulf of Mexico	Lat 44°58'46", long 93°14'50", in SE¼SE¼ sec.23, T.29 N., R.24 W., Hennepin County, Hydrologic Unit 07010206, at lower St. Anthony Falls lock and dam in Minneapolis, MN, at River Mile 853.3 upstream from Ohio River. (Discharge measurements made between Hennepin Avenue and Franklin Avenue bridges over the Mississippi River are included). (05288920)	a19,700	1912, 1938-39, 1941, 1943, 1953-54, 1957, 1963-83	4-13-84	19,800
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 down- stream 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, 1972-83	10-27-83 8- 9-84 9-21-84	9,730 6,820 2,900
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 07020005, 1 mile north of Watson, MN.	-	1945-83,	11- 8-83 2-17-84 4-25-84 8- 6-84	261 167 602 293
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.	-	1945-83,	11- 8-83 2-17-84 4-25-84 8- 6-84	50 40 576 99

"See footnotes at end of table."

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1984--Continued

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements						
					Date	Discharge (ft ³ /s)					
Streams tributary to Vadnais Lake basin											
Wilkinson Creek inlet	Wilkinson Lake	Lat 45°06'30", long 93°03'40" in NW¼NW¼ sec.9, T.30 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, at culvert on County road J, 1300 ft west of Centerville Road in North Oaks, and 2200 ft upstream of Wilkinson Lake.	-	-	4-18-84	2.4					
					4-19-84	1.8					
					4-20-84	1.8					
					4-20-84	1.3					
					4-23-84	0.74					
					4-26-84	0.72					
					4-27-84	2.2					
					4-30-84	5.7					
					5- 1-84	7.7					
					5- 2-84	7.8					
					5- 3-84	7.2					
					5- 9-84	4.5					
					5-18-84	3.3					
					5-23-84	1.8					
					5-31-84	0.6					
					6-10-84	20					
					6-13-84	14					
					6-14-84	11					
					6-15-84	8.5					
Charley Creek inlet	Charley Lake	Lat 45°06'10", long 93°07'11". in SE¼NW¼ sec.12, T.30 N., R.23 W., Ramsey County, Hydrologic Unit 07010206, at culvert on Long Marsh Lane, 300 ft upstream of Charley Lake, in Shoreview.	-	-	4-24-84	0.57					
					4-26-84	0.73					
					4-27-84	1.6					
					4-30-84	3.2					
					5- 1-84	3.2					
					5- 2-84	3.0					
					5- 3-84	3.1					
					5- 8-84	3.2					
					5-10-84	2.5					
					5-11-84	1.7					
					5-18-84	1.6					
					5-21-84	0.76					
					5-23-84	0.96					
					6-10-84	3.3					
					6-14-84	3.2					
					Lamberts Creek	Vadnais Lake	Lat 45°04'35", long 93°01'31", in NE¼NE¼ sec.22, T.30 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, at site on stream in Ramaley Park on Dillon Street, 300 ft north of Whitaker Street in the City of White Bear Lake, 0.45 mile downstream of White Bear Lake.	-	-	7-19-84	0.25
										7-23-84	0.55
										7-31-84	4.2
										7-31-84	0.27
8- 1-84	0.52										
8- 7-84	0.92										
8-21-84	2.5										
East Branch Lamberts Creek	Lamberts Creek	Lat 45°03'53", long 93°03'27", in NE¼NW¼, sec.28, T.30 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, at culvert on County Road F, 2.4 miles east of County Road 49 in Vadnais Heights, 2.1 miles downstream of White Bear Lake.	-	-	7-30-84	0.22					
					7-31-84	0.62					
					7-31-84	0.48					
					8- 1-84	0.34					
					8- 2-84	0.31					
					8- 3-84	5.8					
					8- 3-84	4.1					
					8- 6-84	3.0					
					8- 7-84	5.2					
					8-10-84	2.6					
					8-13-84	1.5					
Lamberts Creek	Vadnais Lake	Lat 45°03'22", long 93°04'03", in SE¼NE¼ sec.29, T.30 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, 1 mile upstream of Vadnais Lake, in Vadnais Heights, 100 ft from end of Stockdale Road.	-	-	7-30-84	0.29					
					7-31-84	0.64					
					7-31-84	1.1					
					8- 2-84	.37					
					8- 3-84	15					
					8- 3-84	12					
					8- 6-84	6.0					
					8- 7-84	9.9					
					8-10-84	5.3					
					8-13-84	2.7					

"See footnotes at end of table."

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1984--Continued

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
Lamberts Creek Inlet	Vadnais Lake	Lat 45°03'06", long 93°05'08", in SW¼SW¼, sec.29, T.30 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, 200 ft above Lake Side road, 300 ft above Vadnais Lake, in Vadnais Heights.	-	-	4-11-84	3.5
					4-12-84	5.9
					4-12-84	7.9
					4-12-84	9.0
					4-12-84	9.6
					4-13-84	6.7
					4-13-84	6.8
					4-13-84	7.2
					4-13-84	4.8
					4-19-84	3.3
					4-23-84	2.3
					4-26-84	9.1
					4-27-84	14
					4-30-84	14
					5- 1-84	14
					5- 2-84	14
					5- 3-84	10
					5-29-84	1.7
					5-31-84	1.9
					6-13-84	25
					6-14-84	23
					6-15-84	19
					8-15-84	1.1
Vadnais Creek inlet	Vadnais Lake	Lat 45°02'42", long 93°04'35" in SE¼NW¼ sec.32, T.30 N., R.22 W., Ramsey County, Hydrologic Unit 07010206 at culvert on Edgerton St., in Vadnais Heights.	-	-	4-24-84	0.02
					4-27-84	1.8
					4-27-84	0.96
					4-30-84	2.9
					5- 1-84	1.3
					5- 2-84	0.98
					5- 3-84	0.41
					5- 7-84	1.9
					5- 9-84	0.27
					5-10-84	0.20
					5-15-84	0.06
					6-10-84	1.8
					6-11-84	0.44
					6-15-84	0.23
Mississippi River main stem						
Mississippi River	Gulf of Mexico	Lat 44°44'48", long 92°51'08", on line between secs.21 and 22, T. 115 N., R.17 W., Dakota-Washington County line, Hydrologic Unit 07010206, at bridge on U.S. High- way 61, at Hastings, MN, 2.5 miles upstream from St. Croix River (05331580).	a37,100	1928, 1931-39, 1941-52, 1959-83	4-16-84	50,000
					6-25-84	73,300
					7-11-84	39,900
					8-29-84	11,900
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, 1959-83	4-16-84	13,500
					6-25-84	13,500
					7-11-84	8,360

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.

465858095170801 STRAIGHT RIVER NEAR OSAGE, MN

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	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)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	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)	
MAY 22...	1100	398	387	7.7	17.0	54	13	1.2	215	3.1	2.8	
DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	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, 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)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
MAY 22...	256	18	.53	.04	2.0	.10	.05	.02	<1	100	30	1
DATE	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	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)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CYANIDE TOTAL (MG/L AS CN) (00720)
MAY 22...	<10	2	30	<1	60	.4	<1	<1	40	9.1	2.5	<.01

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 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05211000 MISSISSIPPI RIVER AT GRAND RAPIDS, MN							
OCT. 13, 1983...	1130	8.0	270	JUNE 12.....	2040	22.0	230
DEC. 13.....	1670	.0	370	JUNE 18.....	1800	---	---
FEB. 09, 1984...	1640	.5	375	JUNE 29.....	1800	---	---
MAR. 27.....	1910	.0	340	JULY 26.....	1150	---	---
APR. 27.....	177	14.0	240	AUG. 20.....	235	24.0	310
MAY. 21.....	413	18.0	235	SEPT. 13.....	335	17.0	340
MAY 31.....	163	20.0	250				
05216820 INITIAL TAILINGS BASIN OUTFLOW NEAR KEEWATIN, MN							
OCT. 03, 1983....	2.9	13.0	412	MAY 22.....	.31	21.0	435
OCT. 11.....	8.6	11.0	360	JUNE 07.....	1.3	24.5	440
OCT. 14.....	.99	10.0	350	JUNE 08.....	27	18.0	230
APR. 02, 1984...	5.5	8.5	350	JUNE 13.....	10	18.0	330
APR. 06.....	1.3	---	450	JUNE 27.....	4.1	22	455
APR. 20.....	.03	12.5	515				
05216860 SWAN RIVER NEAR CALUMET, MN							
OCT. 14, 1983...	68	7.5	265	MAY. 31.....	70	17.0	285
DEC. 23.....	42	.0	350	JULY 30.....	28	24.0	257
FEB. 06, 1984...	34	.0	370	SEPT. 17.....	6.0	13.0	320
APR. 02.....	50	3.0	300				
05227500 MISSISSIPPI RIVER AT AITKIN, MN							
DEC. 21, 1983...	2660	.0	290	JUNE 14.....	8500	19.0	165
FEB. 07, 1984...	2200	.0	365	AUG. 02.....	1430	26.0	275
APR. 06.....	4130	4.0	245	SEPT. 11.....	406	---	---
MAY 30.....	2520	17.0	200				
05245100 LONG PRAIRIE RIVER AT LONG PRAIRIE, MN							
OCT. 03, 1983...	50	13.0	520	APR. 04.....	265	3.0	500
NOV. 25.....	85	2.0	500	MAY 04.....	198	10.0	420
JAN. 04, 1984...	50	.0	570	JUNE 20.....	349	20.0	470
MAR. 16.....	84	.0	490	AUG. 15.....	145	26.0	830

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05247500 CROW WING RIVER NEAR PILLAGER, MN							
DEC. 08, 1983...	1070	.0	250	JULY 20.....	944	25.0	330
FEB. 09, 1984...	853	.0	255	SEPT. 12.....	546	16.0	325
APR. 05.....	2790	4.5	290	SEPT. 13.....	700	14.5	320
MAY 10.....	3310	10.0	275	SEPT. 26.....	639	12.0	---
				SEPT. 26.....	652	12.0	---
05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN							
OCT. 19, 1983...	4310	7.0	285	JUNE 26.....	12700	22.0	300
APR. 19, 1984...	8960	10.0	240	AUG. 24.....	1100	22.5	330
05275000 ELK RIVER NEAR BIG LAKE, MN							
OCT. 11, 1983...	322	11.0	330	JUNE 12.....	2280	20.0	195
DEC. 09.....	327	.0	350	JUNE 15.....	4370	19.0	170
FEB. 01, 1984...	227	.0	390	JULY 09.....	397	22.0	270
MAR. 02.....	1780	.0	225	AUG. 13.....	213	25.0	290
MAR. 29.....	780	---	---	SEPT. 21.....	156	19.0	280
MAY 15.....	706	15.5	295				
05278000 MIDDLE FORK CROW RIVER NEAR SPICER, MN							
OCT. 03, 1983...	144	15.0	410	APR. 04.....	202	5.0	420
NOV. 25.....	195	2.0	380	MAY 04.....	244	10.0	390
JAN. 23, 1984...	92	0.5	500	JUNE 20.....	329	20.0	410
MAR. 16.....	161	0.5	450	AUG. 15.....	72	26.0	320
05280000 CROW RIVER AT ROCKFORD, MN							
OCT. 26, 1983....	1310	8.5	660	MAY 25.....	2610	17.0	650
NOV. 29.....	1180	0.5	480	JUNE 12.....	3190	19.5	480
DEC. 27.....	951	.0	840	JUNE 15.....	4430	19.5	495
JAN. 25, 1984...	583	0.5	650	JUNE 19.....	6790	21.5	605
FEB. 27.....	2220	0.5	660	JUNE 28.....	6130	25.0	570
MAR. 27.....	3120	---	---	JULY 27.....	1370	25.0	460
APR. 25.....	3600	12.0	580	AUG. 27.....	614	24.0	550
				SEPT. 25.....	438	---	460

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05286000 RUM RIVER NEAR ST. FRANCIS, MN							
OCT. 17, 1983...	1160	8.0	250	MAY 17.....	1900	16.0	235
DEC. 27.....	507	.0	410	JUNE 15.....	6280	19.0	140
FEB. 17, 1984...	636	---	---	JULY 18.....	953	---	---
MAR. 29.....	1570	---	---	AUG. 13.....	488	25.0	250
05287890 ELM CREEK NEAR CHAMPLIN, MN							
OCT. 18, 1983...	16.6	---	---	MAY 31.....	30.9	16.0	510
NOV. 07.....	16.8	6.0	460	JUNE 15.....	143	19.5	410
NOV. 30.....	45.4	0.5	---	JUNE 29.....	57.8	---	---
JAN. 10, 1984...	16.6	0.5	500	AUG. 02.....	3.99	17.5	610
FEB. 14.....	16.6	1.5	670	SEPT. 06.....	2.86	12.0	630
MAR. 16.....	45.6	0.5	640	SEPT. 26.....	17.8	8.5	420
APR. 06.....	133	---	---				
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN							
OCT. 04, 1983...	5600	17.0	385	JUNE 15.....	41000	19.0	310
APR. 11, 1984...	18700	7.0	460	JUNE 26.....	30700	22.5	430
05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SOUTH DAKOTA							
OCT. 03, 1983...	2.0	14.0	1125	MAR. 26.....	1280	3.0	335
DEC. 02.....	5.9	.5	1550	APR. 02.....	406	8.5	560
JAN. 30, 1984...	5.5	.0	1605	APR. 10.....	238	7.0	670
FEB. 16.....	67	.0	---	APR. 20.....	129	12.0	---
FEB. 23.....	402	2.0	390	JUNE 18.....	1020	---	---
MAR. 02.....	96	.0	670	AUG. 02.....	12	26.0	1050
05292000 MINNESOTA RIVER AT ORTONVILLE, MN							
OCT. 03, 1983...	2.4	14.0	1400	APR. 10.....	837	5.0	1135
DEC. 02.....	3.6	.5	1800	APR. 23.....	547	12.5	1030
JAN. 30, 1984...	2.6	1.0	2000	MAY 17.....	10	21.0	1350
FEB. 24.....	318	2.0	380	JUNE 18.....	857	---	---
MAR. 28.....	561	4.0	390	AUG. 17.....	3.8	---	---
APR. 02.....	872	6.0	920				

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05293000 YELLOW BANK RIVER NEAR ODESSA, MN							
OCT. 03, 1983...	.78	14.0	975	MAR. 26.....	1610	1.5	300
DEC. 02.....	5.9	1.0	1100	APR. 02.....	559	7.5	510
JAN. 30, 1984...	2.2	.0	1300	APR. 09.....	295	6.0	650
FEB. 24.....	400	2.0	300	APR. 23.....	139	11.0	830
MAR. 02.....	116	0.5	530	JUNE 18.....	1670	---	---
				AUG. 29.....	6.1	23.0	1000
05294000 POMME DE TERRE RIVER AT APPLETON, MN							
OCT. 03, 1983...	22	15.0	990	MAR. 26.....	1160	1.5	420
NOV. 07.....	43	8.0	1080	APR. 23.....	370	---	---
JAN. 10, 1984...	23	.0	1150	JUNE 18.....	526	---	---
JAN. 23.....	21.1	.0	1050	JULY 24.....	115	24	875
FEB. 13.....	19	---	---				
05300000 LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MN							
OCT. 04, 1983...	2.7	---	---	APR. 09.....	1180	8.0	760
NOV. 07.....	17	10.0	1450	APR. 16.....	2140	12.5	1000
JAN. 10, 1984...	9.8	0.0	1650	JUNE 14.....	1990	---	---
FEB. 21.....	22.4	0.0	975	JUNE 18.....	3380	22.0	780
MAR. 26.....	1710	2.0	520	JULY 24.....	118	26.0	1175
APR. 02.....	2190	7.5	620				
05301000 MINNESOTA RIVER NEAR LAC QUI PARLE, MN							
OCT. 04, 1983...	203	14.0	725	MAY 14.....	2370	16.0	830
NOV. 08.....	410	9.0	760	MAY 23.....	1330	16.0	880
NOV. 30.....	606	---	---	JUNE 18.....	6100	22.0	730
JAN. 23, 1984...	152	1.0	1050	JUNE 29.....	5030	24.0	680
FEB. 17.....	342	2.0	1000	JULY 17.....	1850	23.5	780
FEB. 24.....	553	3.0	1000	JULY 18.....	1090	23.0	840
MAR. 22.....	720	---	---	AUG. 29.....	7.2	24.5	970
APR. 09.....	4640	8.0	610				
05304500 CHIPPEWA RIVER NEAR MILAN, MN							
OCT. 05, 1983...	298	14.0	850	MAR. 28.....	2300	1.5	570
NOV. 08.....	331	9.0	750	APR. 25.....	1200	---	725
DEC. 19.....	240	---	---	JUNE 15.....	4550	18.0	500
FEB. 13, 1984...	120	---	---	AUG. 06.....	388	27.0	710

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCTANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCTANCE (MICRO- MHOS)
05311000 MINNESOTA RIVER AT MONTEVIDEO, MN							
OCT. 21, 1983...	411	10.0	725	APR. 02.....	5820	---	---
NOV. 07.....	432	8.0	825	MAY 14.....	3150	16.0	790
NOV. 30.....	580	---	---	MAY 19.....	2860	---	---
DEC. 16.....	354	---	---	JUNE 18.....	7630	22.0	780
JAN. 23, 1984...	192	---	---	JUNE 26.....	8300	---	---
FEB. 14.....	407	.0	1100	JULY 17.....	2600	23.5	850
FEB. 27.....	864	---	---	JULY 24.....	1730	25.0	875
MAR. 22.....	1040	---	---	AUG. 29.....	526	25.0	700
05313500 YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MN							
OCT. 06, 1983...	9.0	13.0	980	MAR. 31.....	3100	3.0	740
NOV. 18.....	41	5.0	1225	APR. 24.....	676	13.0	1325
JAN. 10, 1984...	30	.0	1700	JUNE 12.....	2890	18.0	800
FEB. 21.....	26	.0	1200	AUG. 21.....	39	---	---
05315000 REDWOOD RIVER NEAR MARSHALL, MN							
OCT. 06, 1983...	6.6	12.0	1300	APR. 02.....	1560	2.5	580
NOV. 18.....	16	4.0	1400	APR. 19.....	667	---	---
JAN. 09, 1984...	15	---	---	JUNE 13.....	541	20.5	---
FEB. 29.....	39	1.0	1100	JUNE 19.....	759	---	---
MAR. 28.....	303	4.0	900	AUG. 10.....	31	---	---
05316500 REDWOOD RIVER NEAR REDWOOD FALLS, MN							
OCT. 06, 1983...	26	13.0	1490	MAR. 30.....	2170	5.0	900
DEC. 21.....	47	.0	1700	APR. 16.....	2310	10.0	860
FEB. 10, 1984...	10	1.0	1700	JUNE 13.....	1350	19.0	---
MAR. 20.....	145	.5	520	JULY 20.....	254	---	---
MAR. 28.....	1580	3.0	960	SEPT. 25.....	21	7.0	1240
05317000 COTTONWOOD RIVER NEAR NEW ULM, MN							
OCT. 06, 1983...	60.4	11.0	880	MAR. 30.....	4730	2.5	790
NOV. 30.....	113	.0	1200	MAY 21.....	942	18.5	1250
JAN. 11, 1984...	75.2	.0	1310	JUNE 15.....	3940	---	---
FEB. 22.....	198	1.0	905	JUNE 19.....	4160	20.5	---
MAR. 27.....	2780	.5	790	AUG. 03.....	361	24.0	900

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05317200 LITTLE COTTONWOOD RIVER NEAR COURTLAND, MN							
OCT. 06, 1983...	8.09	10.0	825	MAY 01.....	214	9.0	760
NOV. 30.....	22.9	.0	965	MAY 22.....	116	17.0	860
JAN. 11, 1984...	9.98	.0	1100	JUNE 19.....	529	22.0	---
FEB. 22.....	37.2	.5	730	AUG. 15.....	27.7	24.5	755
MAR. 27.....	271	0.5	530	SEPT. 05.....	12.4	18.5	---
APR. 20.....	282	12.0	730				
05319500 WATONWAN RIVER NEAR GARDEN CITY, MN							
OCT. 04, 1983...	28.5	16.0	800	MAR. 29.....	2550	1.0	570
NOV. 30.....	107	.0	---	MAY 02.....	1440	8.0	740
JAN. 11, 1984...	51.0	.0	1175	MAY 22.....	591	17.5	810
FEB. 22.....	170	0.5	790	JUNE 19.....	2300	20.5	---
MAR. 27.....	1610	0.5	605	JULY 31.....	128	24.0	715
05320000 BLUE EARTH RIVER NEAR RAPIDAN, MN							
OCT. 04, 1983...	190	15.5	770	MAR. 29.....	7760	2.0	610
DEC. 01.....	250	.0	760	MAY 23.....	2700	18.0	725
JAN. 12, 1984...	268	.5	890	JUNE 20.....	7410	---	---
FEB. 22.....	1890	1.0	530	JULY 31.....	596	23.5	640
FEB. 24.....	2480	---	---	AUG. 15.....	113	26.5	610
05320500 LE SUEUR RIVER NEAR RAPIDAN, MN							
OCT. 05, 1983...	120	15.0	815	MAR. 28.....	5470	3.0	455
DEC. 01.....	287	.0	825	MAY 24.....	990	16.5	665
JAN. 12, 1984...	151	.0	840	JUNE 21.....	2690	22.0	---
FEB. 23.....	3220	0.5	520	AUG. 14.....	116	29.0	560
FEB. 24.....	3490	---	---	SEPT. 05.....	29.5	---	---
05325000 MINNESOTA RIVER AT MANKATO, MN							
OCT. 05, 1983...	903	15.0	825	MAR. 30.....	24800	1.5	745
DEC. 13.....	2070	.0	1155	MAY 24.....	10400	18.5	1000
JAN. 12, 1984...	962	.5	940	JUNE 18.....	31200	21.5	---
FEB. 24.....	7290	.0	660	AUG. 17.....	1960	26.0	810
MAR. 28.....	19600	1.0	780				

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05327000 HIGH ISLAND CREEK NEAR HENDERSON, MN							
OCT. 12, 1983...	95.1	10.0	850	MAY 01.....	448	6.0	685
NOV. 21.....	255	4.5	825	MAY 18.....	322	16.5	840
JAN. 03, 1984...	50.5	.0	1100	MAY 21.....	265	19.0	840
FEB. 09.....	27.8	.0	1100	MAY 25.....	213	17.0	810
FEB. 21.....	198	---	---	JUNE 18.....	654	23.5	800
MAR. 23.....	246	2.0	950	JUNE 25.....	372	---	---
APR. 03.....	975	4.0	610	AUG. 02.....	43.6	25.0	310
APR. 17.....	547	11.0	840	AUG. 30.....	21.3	---	---
05330000 MINNESOTA RIVER NEAR JORDAN, MN							
OCT. 26, 1983...	2050	5.5	872	APR. 02.....	29800	4.0	610
DEC. 07.....	2940	---	---	APR. 27.....	19900	13.5	940
DEC. 28.....	1810	.0	1150	MAY 25.....	12200	---	---
JAN. 17, 1984...	1360	.0	1100	JUNE 22.....	36400	22.5	775
FEB. 01.....	1210	.0	1000	JUNE 27.....	43700	23.0	710
FEB. 15.....	1530	3.0	1000	JUNE 29.....	43700	23.0	690
FEB. 22.....	6340	0.5	710	JULY 26.....	6720	24.0	880
FEB. 28.....	10200	.0	640	AUG. 29.....	1660	25.0	690
MAR. 14.....	7110	0.5	930	SEPT. 26.....	996	11.5	850
MAR. 29.....	16700	1.0	650				
05331000 MISSISSIPPI RIVER AT ST. PAUL, MN							
OCT. 27, 1983...	13000	9.0	470	AUG. 09.....	14200	26.0	555
APR. 12, 1984...	51400	7.5	600	SEPT. 21.....	3970	19.0	540
JUNE 21.....	66900	22.0	---				
05336700 KETTLE RIVER BELOW SANDSTONE, MN							
NOV. 15, 1983...	444	3.0	110	JUNE 13.....	6190	18.0	75
FEB. 08, 1984...	266	.0	240	JULY 18.....	277	20.5	130
APR. 03.....	2990	1.5	270	AUG. 06.....	263	---	---
MAY 08.....	2370	8.0	80	SEPT. 10.....	139	15.0	180
MAY 16.....	1040	13.5	80				
05337400 KNIFE RIVER NEAR MORA, MN							
OCT. 17, 1983...	85.9	8.0	125	APR. 06.....	331	6.5	110
DEC. 06.....	83.4	.0	---	MAY 17.....	101	15.0	100
FEB. 10, 1984...	22.2	.0	225	JUNE 13.....	840	20.0	90
FEB. 15.....	45.6	---	---	JULY 18.....	20.7	22.0	135
MAR. 20.....	25.2	3.0	150	SEPT. 10.....	7.40	15.0	190

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05340050 SUNRISE RIVER NEAR LINDSTROM, MN							
OCT. 07, 1983...	29.5	12.5	310	MAY 07.....	299	12.0	250
DEC. 06.....	94.9	0.5	---	JUNE 08.....	244	22.0	---
JAN. 31, 1984...	79.9	.0	270	JUNE 13.....	412	21.0	190
FEB. 21.....	155	1.0	290	JULY 06.....	163	22.5	260
APR. 03.....	221	3.0	210	AUG. 09.....	73.0	---	230
APR. 05.....	246	7.5	220				
05344500 MISSISSIPPI RIVER AT PRESCOTT, WISCONSIN							
APR. 16, 1984...	63500	9.0	---	JULY 11.....	41300	23.0	470
JUNE 25.....	88800	---	---	AUG. 29.....	11900	26.0	550
05345000 VERMILLION RIVER NEAR EMPIRE, MN							
OCT. 21, 1983...	54	9.5	675	MAY. 04.....	258	12.0	530
DEC. 08.....	44	1.0	610	JUNE 11.....	155	---	---
JAN. 06, 1984...	42	3.0	760	JULY 11.....	231	21.0	340
FEB. 08.....	35	1.5	712	AUG. 08.....	615	---	---
FEB. 22.....	163	2.0	525	AUG. 08.....	775	23.5	195
MAR. 09.....	67	---	---	AUG. 10.....	227	18.5	510
MAR. 28.....	265	---	---	SEPT. 19.....	49	18.0	690
05353800 STRAIGHT RIVER NEAR FARIBAULT, MN							
OCT. 17, 1983...	263	11.0	800	MAY 03.....	3560	7.5	460
DEC. 16.....	130	0.5	510	JUNE 04.....	299	18.0	670
FEB. 06, 1984...	79.1	.5	740	JULY 23.....	151	24.0	730
MAR. 21.....	276	1.5	---	SEPT. 10.....	39.6	16.0	715
05372995 SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN							
OCT. 20, 1983...	431	9.5	390	MAY. 01.....	1150	8.0	420
DEC. 13.....	188	4.0	560	JUNE 19.....	396	22.0	530
FEB. 07, 1984...	96	5.5	615	JULY 25.....	106	23.0	640
MAR. 19.....	237	5.0	550	SEPT. 13.....	117	19.0	427
05374900 ZUMBRO RIVER AT KELLOGG, MN							
DEC. 05, 1983...	1060	0.5	600	MAY 21.....	1600	19.0	570
JAN. 24, 1984...	684	0.5	780	JULY 09.....	870	20.0	565
MAR. 05.....	1440	2.0	480	AUG. 20.....	579	23.5	547
APR. 17.....	2430	10.0	520				

MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

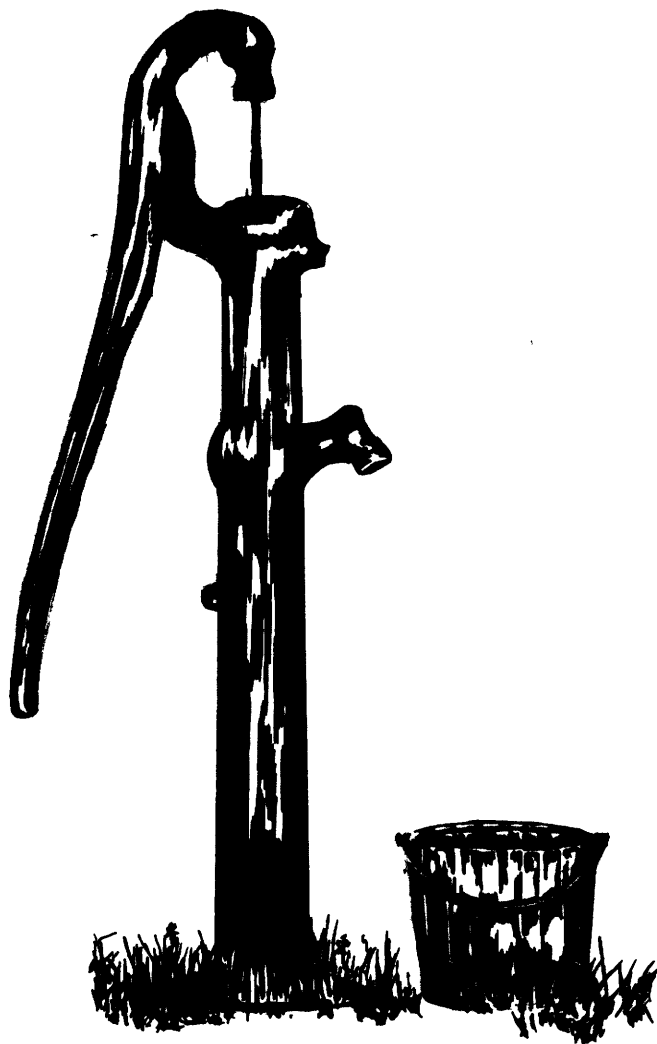
WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05376000 NORTH FORK WHITEWATER RIVER NEAR ELBA, MN							
OCT. 24, 1983...	66	5.0	680	MAY 23.....	80	13.5	590
JAN. 17, 1984...	42	0.5	505	JULY 17.....	61	17.0	565
MAR. 14.....	58	2.0	540	AUG. 22.....	49	16.5	520
APR. 24.....	77	9.5	585				
05376800 WHITEWATER RIVER NEAR BEAVER, MN							
NOV. 21, 1983...	207	6.0	480	MAY 23.....	229	14.0	540
JAN. 19, 1984...	176	0.5	675	JULY 11.....	317	16.5	455
MAR. 07.....	178	1.5	535	AUG. 23.....	152	16.0	543
APR. 19.....	229	8.5	560				
05378230 STOCKTON VALLEY CREEK AT STOCKTON, MN							
FEB. 15, 1984...	14	5.5	510	JULY 10.....	13	15.0	490
APR. 18.....	14	12.5	480	JULY 10.....	24	15.0	480
APR. 30.....	19	5.5	430	AUG. 22.....	12	16.0	475
MAY 22.....	14	14.5	480	SEPT. 12.....	36	13.5	237
05378235 GARVIN BROOK NEAR MINNESOTA CITY, MN							
JAN. 26, 1984...	34	2.0	525	JULY 09.....	36	18.5	500
MAR. 07.....	31	0.5	325	JULY 10.....	70	16.0	490
APR. 18.....	39	14.0	500	AUG. 22.....	35.0	17.0	487
APR. 30.....	58	6.5	440	SEPT. 12.....	188	14.0	300
MAY 22.....	40	15.5	500				
05378300 STRAIGHT VALLEY CREEK NEAR ROLLINGSTONE, MN							
APR. 19, 1984...	2.1	8.0	550	AUG. 23.....	1.9	15.0	580
MAY 23.....	2.1	9.5	560	SEPT. 12.....	4.3	16.5	406
JULY 11.....	2.3	13.0	645				
05378500 MISSISSIPPI RIVER AT WINONA, MN							
OCT. 25, 1983...	40400	9.5	330	AUG. 01.....	23400	---	---
APR. 10, 1984...	88000	7.5	430				
05384000 ROOT RIVER NEAR LANESBORO, MN							
OCT. 19, 1983...	428	9.5	310	MAY 01.....	3040	4.5	310
DEC. 14.....	515	0.5	350	JUNE 05.....	482	22.0	500
FEB. 07, 1984...	251	0.5	575	JULY 24.....	380	21.5	575
MAR. 20.....	565	2.5	510	SEPT. 12.....	371	15.5	492

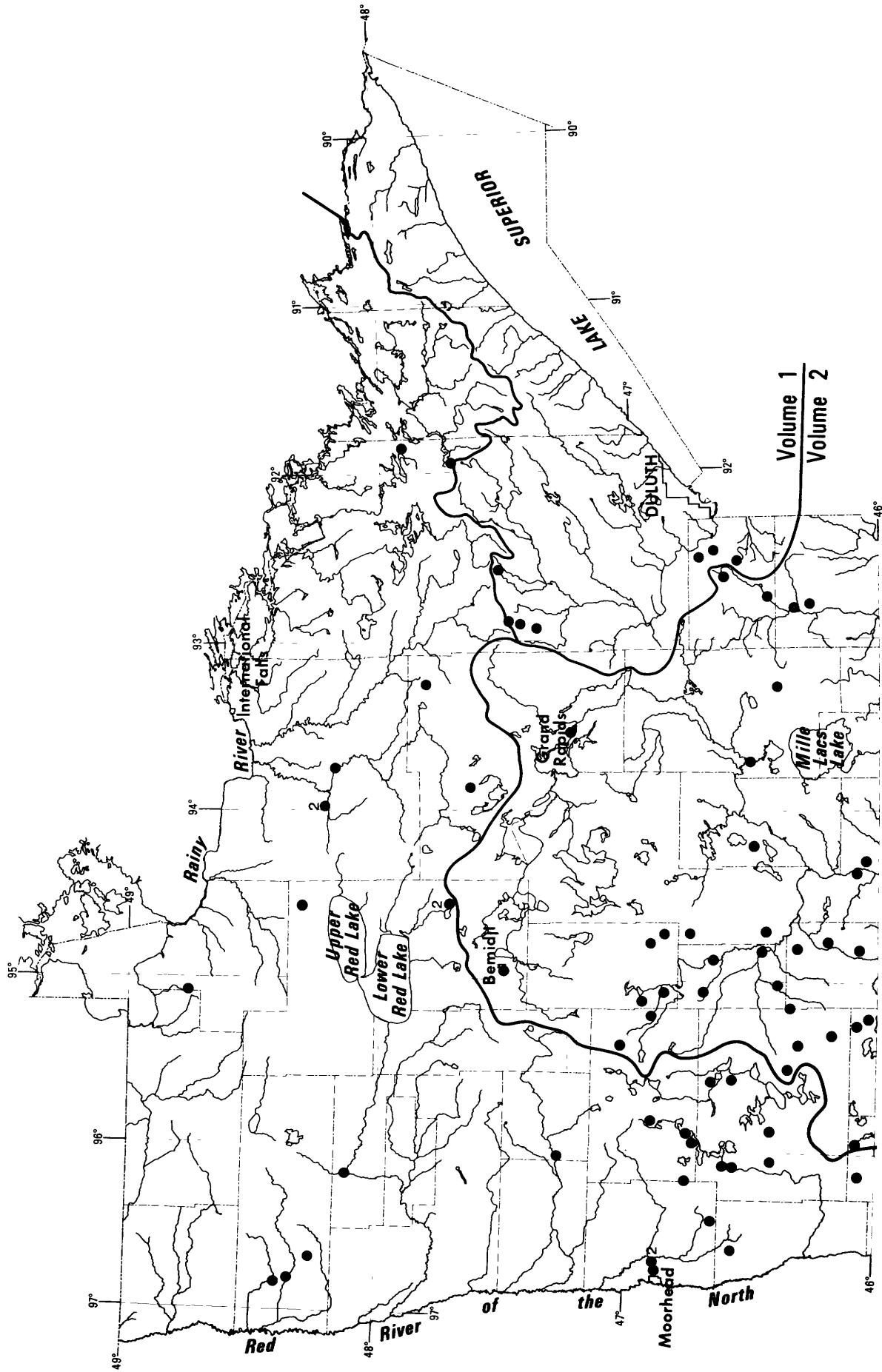
MISCELLANEOUS ANALYSES OF STREAMS IN MINNESOTA

WATER QUALITY DATA AT STREAMFLOW STATIONS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)	DATE	MEASURED DISCHARGE (ft ³ /s)	TEMPERA- TURE (°C)	SPECIFIC CONDUCT- TANCE (MICRO- MHOS)
05385000 ROOT RIVER NEAR HOUSTON, MN							
NOV. 22, 1983...	1470	5.0	---	MAY 22.....	1320	17.5	520
JAN. 18, 1984...	579	0.5	470	JULY 10.....	1150	18.0	555
MAR. 06.....	1370	2.0	525	AUG. 22.....	783	18.0	547
APR. 18.....	1780	10.0	510				
05385500 SOUTH FORK ROOT RIVER NEAR HOUSTON, MN							
NOV. 22, 1983...	275	5.5	600	MAY. 22.....	280	16.5	520
FEB. 07, 1984...	192	0.5	528	JULY 10.....	319	16.5	585
MAR. 06.....	268	2.5	500	AUG. 22.....	272	16.0	525
APR. 18.....	301	12.0	530				
05457000 CEDAR RIVER NEAR AUSTIN, MN							
OCT. 18, 1983...	225	11.0	570	MAY 02.....	3260	7.0	360
DEC. 20.....	243	---	---	JUNE 05.....	239	18.5	590
FEB. 06, 1984...	100	0.5	610	JULY 23.....	189	25.0	625
FEB. 17.....	2760	0.5	---	SEPT. 10.....	73	18.0	648
MAR. 21.....	230	2.0	---				
05476000 DES MOINES RIVER AT JACKSON, MN							
OCT. 19, 1983...	66	9.5	900	APR. 06.....	5650	8.0	660
DEC. 20.....	128	.0	1300	APR. 17.....	6600	10.0	720
FEB. 09, 1984...	41	2.5	1400	JUNE 20.....	4060	24.0	760
MAR. 20.....	264	1.0	800	JULY 19.....	1270	---	---
MAR. 29.....	1710	1.0	720	AUG. 27.....	152	---	---
APR. 03.....	4430	3.0	680	SEPT. 25.....	63	12.0	475



GROUND-WATER RECORDS



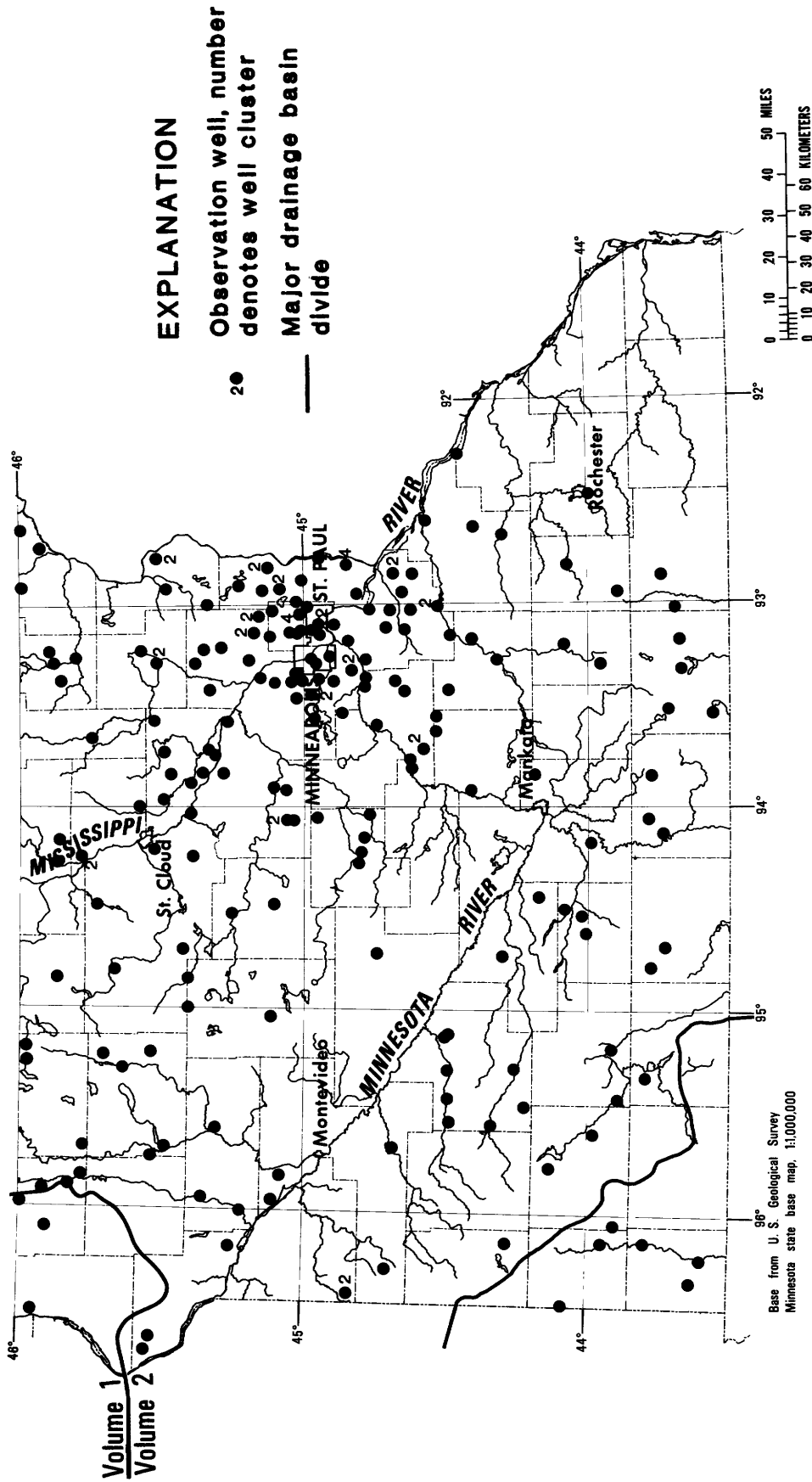


Figure 11.--Location of ground-water wells

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) below 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	0.30	FEB 8	0.33	MAY 29	0.32	JUL 31	0.96	SEP 18	1.02

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).

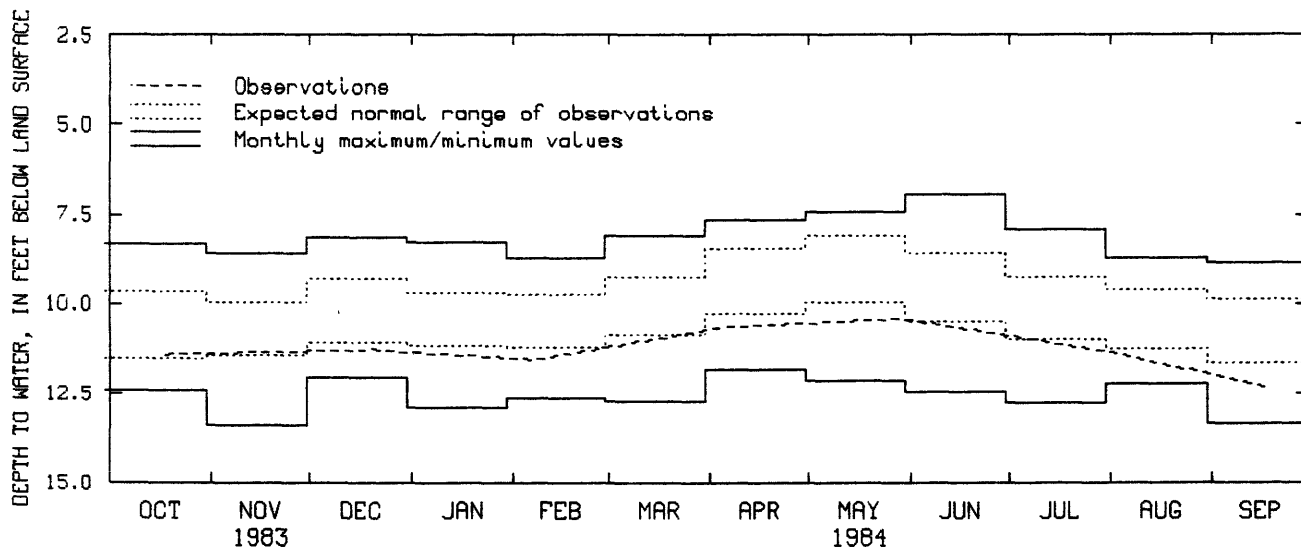
DATUM.--Altitude of land-surface datum is 1,213 ft (370 m). Measuring point: Top of casing, 1.20 ft (0.37 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	11.42	FEB 7	11.56	APR 5	10.65	MAY 29	10.42	AUG 1	11.35	SEP 18	12.36
DEC 20	11.28										



047N27W26BBC01

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	11.28	MAR 7	10.39	MAY 1	10.18	MAY 16	9.40	JUL 12	11.17	SEP 11	12.02
JAN 9	11.16										

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:

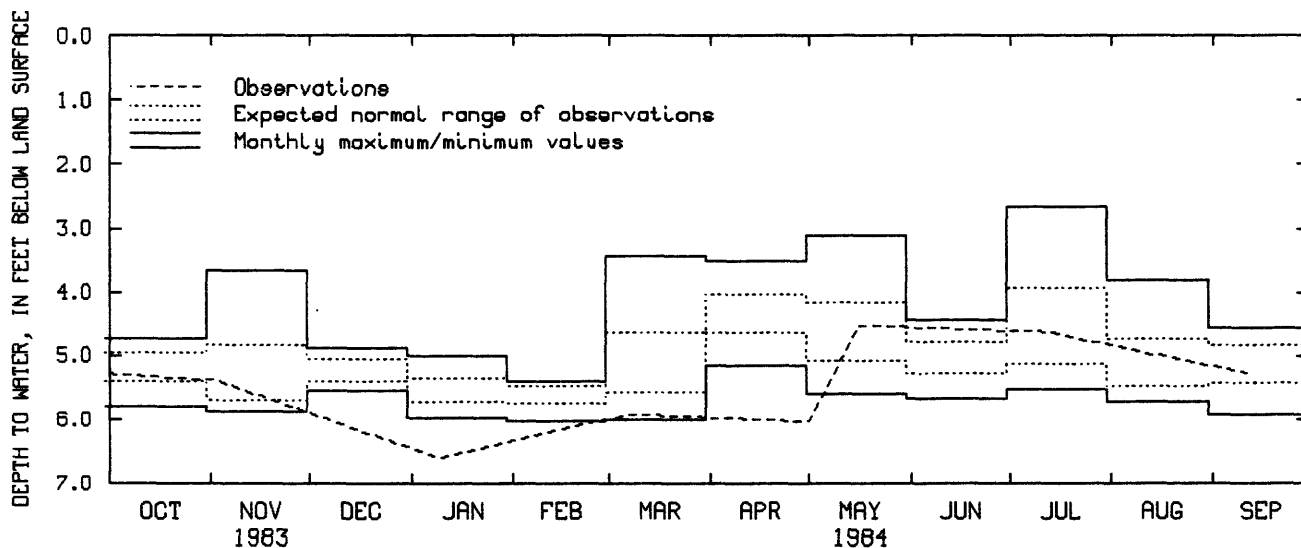
Top of casing, 1.90 ft (0.60 m) above land-surface datum.

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, 6.60 ft (2.01 m) below land-surface datum, Jan. 9, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	5.39	MAR 7	5.92	MAY 1	6.03	MAY 16	4.52	JUL 12	4.62	SEP 11	5.27
JAN 9	6.60										



031N22W18AAA05

GROUND-WATER LEVELS

ANOKA COUNTY

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).

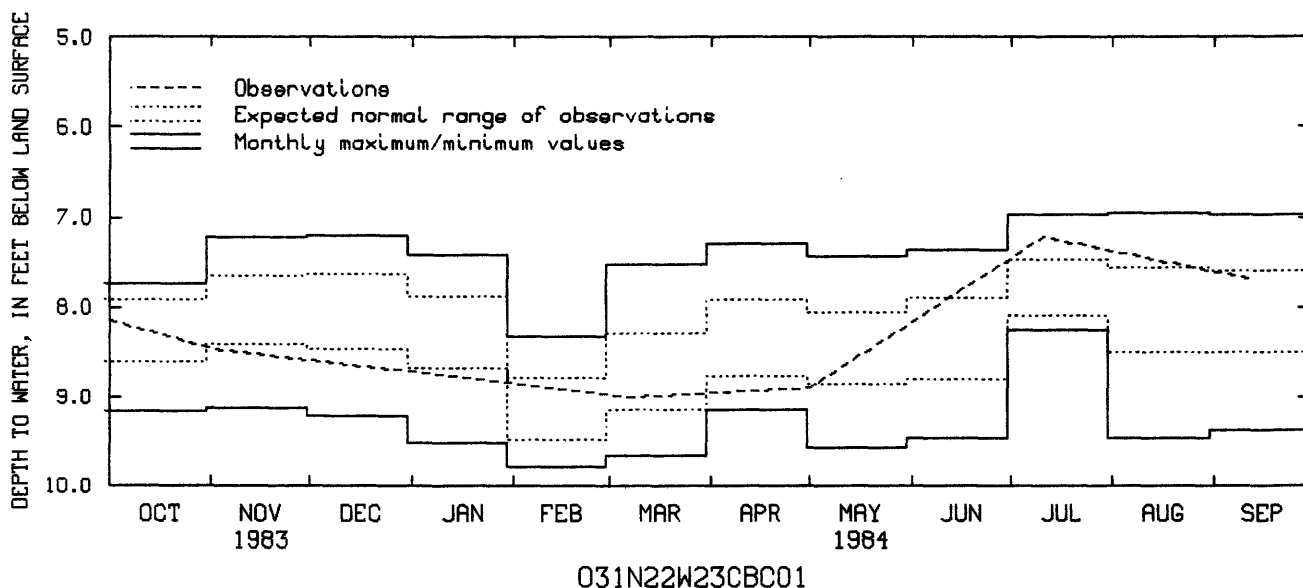
DATUM.--Land-surface datum is 901.6 ft (274.8 m) National Geodetic Vertical Datum of 1929. Measuring point: Top of well cap, 3.00 ft (0.91 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	8.47	MAR 7	9.00	MAY 1	8.90	JUL 11	7.22	SEP 11	7.68



450927093033802. Local number, 031N22W23CBC02.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	10.83	MAR 7	10.99	MAY 1	12.92	MAY 17	13.30	JUL 11	10.02	SEP 11	10.73

GROUND-WATER LEVELS
ANOKA COUNTY--Continued

451210093170201. Local number, 031N24W01CBB01.

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, 21.05 ft (6.42 m) below land-surface datum, May 1, 1984; lowest, 21.66 ft (6.59 m) below land-surface datum, Jan 9, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	21.44	JAN 9	21.66	MAR 7	21.15	MAY 1	21.05	JUL 12	27.25	SEP 11	25.54

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).

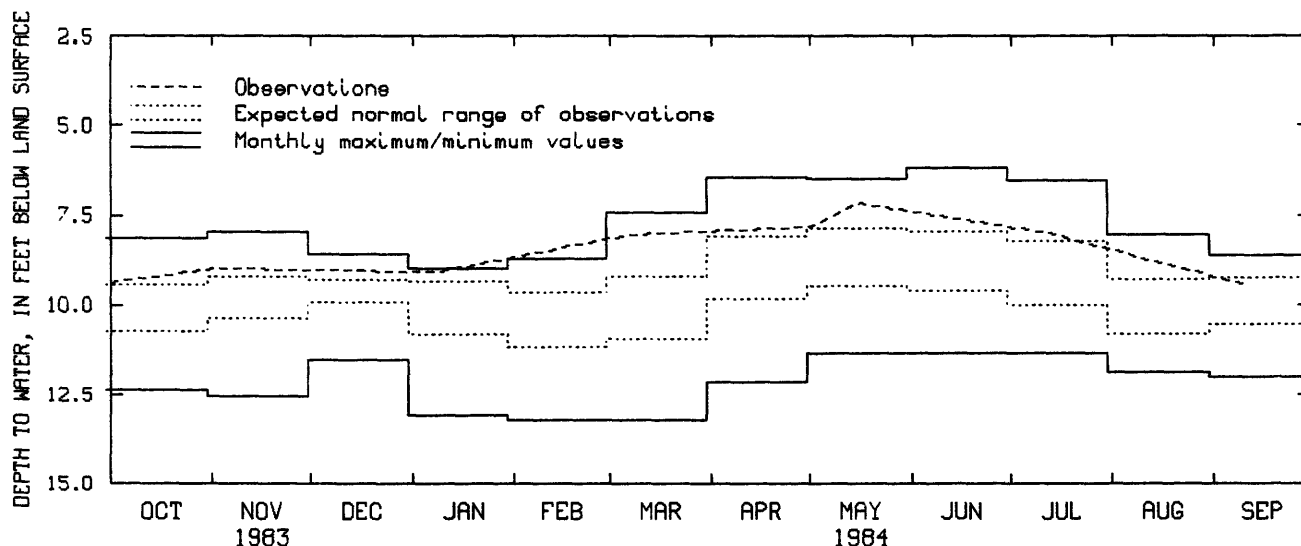
DATUM.--Altitude of land-surface datum is 916 ft (279 m). Measuring point: Top of casing, 3.50 ft (1.07 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	8.99	MAR 7	8.05	MAY 1	7.83	MAY 16	7.18	JUL 12	8.00	SEP 11	9.47
JAN 9	9.08										



032N23W04AAD02

GROUND-WATER LEVELS
ANOKA COUNTY--Continued

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, 19.48 ft (5.94 m) below land-surface datum, July 12, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	20.55	JAN 9	20.95	MAR 7	20.89	MAY 1	20.70	JUL 12	19.48	SEP 11	20.10

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).

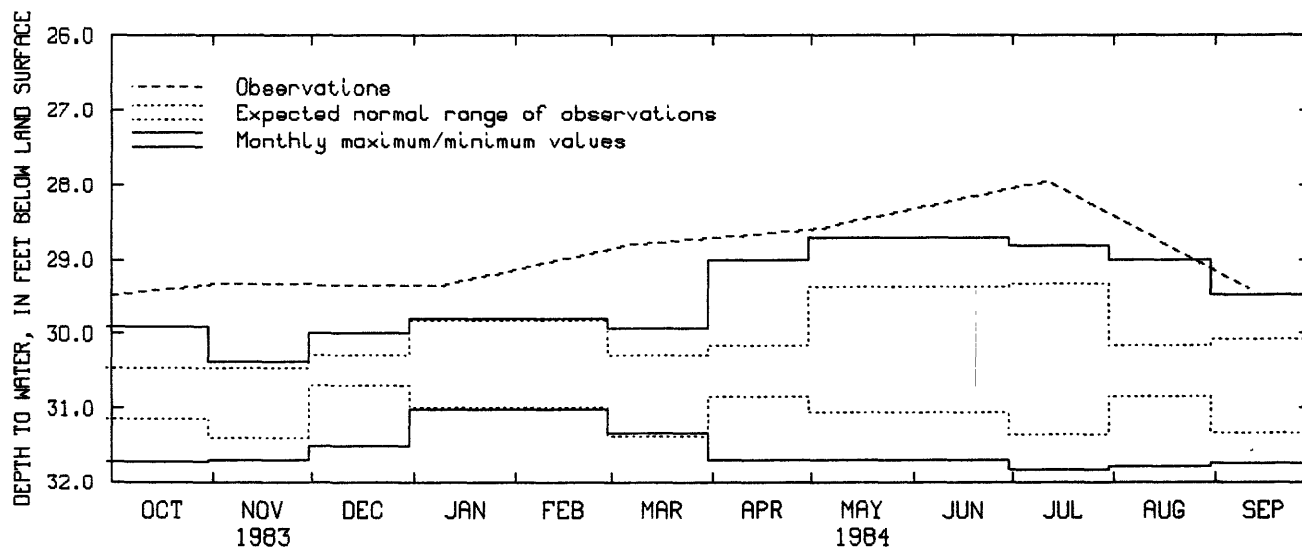
DATUM.--Altitude of land-surface datum is 900 ft (274 m). Measuring point: Top of casing, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--April 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 27.95 ft (8.52 m) below land-surface datum, July 12, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	29.33	JAN 9	29.35	MAR 7	28.80	MAY 1	28.60	JUL 12	27.95	SEP 11	29.39



GROUND-WATER LEVELS
ANOKA COUNTY--Continued

452416093160801. Local number, 034N24W25DAC01.

LOCATION.--Lat 45°24'16", long 93°16'08", in SE¼NE¼SE¼ sec.25, T.24 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).

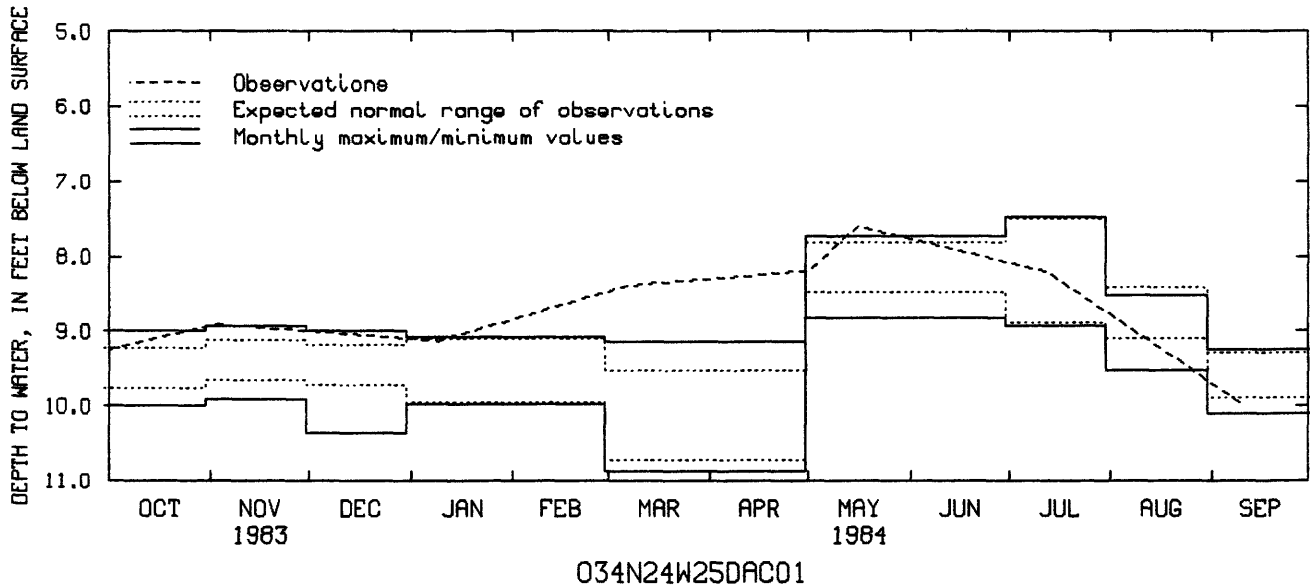
DATUM.--Altitude of land-surface datum is 930 ft (283 m). Measuring point: Top of casing, 2.30 ft (0.70 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	8.90	MAR 7	8.39	MAY 1	8.19	MAY 16	7.60	JUL 12	8.19	SEP 11	10.00
JAN 9	9.13										



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, 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).

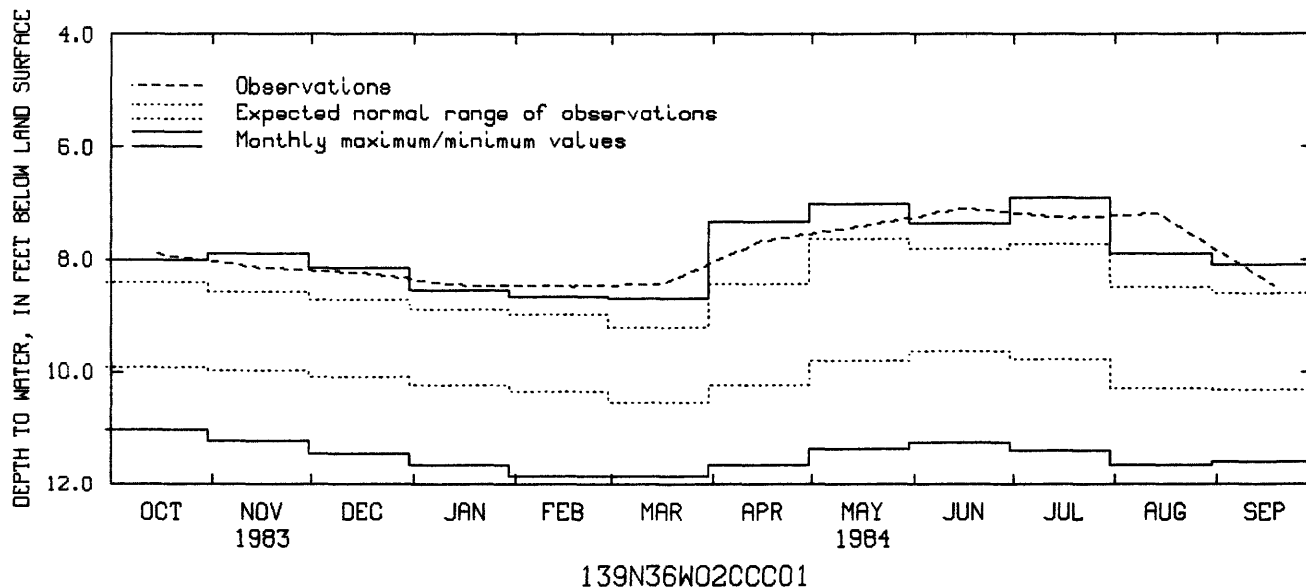
DATUM.--Altitude of land-surface datum is 1,460 ft (445 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	7.91	DEC 17	8.25	FEB 18	8.48	APR 16	7.67	JUN 16	7.09	AUG 14	7.18
NOV 15	8.14	JAN 14	8.45	MAR 17	8.43	MAY 18	7.39	JUL 17	7.26	SEP 18	8.46



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	27.88	DEC 17	26.60	FEB 18	28.10	APR 16	27.55	JUN 16	27.68	AUG 14	28.00
NOV 15	27.98	JAN 14	28.17	MAR 17	28.24	MAY 18	27.64	JUL 17	27.87	SEP 14	28.20

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).

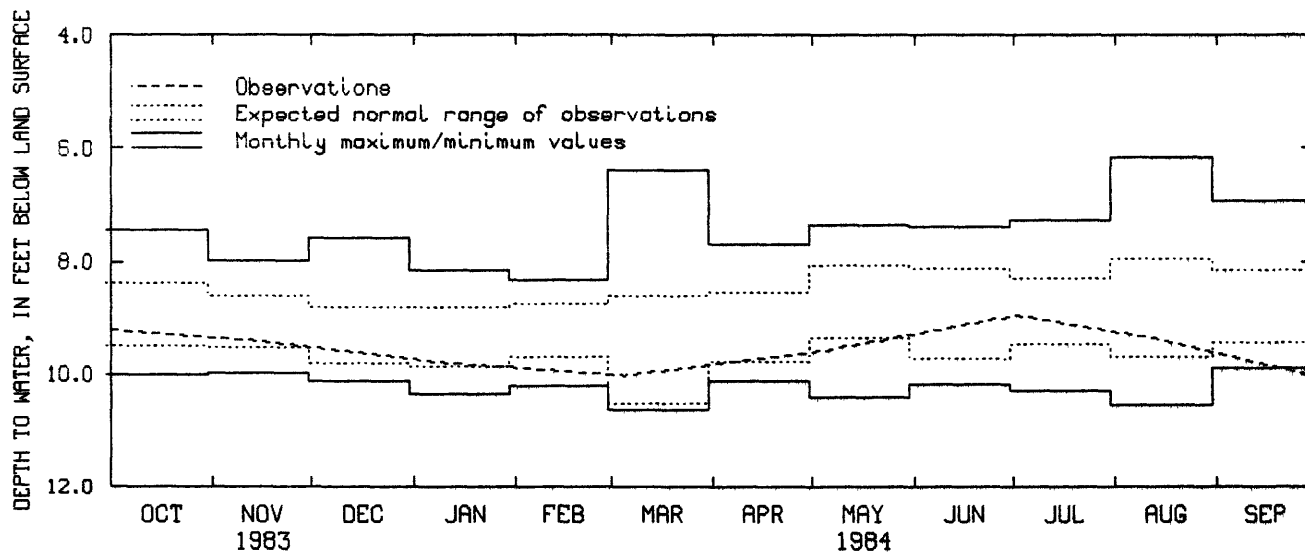
DATUM.--Altitude of land-surface datum is 1,383 ft (421 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 14	9.40	JAN 9	9.79	MAR 5	10.02	MAY 3	9.59	JUL 2	8.95	AUG 13	9.36



147N34W35ADC01

GROUND-WATER LEVELS

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 Duelm.

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).

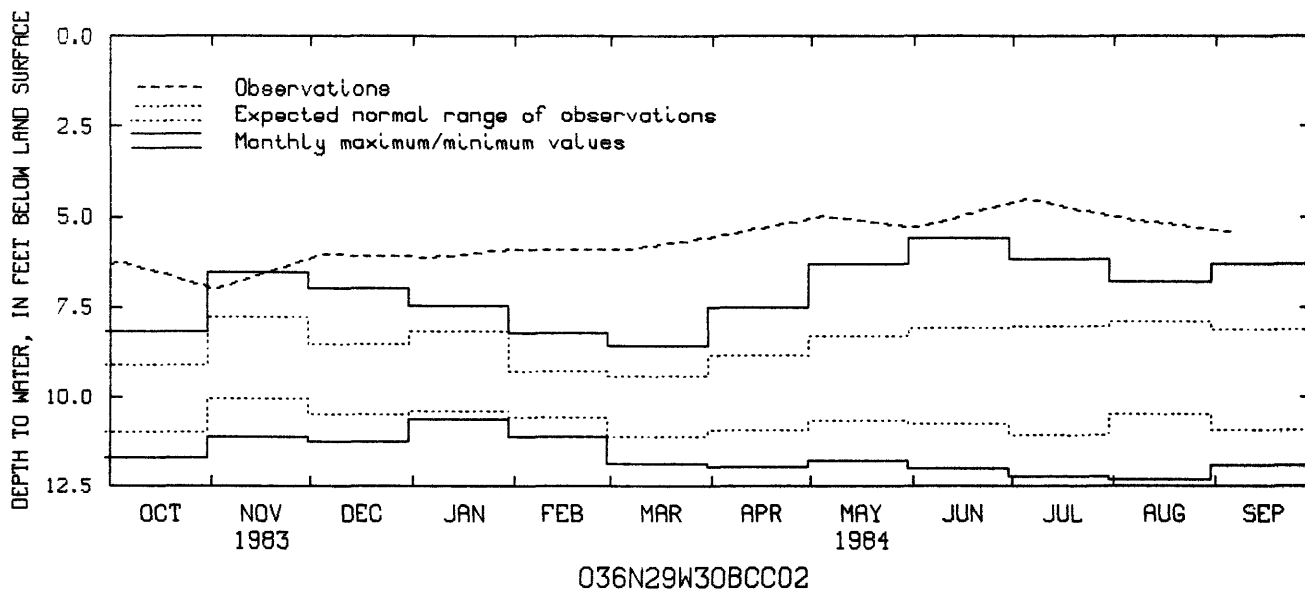
DATUM.--Altitude of land-surface datum is 1,049 ft (320 m). Measuring point: Top of casing, 4.00 ft (1.22 m) above land-surface datum.

PERIOD OF RECORD.--October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.53 ft (1.38 m) below land-surface datum, July 6, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	6.25	DEC 4	6.05	FEB 1	5.90	APR 4	5.52	JUN 1	5.30	AUG 1	5.01
NOV 2	7.00	JAN 7	6.12	MAR 7	5.90	MAY 5	4.98	JUL 6	4.53	SEP 7	5.46



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	23.84	DEC 9	23.58	FEB 1	23.48	APR 4	23.75	JUN 1	23.27	SEP 6	23.49
NOV 2	24.12	JAN 7	23.56	MAR 7	23.52	MAY 5	23.30				

GROUND-WATER LEVELS
BENTON COUNTY--Continued

454648094144102. Local number, 038N31W18DCD02

LOCATION.--Lat $45^{\circ}46'48''$, long $94^{\circ}14'41''$, in SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ 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 1 $\frac{1}{2}$ 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	26.20	DEC 9	26.18	FEB 1	26.14	APR 4	26.12	JUN 1	25.71	AUG 1	25.47
NOV 2	26.27	JAN 7	26.12	MAR 7	26.35	MAY 5	26.02	JUL 6	24.68	SEP 7	25.38

BIG STONE COUNTY

451517096104501. Local number, 121N44W27CCC01.

LOCATION.--Lat $45^{\circ}15'17''$, long $96^{\circ}10'45''$, in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.27, T.121 N., R.44 W., Hydrologic Unit 07010001, north of Correll.

Owner: U.S. Geological Survey

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1 $\frac{1}{2}$ in (0.03 m), depth 16 ft (4.9 m), screened 14 to 16 ft (4.3 to 4.9 m).

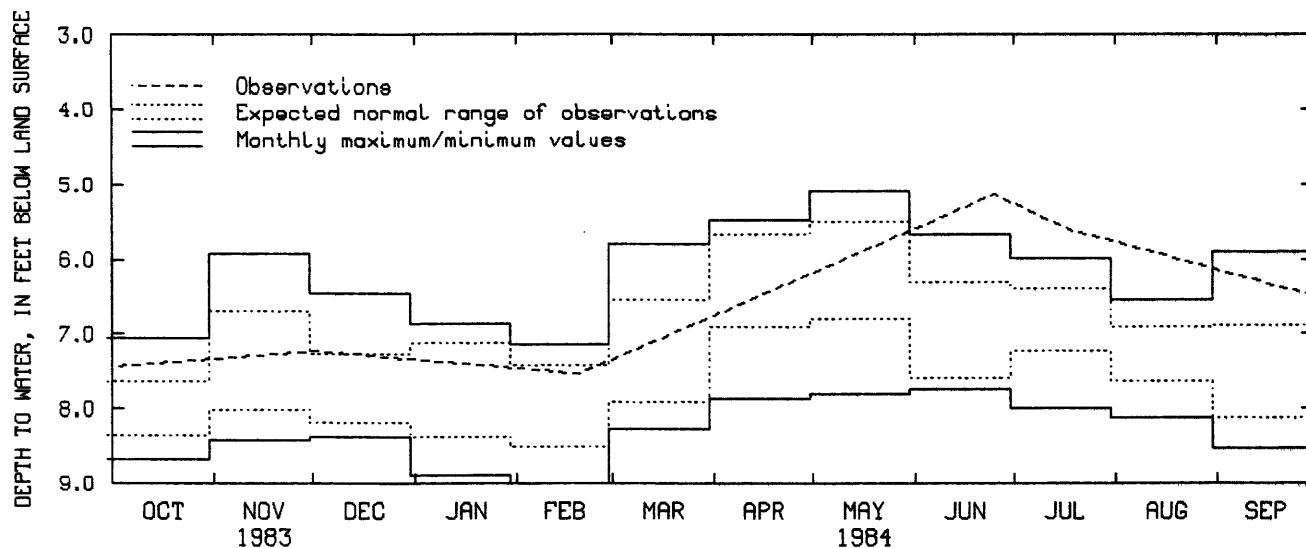
DATUM.--Altitude of land-surface datum is 1,018 ft (310 m). Measuring point: Top of casing, 3.10 ft (0.94 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	7.43	DEC 2	7.23	FEB 20	7.53	APR 1	6.75	JUN 25	5.13	JUL 18	5.60



121N44W27CCC01

GROUND-WATER LEVELS

BIG STONE--Continued

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.--Altitude of land-surface datum is 1,086.8 ft (331.3 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.--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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	18.12	DEC 2	17.99	FEB 1	17.80	APR 10	17.31	JUN 22	16.80	JUL 18	20.11

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).

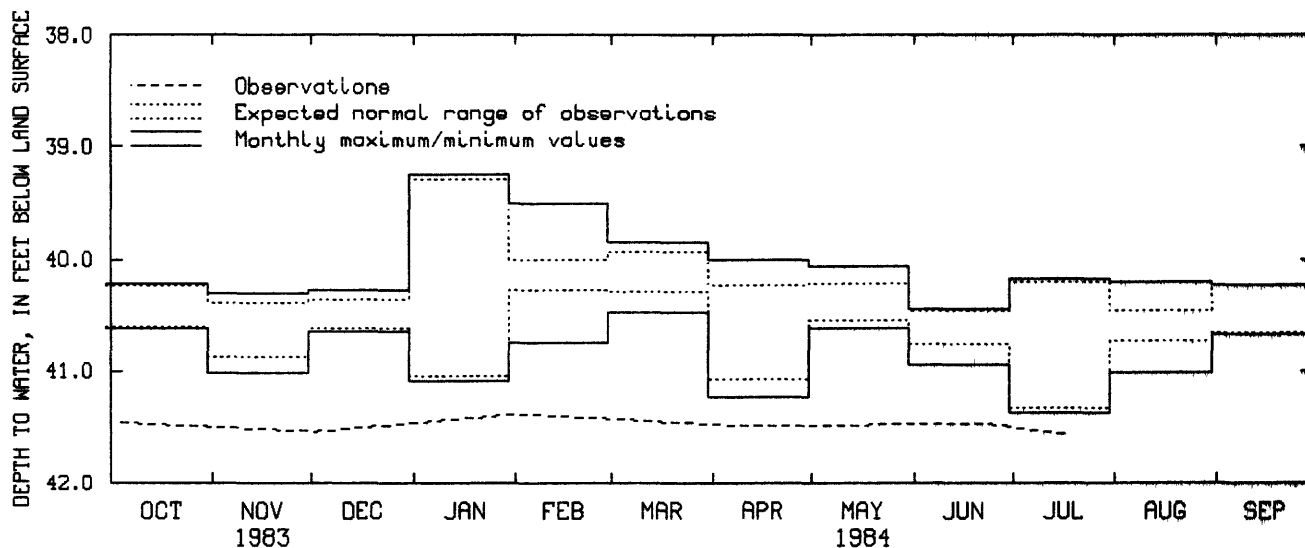
DATUM.--Land-surface datum is 1,087.2 ft (331.4 m) National Geodetic Vertical datum of 1929. Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

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, 41.57 ft (12.67 m) below land-surface datum, July 18, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	41.46	DEC 2	41.54	FEB 1	41.38	APR 10	41.49	JUN 22	41.47	JUL 18	41.57



124N48W23AAA04

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.

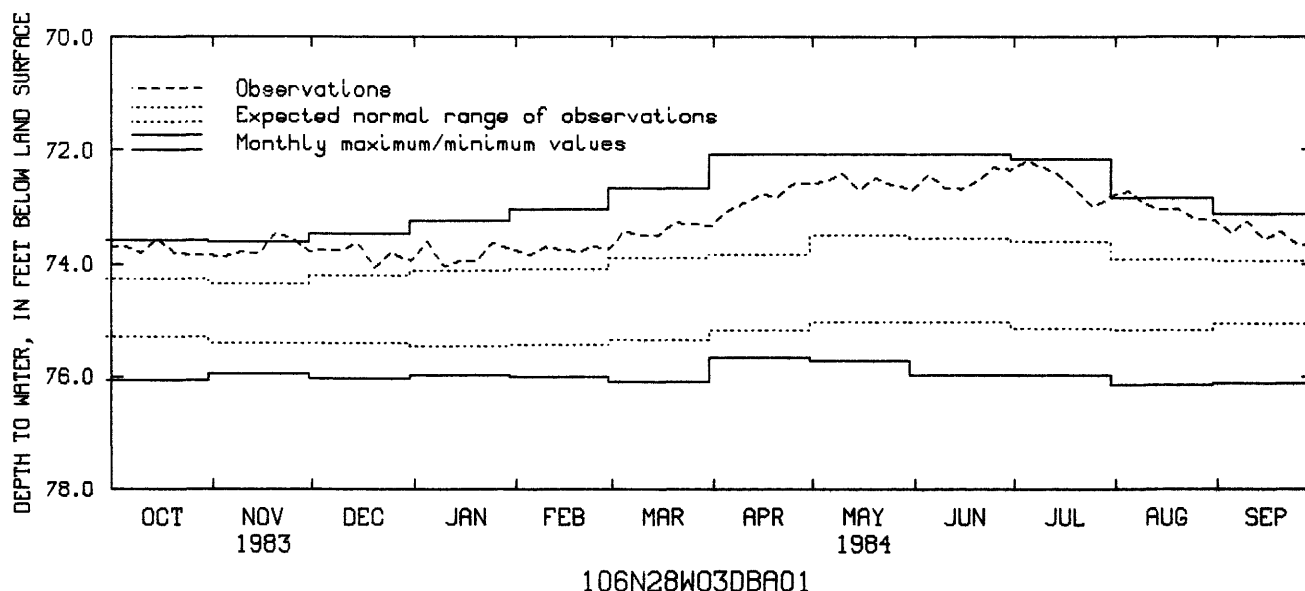
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 71.81 ft (21.89 m) below land-surface datum, Apr. 26, 1983; lowest, 76.17 ft (23.22 m) below land-surface datum, Aug. 17, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	73.68	73.87	73.74	73.61	73.84	73.42	73.06	72.54	72.42	72.20	72.74	73.46
10	73.82	73.79	73.74	74.05	73.71	73.51	72.94	72.42	72.66	72.29	72.96	73.26
15	73.56	73.81	73.65	73.94	73.76	73.50	72.78	72.70	72.69	72.46	73.04	73.57
20	73.80	73.45	74.07	73.94	73.78	73.27	72.82	72.51	72.55	72.69	73.04	73.44
25	73.83	73.57	73.80	73.64	73.69	73.30	72.60	72.60	72.31	73.00	73.20	73.66
EOM	73.85	73.78	73.96	73.70	73.74	73.33	72.59	72.71	72.35	72.80	73.24	73.65

WTR YEAR 1984 HIGHEST 72.07 JUN 26, 1984

LOWEST 74.09 DEC 19, 1983



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, at 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, 93.05 ft (28.36 m) below land-surface datum, July 9, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	93.59	MAY 9	93.26	JUL 9	93.05	SEP 19	93.23

GROUND-WATER LEVELS

BROWN COUNTY

441030094254501. Local number, 108N30W09ADD01.

LOCATION.--Lat 44°10'30", long 94°25'45", in SE¼SE¼NE¼ sec.9, T.108 N., R.30 W., Hydrologic Unit 07020007, 3.7 mi (6.0 km) northeast of Hanska.

Owner: Erwin Kjelskus.

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.

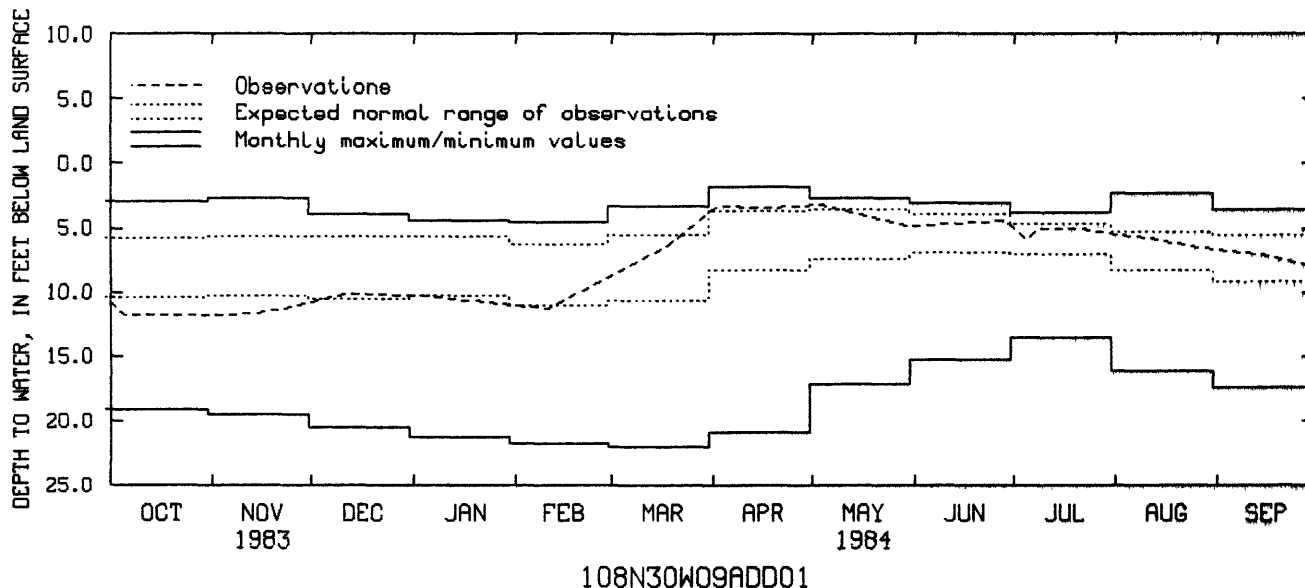
REMARKS.--Measured by Erwin Kjelskus. Water level used in monthly Water Resources Review.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	11.77	DEC 13	10.12	APR 2	3.34	MAY 30	4.88	JUL 22	5.07	AUG 28	6.60
23	11.82	JAN 4	10.30	19	3.40	JUN 28	4.42	JUL 29	5.38	SEP 17	7.16
NOV 2	11.84	FEB 11	11.31	MAY 4	3.19	JUL 5	5.88	AUG 11	5.80	30	8.07
17	11.55	MAR 19	6.20	18	4.08	9	5.07	20	6.22		



441800094434301. Local number, 110N32W30DDB01.

LOCATION.--Lat 44°18'00", long 94°43'43", in NW¼SE¼SE¼ 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, 48.90 ft (14.90 m) below land-surface datum, May 22, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	60.20	JAN 3	53.30	APR 2	51.20	MAY 7	49.20	JUN 1	49.00	AUG 1	58.10
NOV 1	56.90	FEB 1	52.30	MAY 1	49.70	22	48.90	JUL 2	56.10	SEP 4	62.90
DEC 5	52.50	MAR 1	51.90								

GROUND-WATER LEVELS

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).

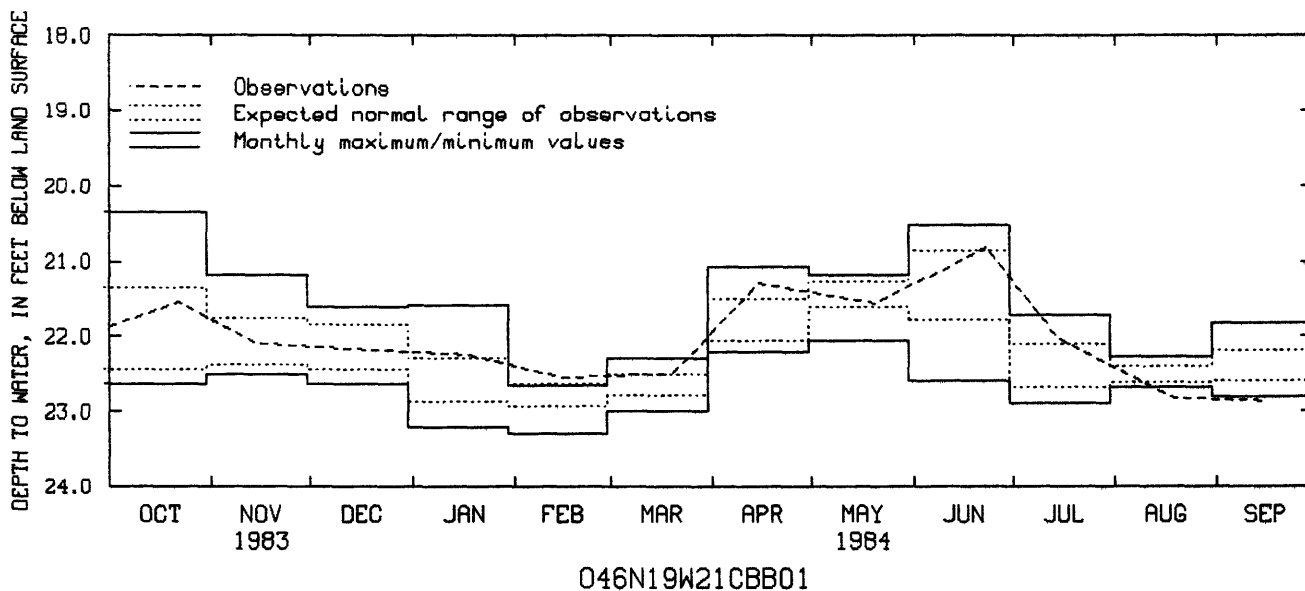
DATUM.--Altitude of land-surface datum is 1,061 ft (323 m). Measuring point: Top of concrete cover, 1.10 ft (0.34 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	21.54	DEC 20	22.18	FEB 15	22.55	APR 15	21.29	JUN 23	20.82	AUG 19	22.82
NOV 15	22.09	JAN 17	22.24	MAR 20	22.49	MAY 20	21.56	JUL 15	22.03	SEP 16	22.86



GROUND-WATER LEVELS
CARLTON COUNTY--Continued

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).

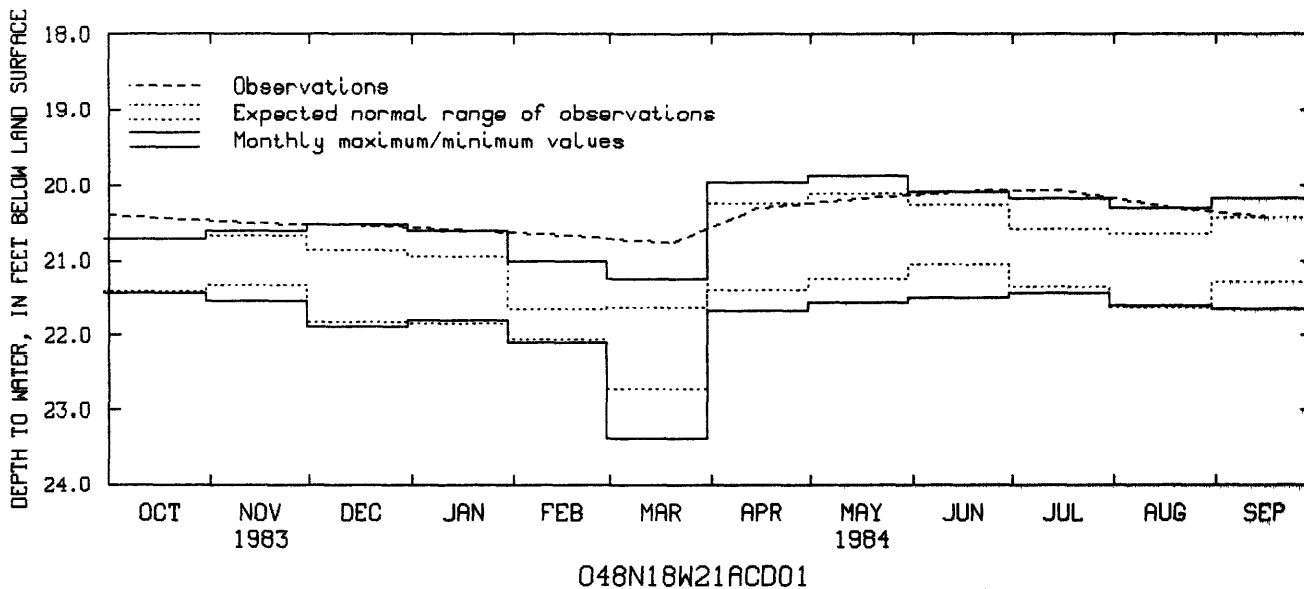
DATUM.--Altitude of land-surface datum is 1,280 ft (390 m). Measuring point: Top of casing, 3.80 ft (1.16 m) (0.34 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	20.44	DEC 20	20.53	FEB 15	20.66	APR 15	20.30	JUN 23	20.07	AUG 19	20.30
NOV 15	20.50	JAN 17	20.59	MAR 20	20.76	MAY 20	20.16	JUL 15	20.06	SEP 16	20.42



GROUND-WATER LEVELS

295

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, 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 m).

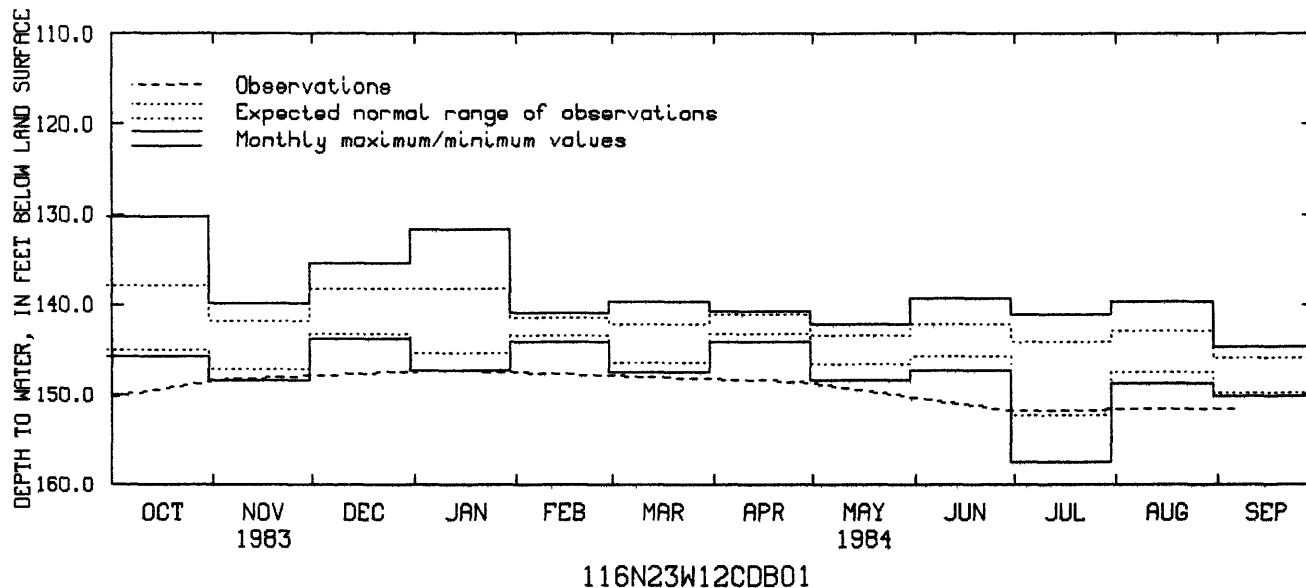
DATUM.--Altitude of land-surface datum is 990 ft (302 m). Measuring point: Edge of vent pipe, 2.40 ft (0.73 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	148.3	JAN 10	147.3	MAR 6	148.0	APR 27	148.6	JUN 29	151.8	SEP 7	151.6



GROUND-WATER LEVELS

CASS COUNTY

462720094433801. Local number, 135N32W33CDD01.

LOCATION.--Lat 46°27'20", long 94°43'38", in SE¼SE¼SW¼ 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 1½ in (0.03 m), depth 15 ft (4.6 m), screened 13 to 15 ft (4.0 to 4.6 m).

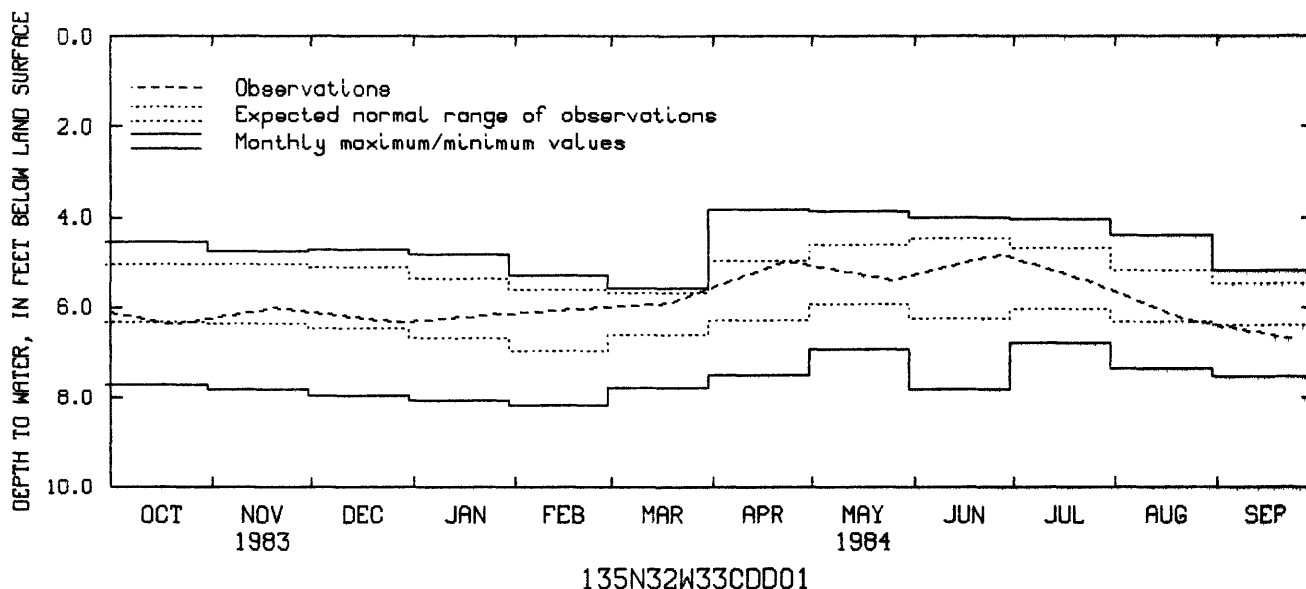
DATUM.--Altitude of land-surface datum is 1,264 ft (385 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	6.39	DEC 28	6.34	FEB 22	6.04	APR 23	4.98	JUN 27	4.83	AUG 22	6.27
NOV 20	6.02	JAN 25	6.17	MAR 19	5.91	MAY 25	5.40	JUL 25	5.45	SEP 25	6.72



464629094420901. Local number, 138N32W15AAA01.

LOCATION.--Lat 46°46'29", long 94°42'09", in NE¼NE¼NE¼ 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 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 1,418 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	8.53	DEC 28	9.13	FEB 22	9.41	APR 23	9.05	JUN 27	7.81	AUG 22	8.40
NOV 20	8.84	JAN 25	9.27	MAR 19	9.63	MAY 25	8.68	JUL 25	8.16	SEP 25	8.96

GROUND-WATER LEVELS

CHIPPEWA COUNTY

450447095490101. Local number, 119N41W29DDD01.

LOCATION.--Lat 45°04'47", long 95°40'01", 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).

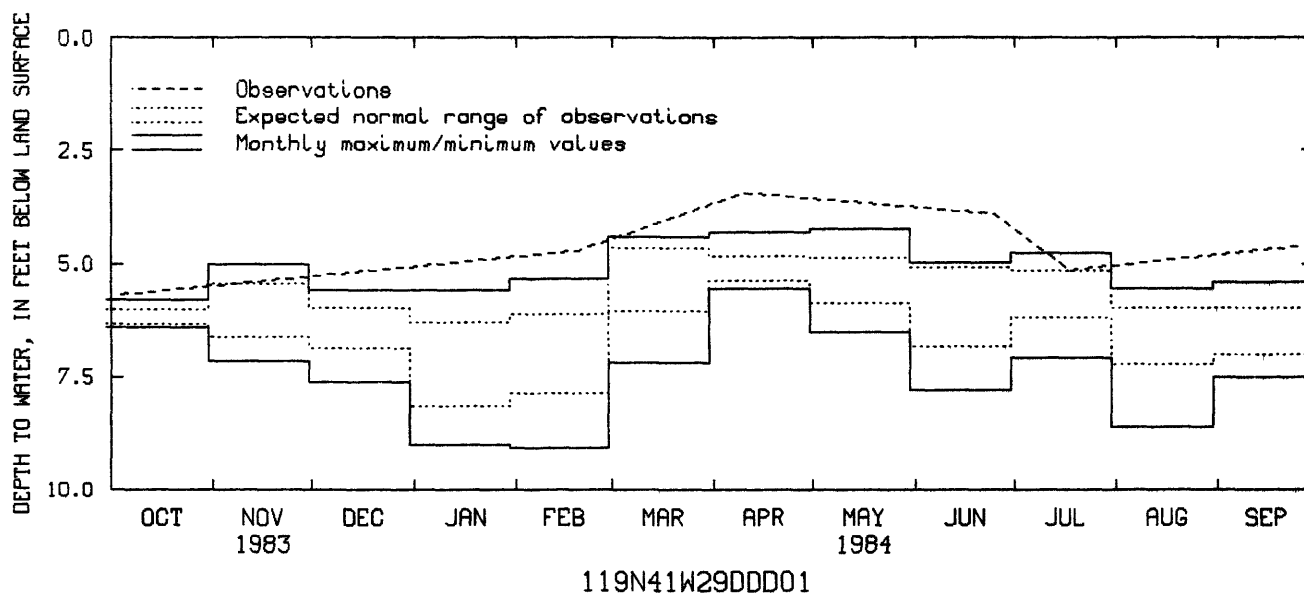
DATUM.--Altitude of land-surface datum is 992 ft (302 m). Measuring point: Top of casing, 3.75 ft (1.14 m) above land-surface datum.

PERIOD OF RECORD.--September 1972 to February 1974, January 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.43 ft (1.05 m) below land-surface datum, Apr. 10, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	5.68	FEB 20	4.71	APR 10	3.43	JUN 25	3.90	JUL 18	5.15



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	7.65	FEB 20	5.78	APR 10	3.70	JUN 25	2.06	JUL 18	4.69

GROUND-WATER LEVELS

CHISAGO COUNTY

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).

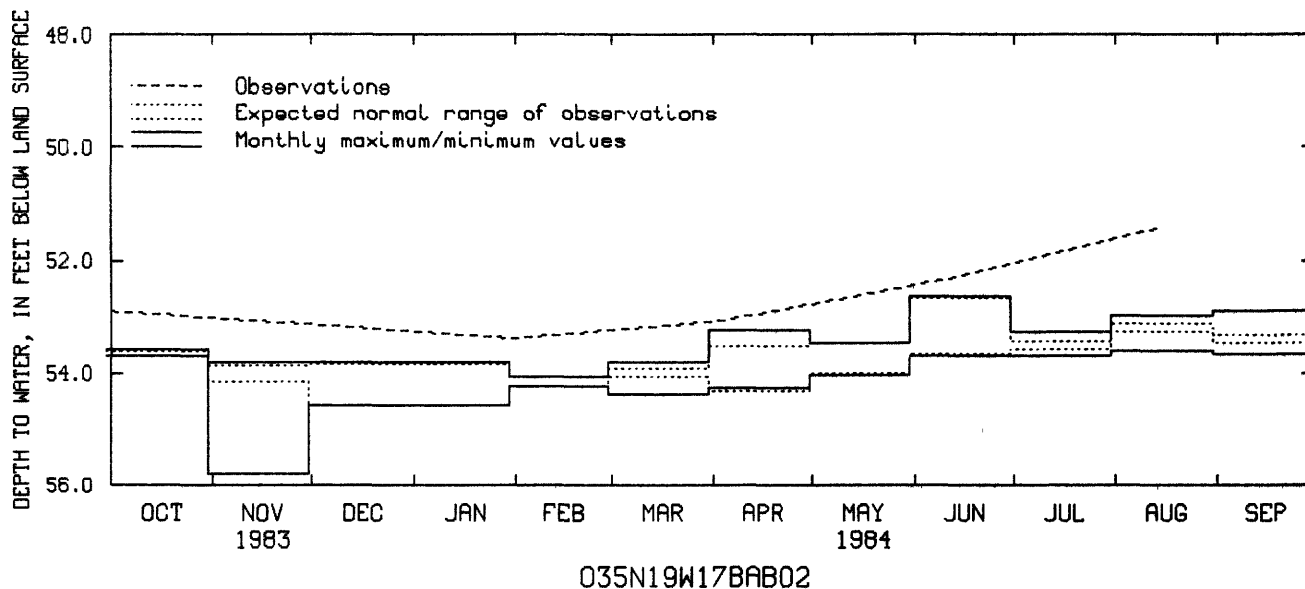
DATUM.--Altitude of land-surface datum is 860 ft (262 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

PERIOD OF RECORD.--October 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 51.42 ft (15.67 m) below land-surface datum, Aug. 15, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 6	53.15	JAN 31	53.38	APR 3	53.07	JUN 8	52.36	AUG 15	51.42



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 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, 41.71 ft (12.71 m) below land-surface datum, Aug. 15, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 6	42.91	JAN 31	43.11	APR 3	42.69	JUN 8	41.95	AUG 15	41.71

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).

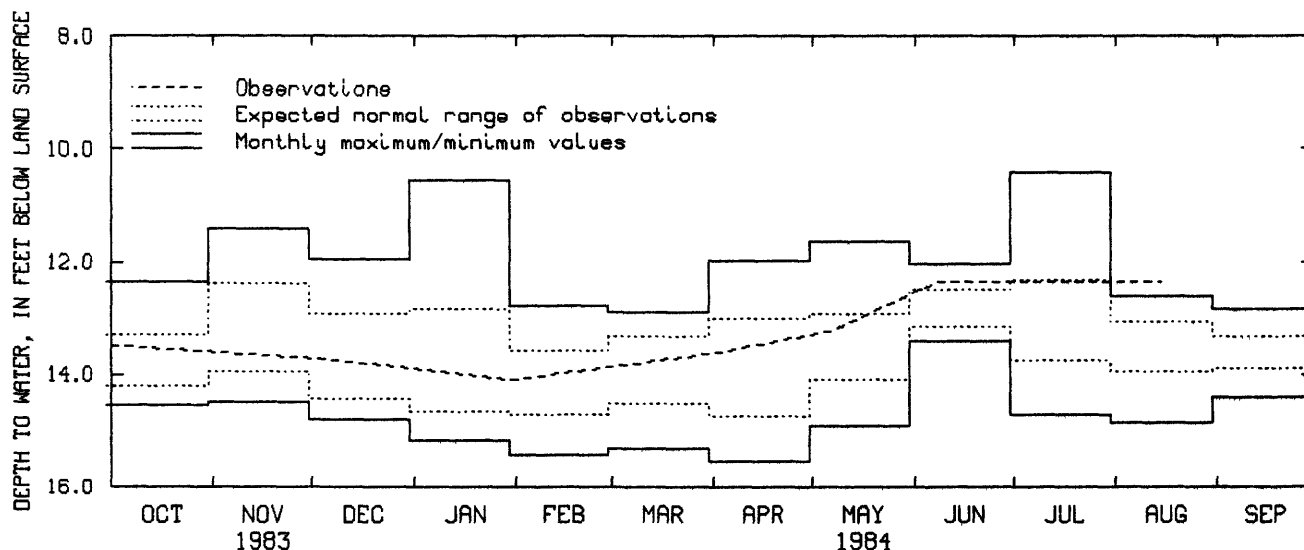
DATUM.--Altitude of land-surface datum is 894 ft (272 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 6	13.73	JAN 31	14.10	APR 3	13.60	MAY 7	13.22	JUN 8	12.35	AUG 15	12.35



035N21W26BCC01

LOCATION.--Lat 45°29'36", long 92°56'19", in NE¼SW¼NE¼ sec.8, T.105 N., R.36 W., Hydrologic Unit 07100001, 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).

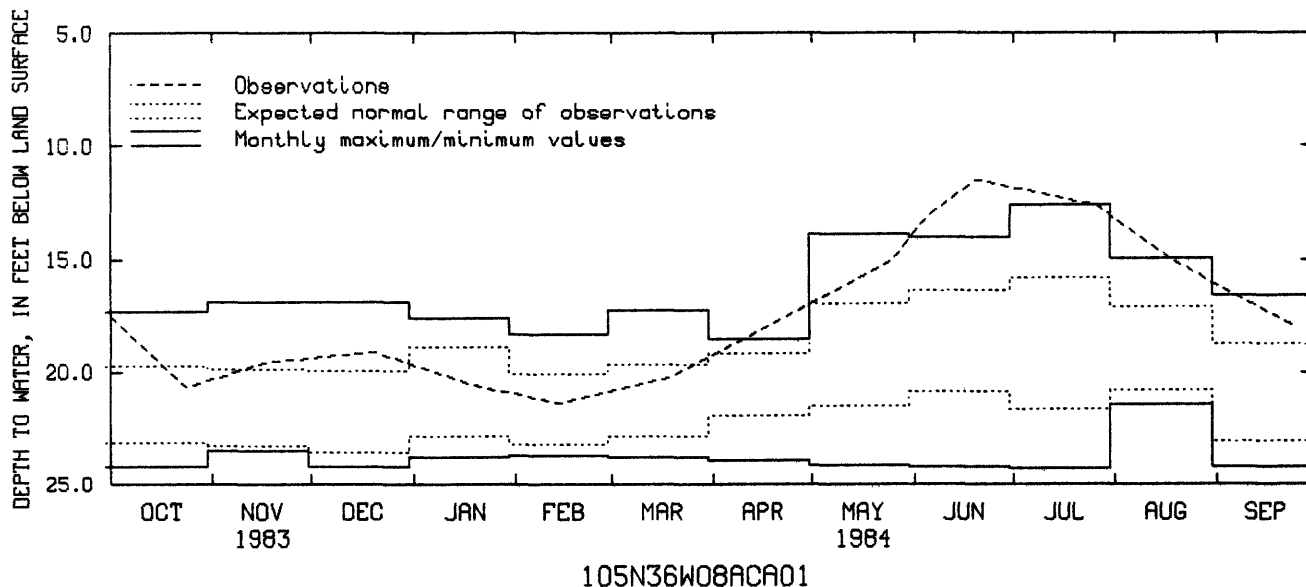
DATUM.--Altitude of land-surface datum is 1,370 ft (418 m). Measuring point: Top of casing, 3.20 ft (0.98 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 11.50 ft (3.51 m) below land-surface datum, June 20, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	20.68	DEC 20	19.08	FEB 14	21.37	MAY 25	15.10	JUN 20	11.50	AUG 20	15.19
NOV 17	19.57	JAN 19	20.57	MAR 19	20.22	JUN 5	13.09	JUL 26	12.62	SEP 25	18.01



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, 5.64 ft (1.72 m) below land-surface datum, Apr. 16, 1984;
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 1983 TO SEPTEMBER 1984

[illegible]

GROUND-WATER LEVELS

CROW WING COUNTY

463006094131201. Local number, 135N28W16CCD01.

LOCATION.--Lat 46°30'06", long 94°13'12", in SE¼SW¼SW¼ 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).

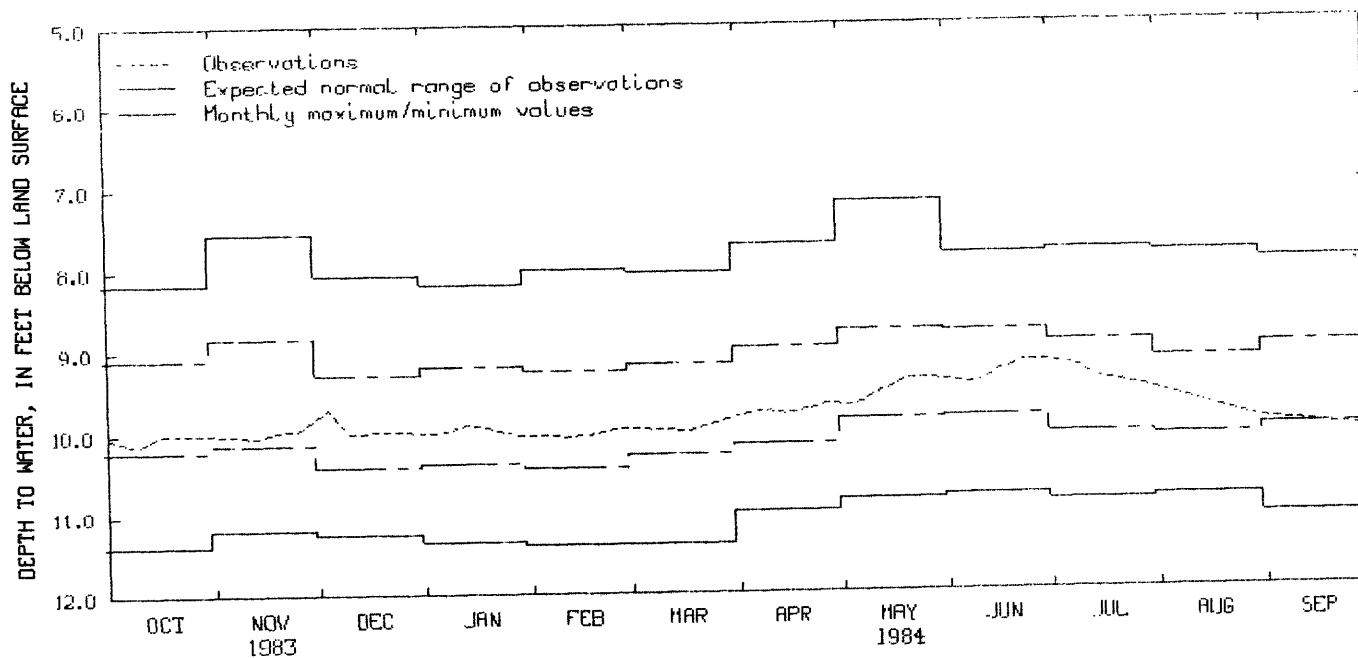
DATUM.--Altitude of land-surface datum is 1,212 ft (369 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	10.03	NOV 26	9.95	JAN 14	9.90	APR 7	9.76	MAY 20	9.39	JUN 30	9.20
9	10.14	DEC 4	9.70	28	10.04	15	9.80	26	9.39	JUL 7	9.24
16	10.00	10	10.00	FEB 6	10.04	22	9.74	JUN 2	9.42	14	9.40
21	10.00	16	9.99	12	10.06	28	9.69	9	9.45	20	9.44
29	10.00	23	9.98	18	10.04	MAY 5	9.71	18	9.27	AUG 4	9.60
NOV 13	10.04	31	10.00	26	9.95	12	9.55	23	9.20	31	9.93
19	9.98	JAN 7	9.99	MAR 18	10.00						



GROUND-WATER LEVELS

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.

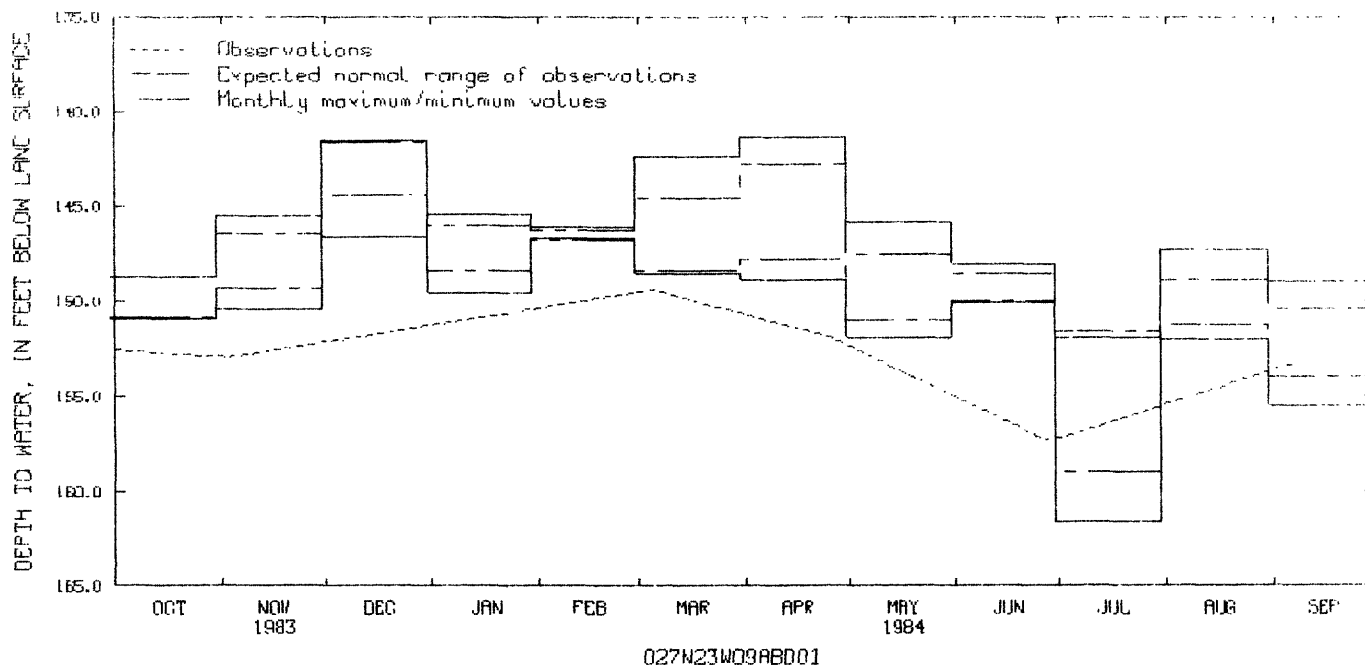
REMARKS.--Water-level affected by pumping.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	153.0	JAN 10	151.0	MAR 5	149.4	APR 26	152.0	JUN 28	157.4	SEP 7	153.3



027N23W09ABD01

444702093170101. Local number, 027N24W34BDC01.

LOCATION.--Lat 44°47'024", 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) below land-surface datum, Sept. 12, 1975; lowest, 42.00 ft (12.80 m) below land-surface datum, July 22, 1975.

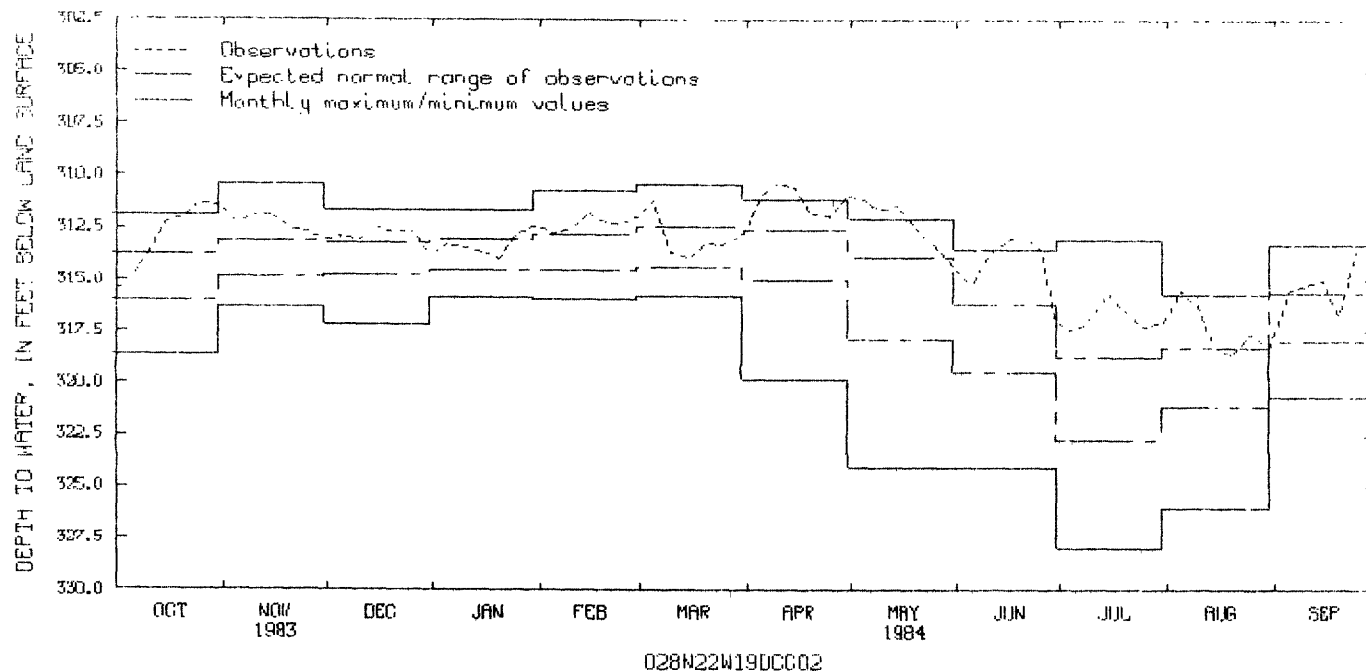
WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	+2.70	NOV 3	26.70	APR 6	+0.50	APR 27	11.60	JUN 29	32.95	SEP 7	14.47
21	+3.40	JAN 4	2.00								

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.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	315.0	312.3	312.9	313.3	312.8	311.2	311.0	311.2	315.5	317.5	315.5	315.6
10	313.8	311.9	313.2	313.4	312.5	313.7	310.4	311.6	313.8	316.7	316.2
15	312.3	311.9	312.5	313.7	311.8	314.0	310.6	311.4	313.1	315.6	318.3	315.0
20	312.1	312.5	312.8	314.0	312.3	313.2	311.8	312.5	312.8	316.5	318.6	316.7
25	311.3	312.7	312.6	312.8	312.3	313.3	312.0	313.3	313.4	317.3	317.6	313.2
FROM	311.5	313.1	313.7	312.4	312.0	312.7	311.0	314.4	317.0	317.0	318.2

WTR YEAR 1984 HIGHEST 309.8 APR 23, 1984 LOWEST 318.9 AUG 19, 1984



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.

[illegible]

GROUND-WATER LEVELS

DAKOTA COUNTY--Continued

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	13.05	FEB 29	12.15	APR 26	12.02	MAY 15	11.77	JUL 2	12.90	SEP 5	13.50
JAN 5	12.62										

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	11.95	JAN 6	11.72	FEB 29	13.33	MAY 2	15.02	JUL 2	15.02	SEP 5	13.64

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, 25.65 ft (7.82 m) below land-surface datum, Sept. 5, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	26.78	JAN 6	27.22	FEB 29	27.08	APR 26	26.26	JUL 2	25.74	SEP 5	25.65

GROUND-WATER LEVELS

DAKOTA COUNTY--Continued

444205092500001. 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.

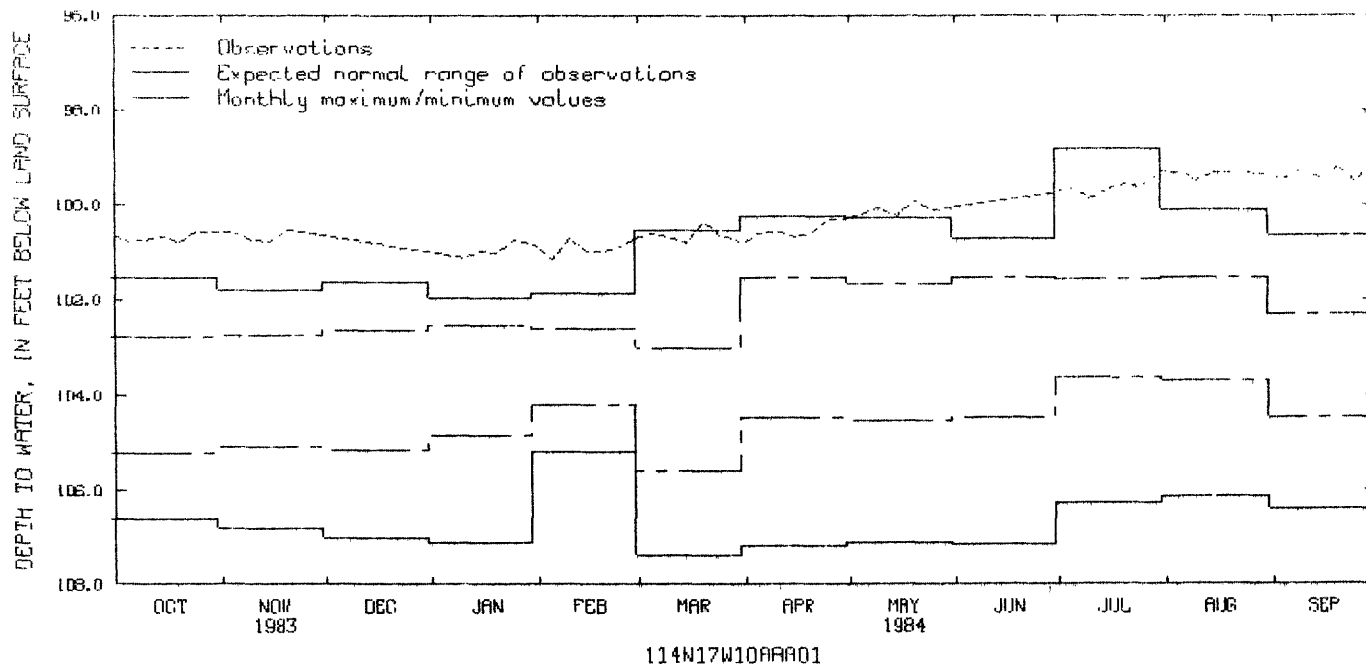
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 98.78 ft (30.11 m) below land-surface datum, Sept. 7, 1984; lowest, 107.4 ft (32.74 m) below land-surface datum, Mar. 12, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	100.8	100.6	.....	.....	101.2	100.6	100.6	100.2	.....	99.66	99.33	99.43
10	100.8	100.8	.....	101.1	100.7	100.7	100.6	100.1	.....	99.87	99.48	99.24
15	100.7	100.8	.....	101.0	101.0	100.8	100.7	100.2	.....	99.70	99.32	99.47
20	100.8	100.5	.....	101.0	101.0	100.4	100.6	99.92	.....	99.57	99.33	99.19
25	100.6	.....	.....	100.8	100.9	100.7	100.3	100.1	.....	99.64	99.33	99.49
EOM	100.6	.....	.....	100.9	100.7	100.8	100.3	.....	99.74	99.28	99.39	99.15

WTR YEAR 1984 HIGHEST 98.78 SEP 7, 1984

LOWEST 101.2 FEB 7, 1984



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, 79.77 ft (24.31 m) below land-surface datum, July 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	81.18	JAN 3	80.49	FEB 28	80.34	APR 26	79.97	JUL 2	79.77	SEP 5	79.84

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, 57.56 ft (17.54 m) below land-surface datum, Sept. 5, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	60.60	FEB 28	60.98	APR 26	59.02	MAY 30	57.73	JUL 2	73.70	SEP 5	57.56
JAN 3	60.39										

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, 63.83 ft (19.46 m) below land-surface datum, Apr. 26, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	65.99	JAN 3	66.17	FEB 29	66.72	APR 26	63.83	JUL 2	68.14	SEP 5	68.24

GROUND-WATER LEVELS
DAKOTA COUNTY--Continued

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).

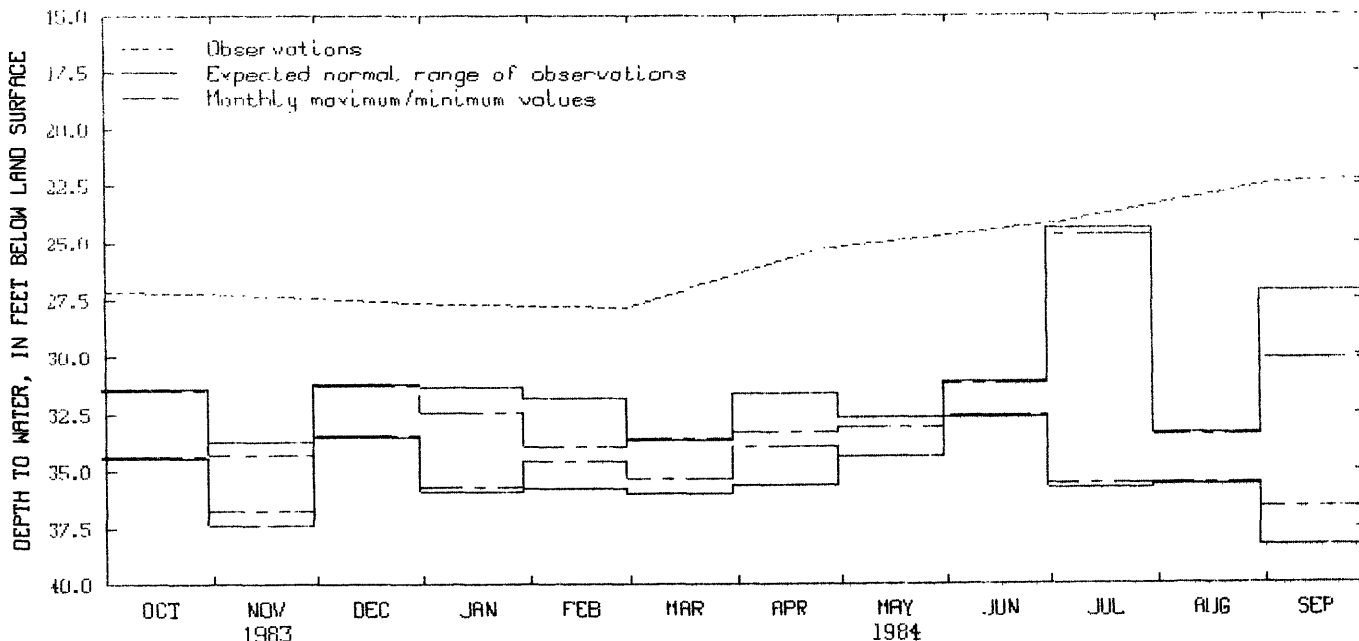
DATUM.--Altitude of land-surface datum is 898 ft (274 m). Measuring point: Hole in pump base, 1.25 ft (0.38 m) above land-surface datum.

PERIOD OF RECORD.--June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.41 ft (6.83 m) below land-surface datum, Sept. 5, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	27.24	JAN 3	27.67	FEB 29	27.85	APR 26	25.28	JUL 2	24.20	SEP 5	22.41



114N18W35CCB01

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, 58.50 ft (17.83 m) below land-surface datum, Sept. 7, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	59.88	MAR 2	59.83	APR 6	59.62	APR 26	59.30	JUN 28	59.22	SEP 7	58.50

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).

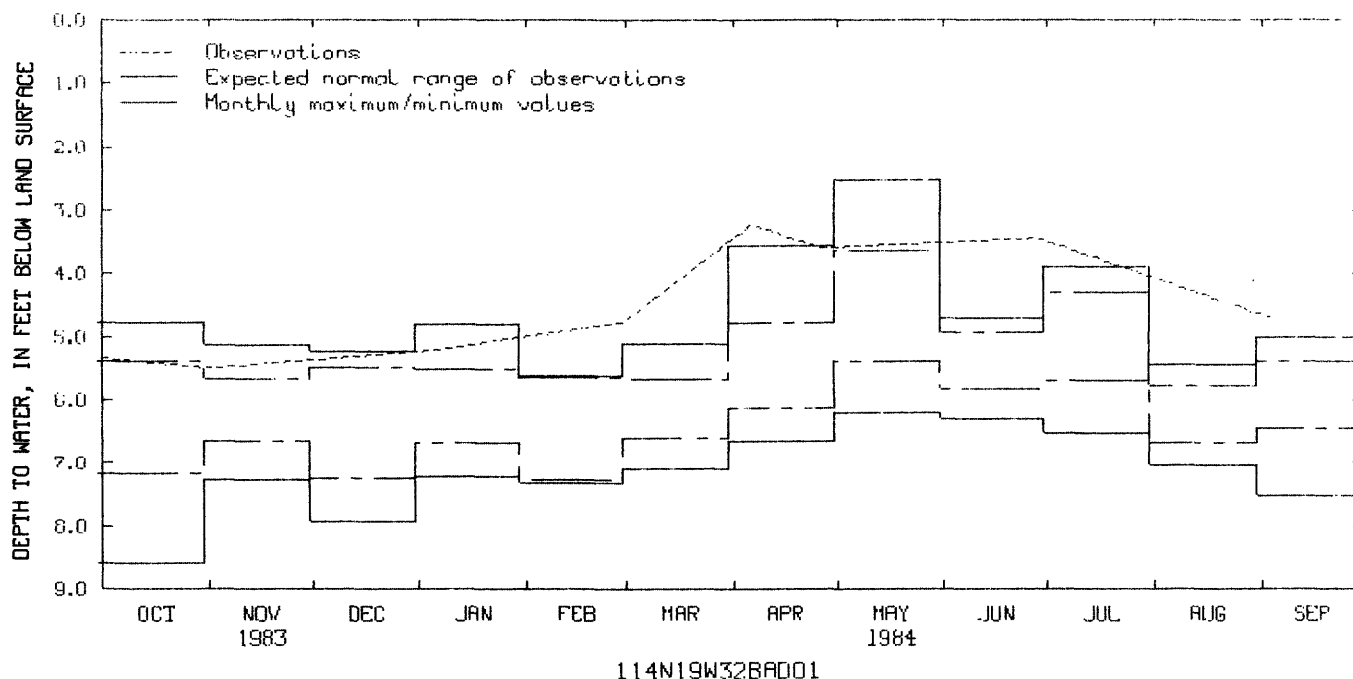
DATUM.--Altitude of land-surface datum is 895 ft (273 m). Measuring point: Top of casing, 3.75 ft (1.14 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	5.50	FEB 29	4.77	APR 6	3.23	APR 26	3.59	JUN 28	3.44	SEP 5	4.72
JAN 6	5.21										



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.

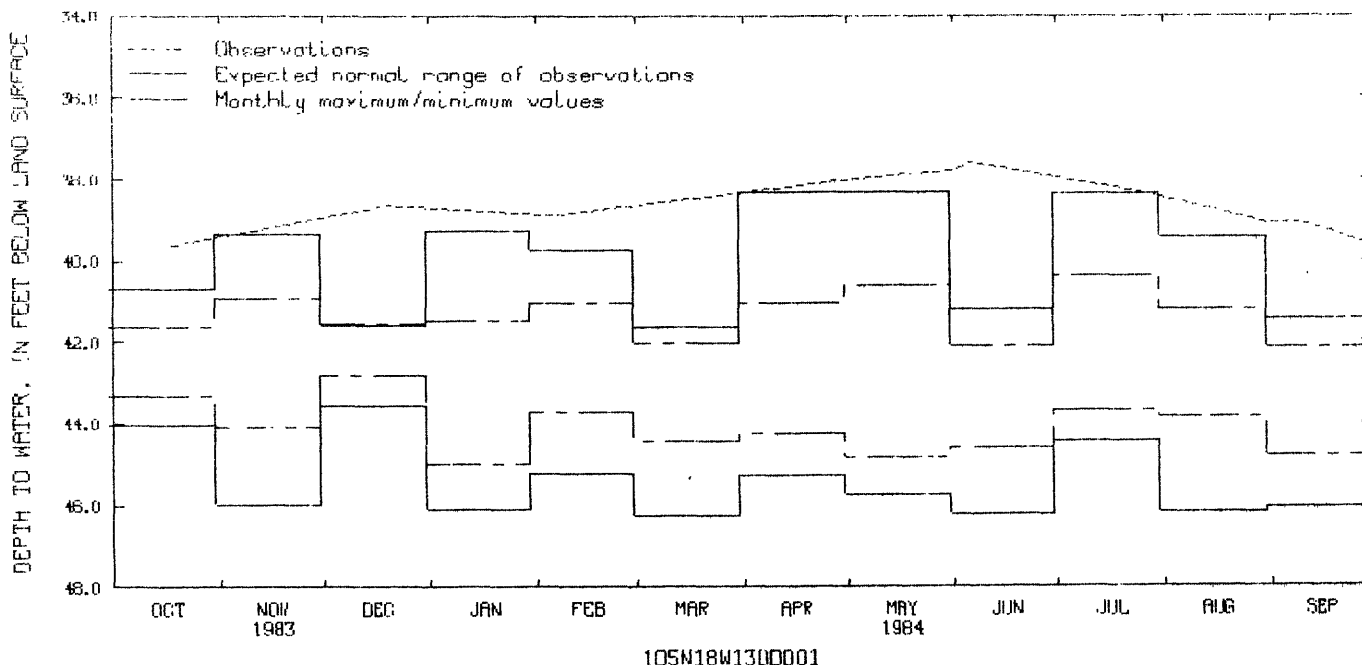
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	170.9	JAN 6	170.6	MAR 2	170.5	APR 26	170.7	JUN 28	169.6	SEP 7	169.7

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 37.61 ft (11.46 m) below land-surface datum, June 6, 1984;
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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	39.63	FEB 6	38.88	MAY 31	37.80	JUL 24	38.30	SEP 1	39.08	SEP 10	39.08
DEC 20	38.64	MAY 2	38.01	JUN 6	37.61						



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 1983 TO SEPTEMBER 1984

[illegible]

GROUND-WATER LEVELS

DOUGLAS COUNTY

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 of 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	6.19	DEC 31	6.18	FEB 29	5.88	APR 30	5.20	JUN 29	4.36	AUG 31	5.47
NOV 30	5.96	JAN 31	6.42	MAR 31	5.57	MAY 30	5.29	JUL 31	5.09	SEP 30	5.82

455900095162001. Local number, 129N36W18CBB01.

LOCATION.--Lat 45°59'00", long 95°16'20", long 95°16'20", 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).

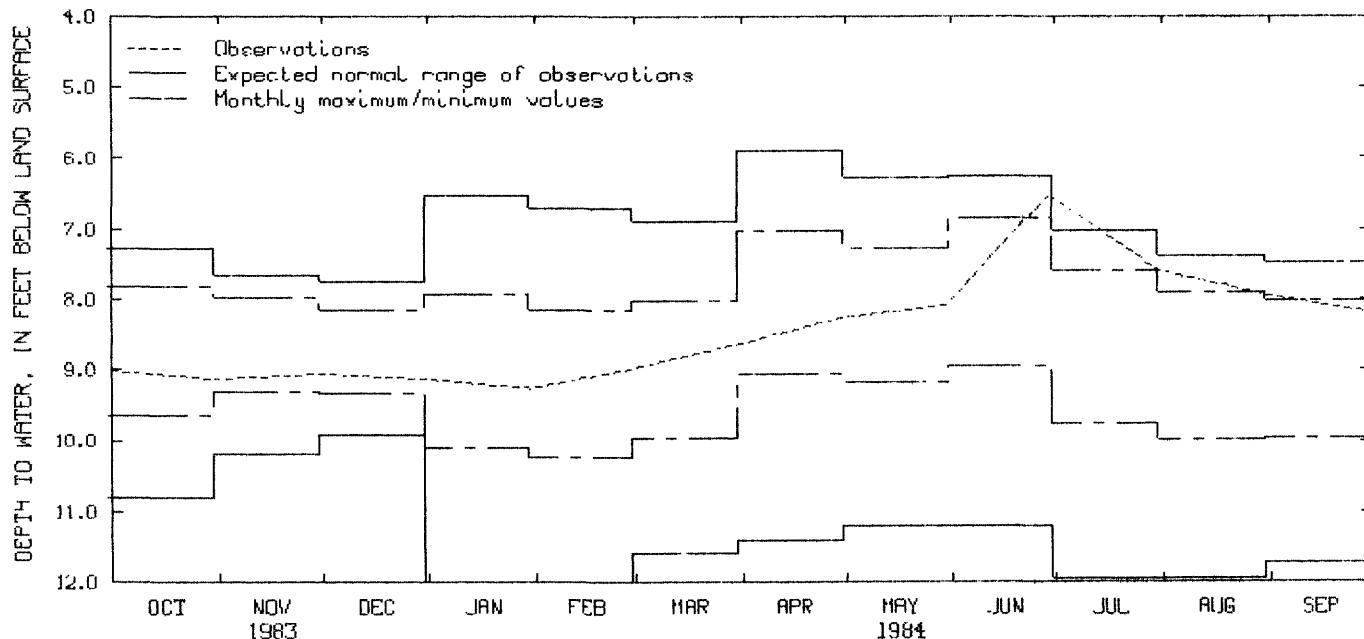
DATUM.--Altitude of land-surface datum is 1,362 ft (415 m). Measuring point: Top of casing, 3.50 ft (1.07 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	9.13	DEC 31	9.13	FEB 29	8.99	APR 30	8.27	JUN 29	6.52	AUG 31	7.95
NOV 30	9.06	JAN 31	9.26	MAR 31	8.64	MAY 30	8.09	JUL 31	7.60	SEP 30	8.19



129N36W18CBB01

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	4.24	DEC 31	4.27	FEB 29	3.91	APR 30	3.28	JUN 29	3.03	AUG 31	3.38
NOV 30	4.06	JAN 31	4.45	MAR 31	3.43	MAY 30	3.42	JUL 31	3.31	SEP 30	3.55

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.--April 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 4.77 ft (1.45 m) below land-surface datum, June 30, 1979; lowest, 12.90 ft (3.92 m) below land-surface datum, Feb. 28, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	9.06	DEC 31	9.16	FEB 29	9.21	APR 30	8.74	JUN 29	8.16	AUG 31	7.93
NOV 30	9.12	JAN 31	9.34	MAR 31	8.95	MAY 30	8.54	JUL 31	7.94	SEP 30	8.03

FARIBAULT 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 PERIODS 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	37.80	MAR 2	36.85	MAY 10	35.34	JUL 10	35.58	SEP 20	38.72

GROUND-WATER LEVELS
FARIBAULT COUNTY--Continued

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	32.05	JAN 5	31.43	MAR 2	31.13	MAY 10	30.10	JUL 10	30.20	SEP 20	32.05

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	29.50	JAN 5	29.08	MAR 2	29.06	MAY 10	27.92	SEP 20	29.56

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	67.44	JAN 5	66.48	MAR 2	66.79	MAY 10	65.72	SEP 20	68.46

GROUND-WATER LEVELS

FREEBORN COUNTY--Continued

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	43.67	JAN 5	42.58	MAR 2	42.62	MAY 10	42.32	JUL 10	45.25	SEP 20	45.60

434032093111801. Local number, 103N20W36CCB01.

LOCATION.--Lat 43°40'32", long 93°11'18", in NE¼SW¼SW¼ 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, 48.40 ft (14.75 m) below land-surface datum, May 10, 1984; lowest, 51.49 ft (15.69 m) below land-surface datum, Sept. 20, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	50.29	JAN 5	50.23	MAR 2	49.75	MAY 10	48.40	JUL 10	49.45	SEP 20	51.49

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	43.94	JAN 5	43.05	MAR 2	43.42	MAY 10	42.46	JUL 10	43.22	SEP 20	45.15

GROUND-WATER LEVELS

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, 18.04 ft (5.50 m) below land-surface datum, May 3, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	20.09	FEB 8	23.68	MAR 19	20.55	MAY 3	18.04	JUL 11	19.17	SEP 13	20.16
DEC 3	26.89										

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).

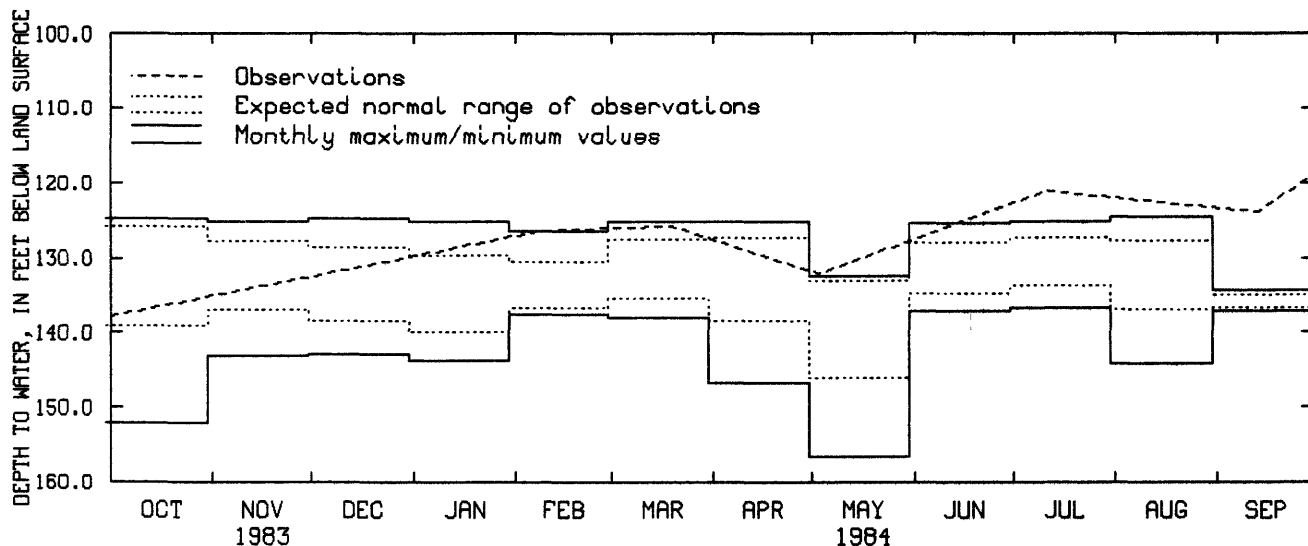
DATUM.--Altitude of land-surface datum is 1,125 ft (343 m). Measuring point: Top of 1½ in (0.03 m) elbow, 1.50 ft (0.46 m) above land-surface datum.

PERIOD OF RECORD.--June 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 121.1 ft (36.91 m) below land-surface datum, July 11, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 8	126.4	MAR 19	125.8	MAY 3	132.1	JUL 11	121.1	SEP 13	123.9



111N15W21CDA01

GROUND-WATER LEVELS

GOODHUE COUNTY--Continued

443012092362201. Local number, 113N15W27BAB01.

LOCATION.--Lat 44°30'12", long 92°26'22", in NWSNESWS 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 560 ft (171 m), cased to 243 ft (74.1 m).

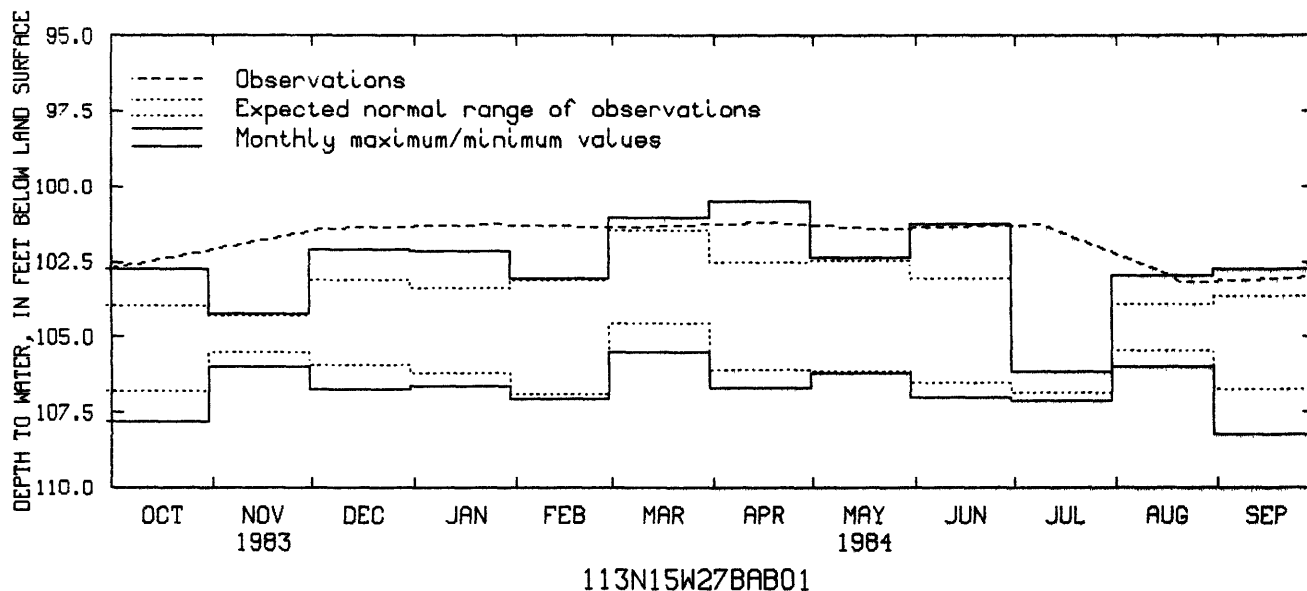
DATUM.--Altitude of land-surface datum is 800 ft (244 m). Measuring point: Edge of casing, 2.70 ft (0.82 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 5	101.4	MAR 5	101.4	MAY 21	101.4	JUL 9	101.2	AUG 17	102.9	AUG 20	103.2
JAN 24	101.2	APR 17	101.2								



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 19	36.46	MAY 22	36.39	JUN 20	36.40

GROUND-WATER LEVELS
GRANT COUNTY--Continued

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.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 19	6.28	MAY 22	5.98	JUN 20	5.44

455641095524001. Local number, 129N41W31ACA01.

LOCATION.--Lat 45°56'41", long 95°52'40", in NE¼SW¼NE¼ 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.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 19	13.90	MAY 22	13.79	JUN 20	13.81

460316095551301. Local number, 130N42W23DBD01.

LOCATION.--Lat 46°03'16", long 95°55'13", in SE¼NW¼SE¼ 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.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 19	12.15	MAY 22	12.14	JUN 20	12.10

GROUND-WATER LEVELS

HENNEPIN COUNTY

444815093194901. Local number, 027N24W30AAA01.

LOCATION.--Lat 44°48'15", long 93°19'49", in NE¼NE¼NW¼ 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).

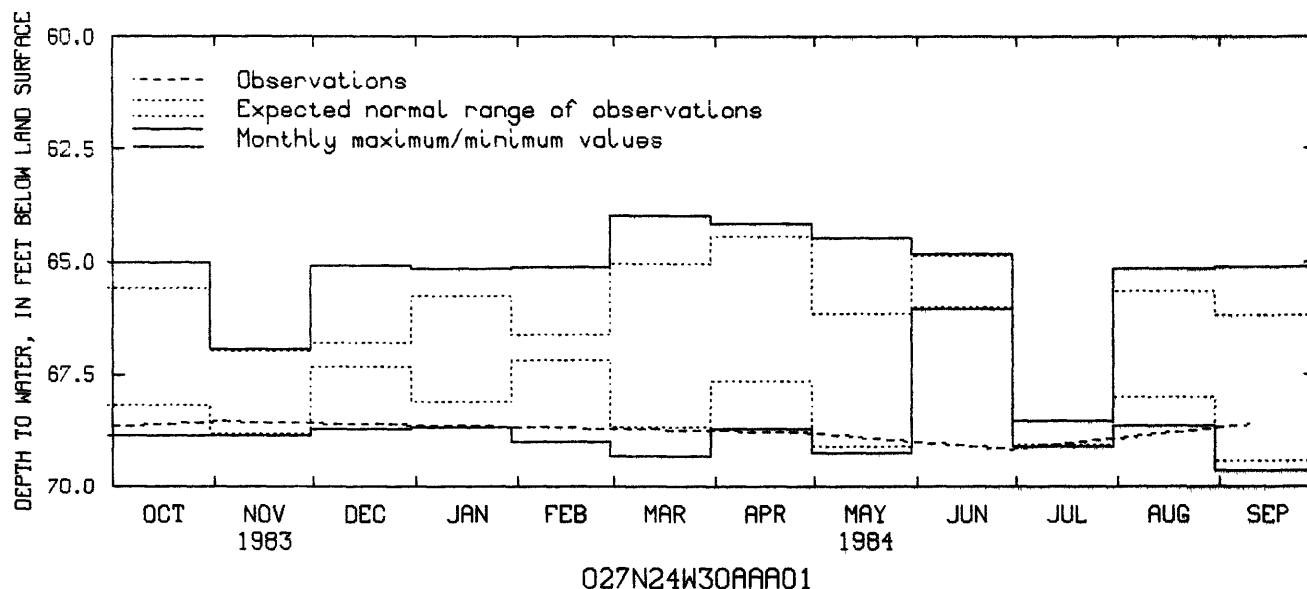
DATUM.--Altitude of land-surface datum is 832 ft (254 m). Measuring point: Top of casing, 0.50 ft (0.15 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	68.55	MAR 6	68.72	APR 27	68.80	JUN 29	69.17	SEP 10	68.62



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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	78.60	77.38	76.72	76.26	76.55	76.02	75.36	76.77	78.15	80.11	76.21	77.37
10	76.99	76.56	76.69	76.56	76.26	76.13	75.18	75.25	76.26	77.36	76.86	76.00
15	77.69	76.73	76.72	76.43	76.44	76.19	77.22	76.12	75.94	75.57	80.22	76.22
20	76.74	76.51	76.75	76.49	76.28	76.90	77.71	75.81	75.53	77.89	79.02	79.06
25	76.64	76.62	76.50	76.35	76.22	76.14	78.36	76.40	78.18	78.21	78.97	79.06
EOM	78.94	76.77	76.63	76.33	76.09	75.91	75.55	81.48	79.13	79.14	78.66	75.87

WTR YEAR 1984 HIGHEST 74.99 APR 12, 1984 LOWEST 81.65 MAY 30, 1984

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, 36.89 ft (11.24 m) below land-surface datum, Mar. 8, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	39.24	MAR 8	36.89	APR 27	38.42	JUN 29	47.17	SEP 7	42.20

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.

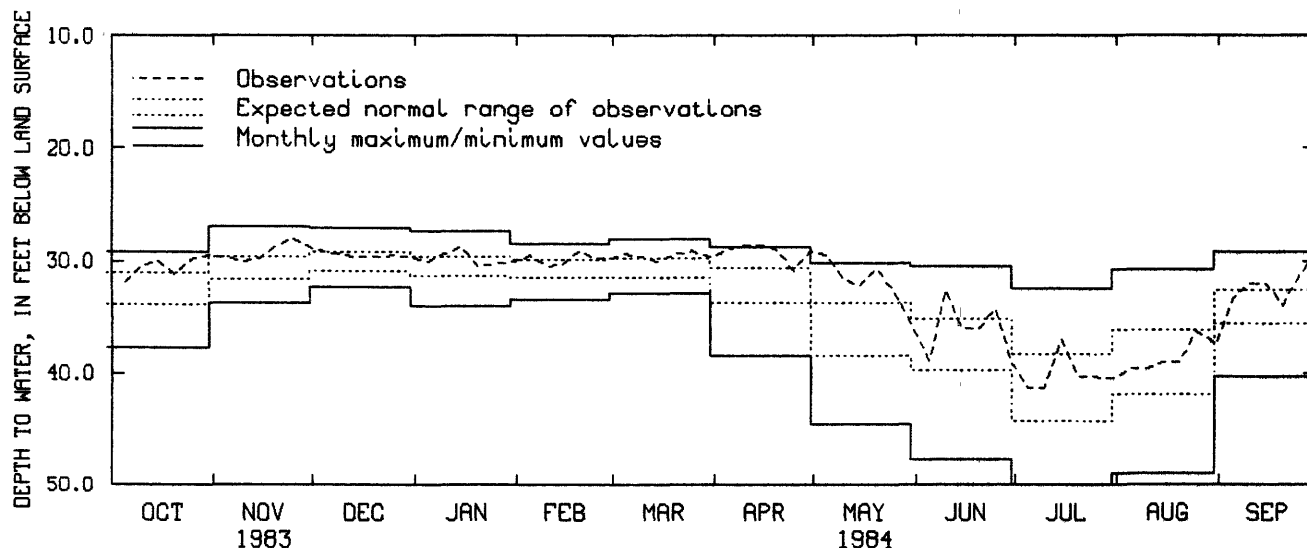
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.54 ft (7.48 m) below land-surface datum, Dec. 28-29, 1975; lowest, 50.11 ft (15.27 m) below land-surface datum, July 14, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	31.97	29.63	29.27	30.04	29.54	29.36	28.97	29.51	38.93	41.36	39.64	33.43
10	30.41	29.99	.....	29.38	30.43	29.66	28.66	31.61	32.66	41.24	39.63	32.12
15	30.02	29.71	29.62	28.73	30.34	30.03	28.57	32.27	36.08	37.04	39.09	32.02
20	31.20	28.74	29.62	30.49	29.06	29.44	29.04	30.63	36.06	40.27	39.01	33.98
25	29.94	27.98	29.54	30.26	29.79	29.12	30.89	32.58	34.25	40.32	36.27	31.43
EOM	29.52	28.77	29.62	30.09	29.83	29.67	29.12	35.92	39.22	40.52	37.44	29.47

WTR YEAR 1984 HIGHEST 26.36 NOV 28, 1983

LOWEST 44.12 JUL 3, 1984



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.

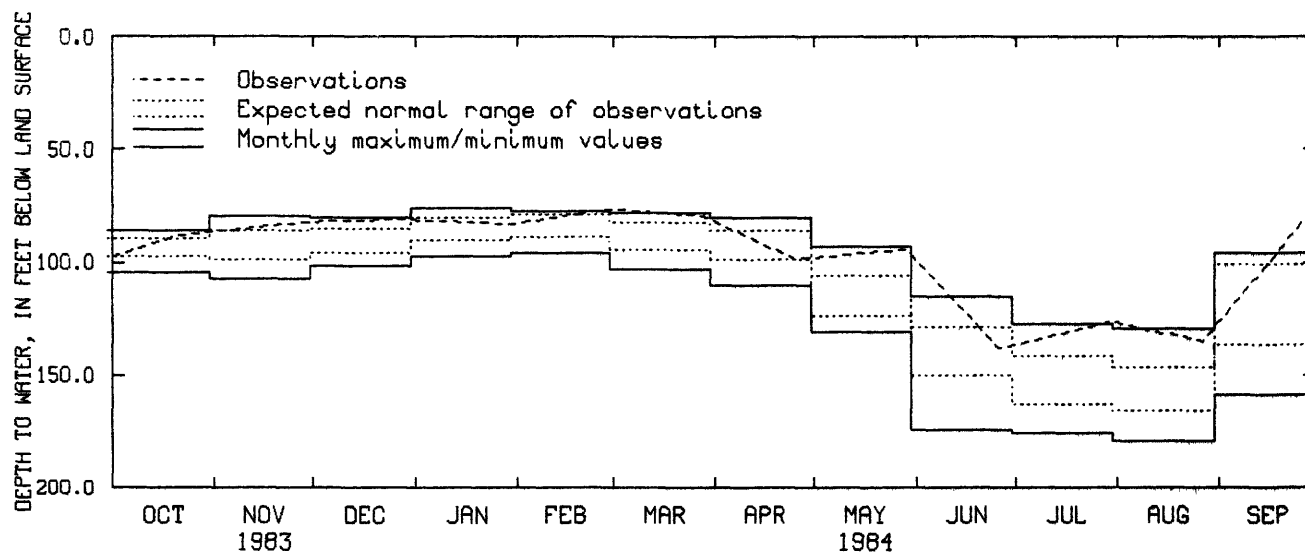
REMARKS.--Water level affected by pumping of nearby wells.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	88.40	DEC 27	81.00	FEB 28	76.50	APR 25	98.70	JUN 26	138.0	AUG 27	134.9
NOV 29	82.30	JAN 30	83.15	MAR 28	79.30	MAY 29	94.40	JUL 30	126.5	SEP 27	80.60



029N24W23CCB02

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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5					66.34	69.54	74.51	80.69		124.3	112.9	
10	76.44	67.44	77.88	98.89	.....	129.9	130.9	.....
15	72.19	.....	66.69	71.59	72.53	66.14	101.6	.....	104.7	134.9	.....
20	77.87	68.27	70.12	78.21	85.79	.....	127.6	127.8	116.1
25	77.72	66.79	64.84	93.15	.....	.....	128.6	112.6	76.90
EOM	76.58	70.42	68.29	70.60	115.3	108.1	125.7	.....	66.02

WTR YEAR 1984 HIGHEST 62.06 FEB 12, 1984 LOWEST 138.0 AUG 6, 1984

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.

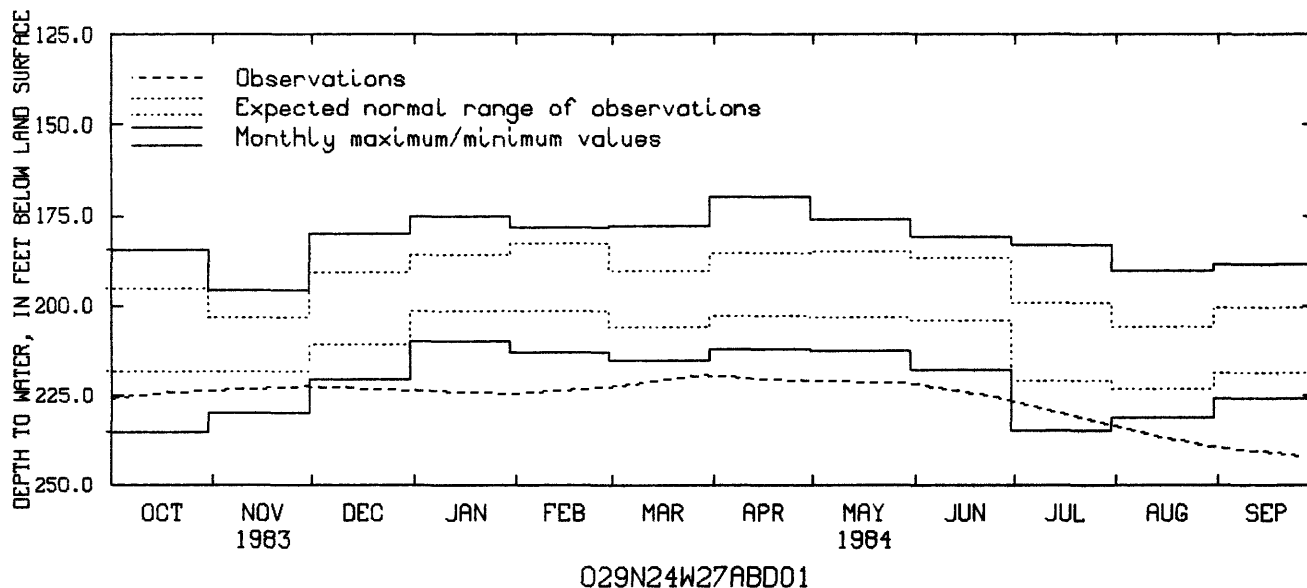
REMARKS.--Water level affected by regional pumping.

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, 242.0 ft (73.76 m) below land-surface datum, SEPT. 27, 1984.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	224.2	DEC 27	223.4	FEB 28	222.8	APR 25	221.0	JUN 26	225.6	AUG 27	239.1
NOV 29	222.6	JAN 30	224.6	MAR 28	219.4	MAY 29	221.5	JUL 30	233.1	SEP 27	242.0



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	48.18	JAN 10	48.75	MAR 6	47.95	APR 27	49.98	SEP 7	51.20

GROUND-WATER LEVELS
HENNEPIN COUNTY--Continued

445615093212301. Local number, 117N21W16CCA01.

LOCATION.--Lat 44°56'15", long 93°21'23", in NE¼SW¼ 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.

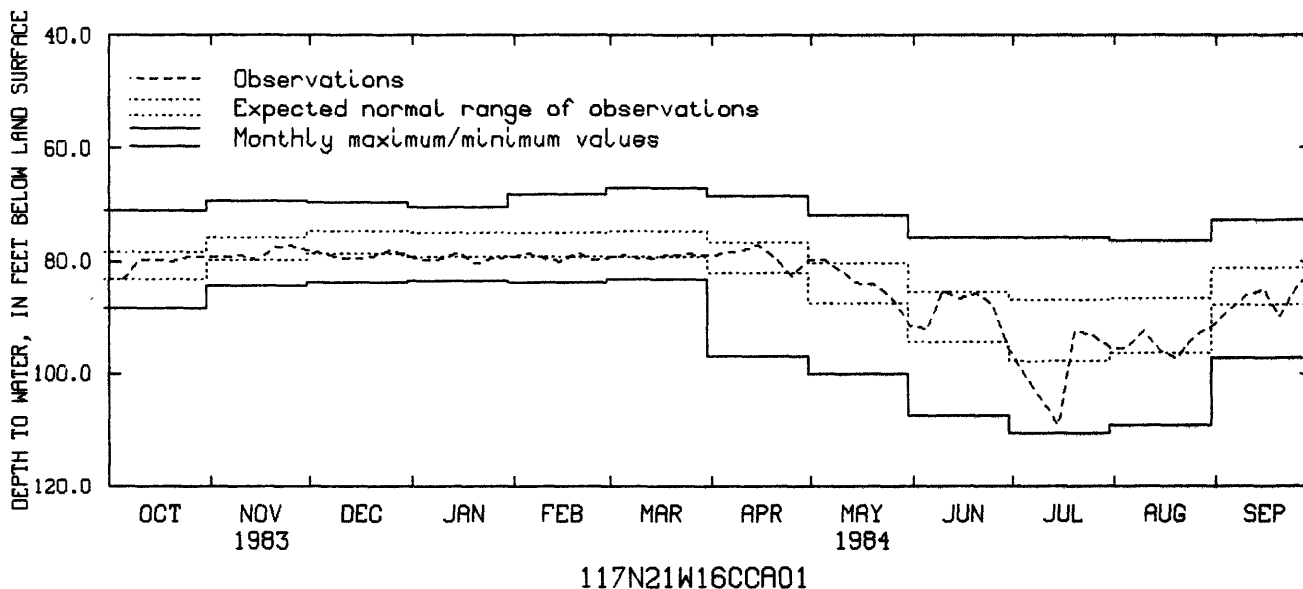
PERIOD OF RECORD.--February 1953 to current year.

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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	83.22	79.37	78.78	79.88	78.66	78.98	78.56	79.86	92.27	100.0	95.54	88.75
10	79.95	79.01	79.40	79.59	79.52	79.53	78.19	81.74	85.19	97.09	92.43	86.20
15	79.78	79.79	79.58	78.45	79.97	79.47	77.15	83.92	86.64	93.03	95.93	85.04
20	80.07	77.70	79.12	80.52	78.52	78.88	79.51	84.18	85.77	92.33	97.27	89.89
25	79.32	77.14	78.22	79.59	79.88	78.76	82.58	86.10	87.94	93.03	93.53	84.90
EOM	79.09	78.04	79.12	79.30	79.56	79.10	79.95	91.36	95.73	95.45	91.55	81.80

WTR YEAR 1984 HIGHEST 75.79 NOV 27, 1983 LOWEST 100.1 JUL 4, 1984



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	143.0	NOV 4	139.8	DEC 2	137.6	JUN 29	138.0	AUG 10	142.1	SEP 10	143.9
25	141.4	21	138.3	APR 17	133.2						

GROUND-WATER LEVELS

HENNEPIN COUNTY--Continued

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.

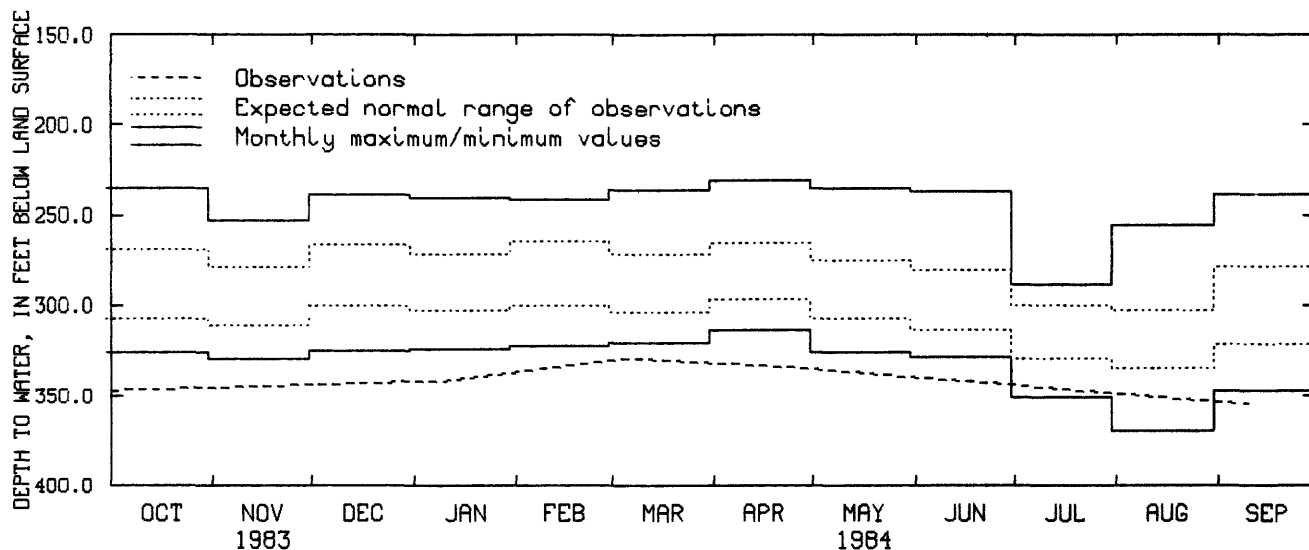
REMARKS.--Water level affected by pumping.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 10	341.8	MAR 6	329.4	APR 27	334.6	SEP 10	354.9



117N21W32DAD01

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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	29.18	28.06	28.01	27.88	28.49	27.76	28.30	27.42	32.94	36.03	33.52	30.88
10	28.62	27.99	28.51	28.20	28.53	.....	28.25	27.32	30.46	35.42	31.89	29.91
15	28.53	27.82	28.21	28.65	28.48	27.64	28.09	27.76	29.22	33.92	33.20	29.54
20	28.25	27.60	28.45	28.56	28.06	27.56	28.38	28.07	28.78	32.76	34.63	31.32
25	28.08	27.67	28.34	28.33	27.98	28.01	28.16	28.98	28.91	32.32	33.72	29.93
EOM	28.09	27.53	28.36	28.35	28.02	28.25	27.52	30.30	33.60	34.02	31.31	29.04

WTR YEAR 1984 HIGHEST 27.17 NOV 28, 1983 LOWEST 36.38 JUL 8, 1984

GROUND-WATER LEVELS
HENNEPIN COUNTY--Continued

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.

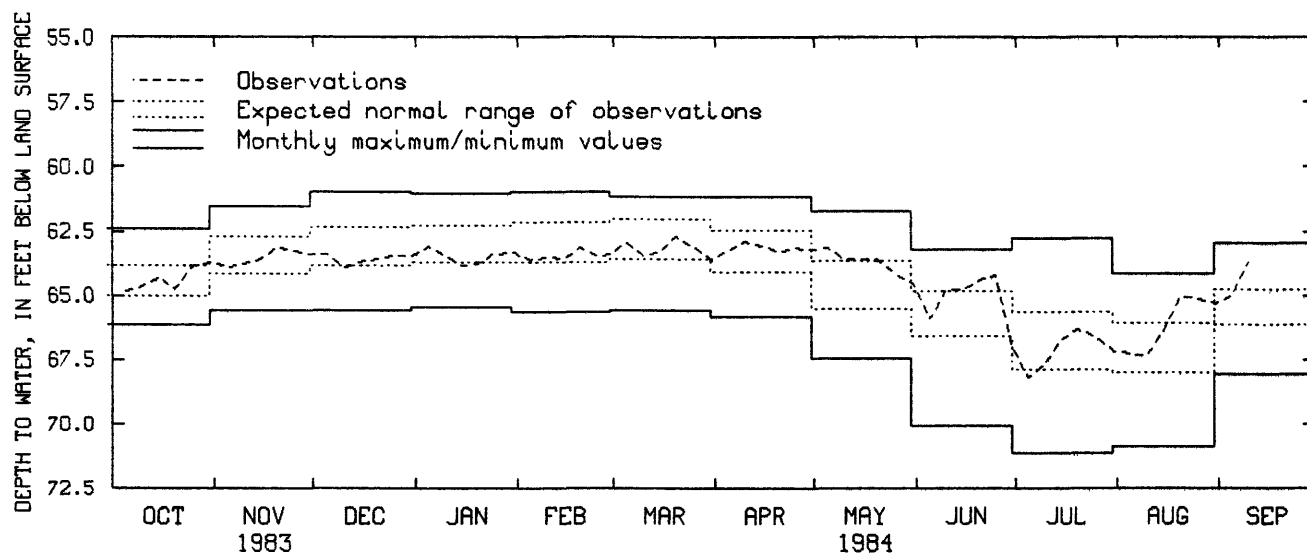
PERIOD OF RECORD.--October 1965 to current year.

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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	64.84	63.93	63.38	63.11	63.62	62.95	63.24	63.16	65.92	68.21	.....	64.92
10	64.66	63.77	63.90	63.47	63.54	63.47	62.90	63.57	64.80	67.70	67.36	63.71
15	64.29	63.56	63.70	63.84	63.56	63.34	63.11	63.59	64.76	66.69	66.36	.....
20	64.76	63.15	63.61	63.76	63.17	62.72	63.27	63.58	64.41	66.33	65.10	.....
25	63.90	63.27	63.43	63.37	63.48	63.07	63.16	64.08	64.19	66.60	65.10	.....
EOM	63.68	63.39	63.45	63.36	63.41	63.62	63.20	64.51	67.01	67.17	65.34	.....

WTR YEAR 1984 HIGHEST 62.37 APR 23, 1984 LOWEST 68.39 JUL 6, 1984



118N21W07DCB01

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, 17.94 ft (5.47 m) below land-surface datum, May 21, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	18.79	MAR 8	18.65	MAY 3	18.25	MAY 21	17.94	JUN 29	18.19	SEP 12	18.10

GROUND-WATER LEVELS

HENNEPIN COUNTY--Continued

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).

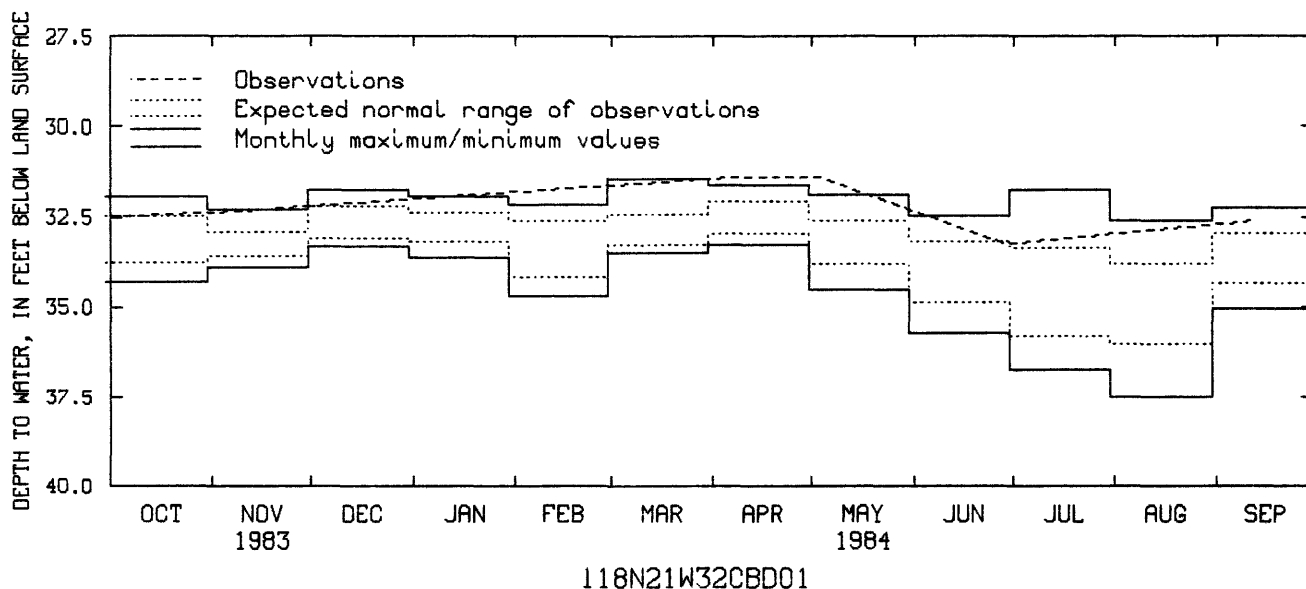
DATUM.--Altitude of land-surface datum is 890 ft (271 m). Measuring point: Top of well cap, 0.70 ft (0.21 m) above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.40 ft (9.57 m) below land-surface datum, May 3, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	32.35	APR 4	31.42	MAY 3	31.40	JUN 29	33.26	SEP 12	32.62



118N21W32CBD01

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.

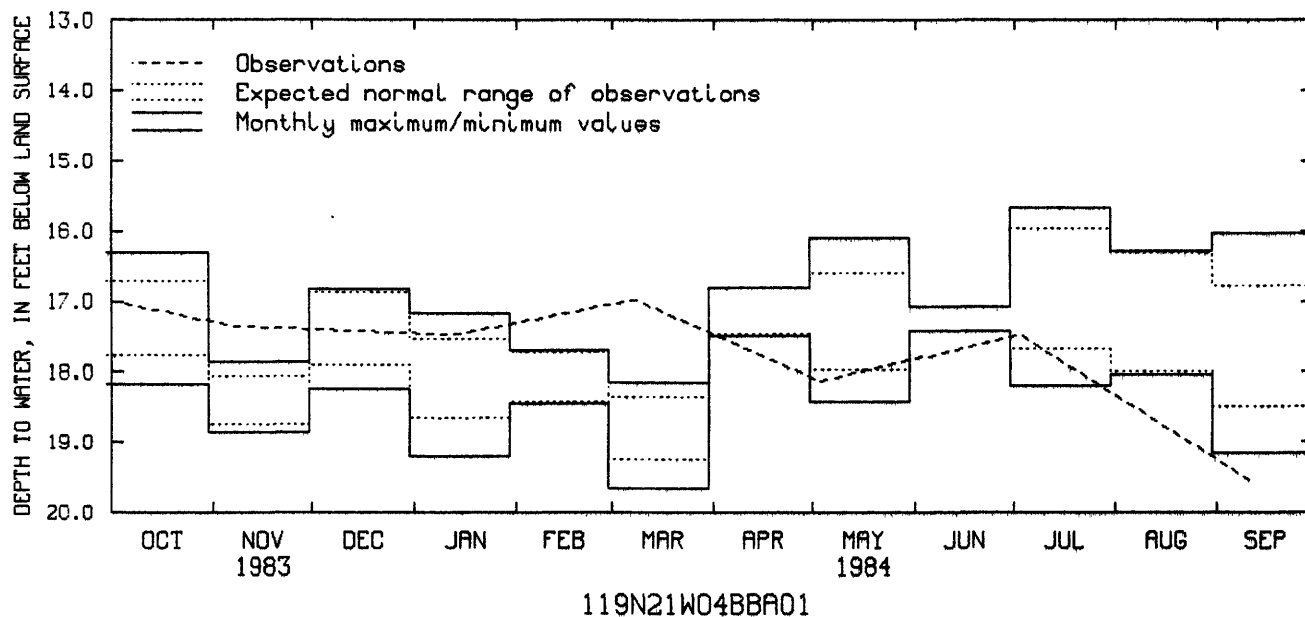
PERIOD OF RECORD.--September 1977 to current year.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	17.35	JAN 13	17.48	MAR 8	16.98	MAY 3	18.13	JUL 3	17.48	SEP 12	19.58

GROUND-WATER LEVELS
HENNEPIN COUNTY--Continued



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, 26.92 ft (8.21 m) below land-surface datum, Sept. 12, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	27.95	JAN 10	27.98	MAR 8	27.95	MAY 3	27.42	JUL 3	27.25	SEP 12	26.92

GROUND-WATER LEVELS

HOUSTON COUNTY

433953091251801. Local number, 102N05W03DCC01.

LOCATION.--Lat 43°39'53", long 91°25'18", in SW¼SW¼SE¼ sec.3, T.102 N., R.5 W., Hydrologic Unit 07060001, 3 mi (4.8 km) east of Caledonia.

Owner: U.S. Geological Survey.

AQUIFER.--Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 4 in (0.10 m), depth 360 ft (110 m), cased to 309 ft (94.2 m).

DATUM.--Altitude of land-surface datum is 1,210 ft (369 m). Measuring point: Top of casing, 2.50 ft (0.76 m) above land-surface datum.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 216.7 ft (66.05 m) below land-surface datum, Sept. 13, 1984; lowest, 245.5 ft (74.83 m) below land-surface datum, June 4, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	228.2	APR 5	224.9	MAY 8	223.3	JUL 5	220.4	SEP 13	216.7

433935091252001. Local number, 102N05W03DCC02.

LOCATION.--Lat 43°39'35", long 91°25'20", in SW¼SW¼SE¼ sec.3, T.102 N., R.5 W., Hydrologic Unit 07060001, 3 mi (4.8 km) east of Caledonia.

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 650 ft (198 m), cased to 614 ft (187 m).

DATUM.--Altitude of land-surface datum is 1,210 ft (369 m). Measuring point: Top of casing, 2.50 ft (0.76 m) above land-surface datum.

PERIOD OF RECORD.--November 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 441.5 ft (134.6 m) below land-surface datum, June 4, 1981; lowest, 448.5 ft (136.7 m) below land-surface datum, Nov. 25, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	443.8	APR 5	443.1	MAY 8	442.8	JUL 5	442.1	SEP 13	441.7

443935091252901. Local number, 102N05W03DCC03.

LOCATION.--Lat 44°39'35", long 91°25'19", in SW¼SW¼SE¼ sec.3, T.102 N., R.5 W., Hydrologic Unit 07060001, 3 mi (4.8 km) east of Caledonia.

Owner: U.S. Geological Survey

AQUIFER.--Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 4 in (0.10 m), depth 888 ft (271 m), cased to 858 ft (262 m).

DATUM.--Altitude of land-surface datum is 1,210 ft (369 m). Measuring point: Top of casing, 2.00 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 522.0 ft (159.1 m) below land-surface datum, Nov. 10, 1983; lowest, 524.6 ft (159.9 m) below land-surface datum, Sept. 20, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	522.0	APR 5	523.8	MAY 8	523.7	JUL 5	523.6	SEP 13	523.9

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.

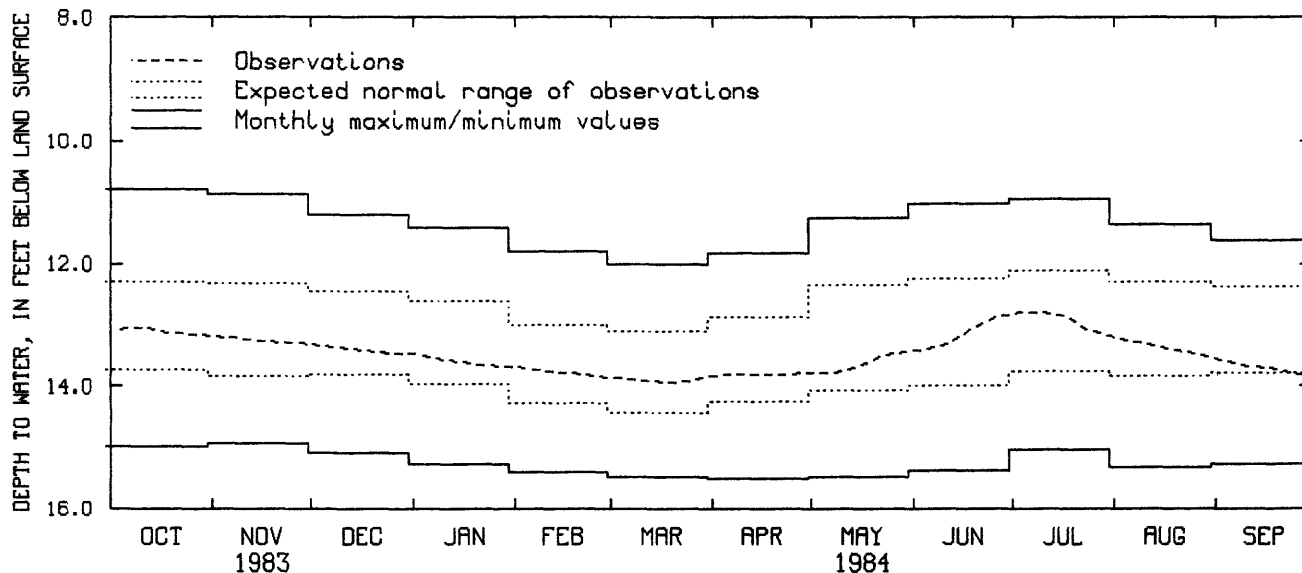
REMARKS.--Measured weekly by Archie Hakala.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	13.07	DEC 7	13.36	FEB 7	13.73	APR 11	13.80	JUN 5	13.40	JUL 31	13.19
11	13.05	13	13.40	14	13.78	17	13.80	12	13.31	AUG 7	13.28
18	13.12	20	13.44	21	13.80	24	13.80	19	13.07	13	13.33
25	13.15	27	13.47	28	13.85	MAY 1	13.79	26	12.88	21	13.43
NOV 1	13.18	JAN 3	13.48	MAR 6	13.88	8	13.78	JUL 3	12.80	SEP 4	13.59
8	13.22	10	13.57	13	13.92	15	13.69	10	12.80	11	13.67
15	13.26	20	13.64	20	13.95	22	13.51	17	12.85	17	13.71
21	13.28	24	13.66	26	13.90	29	13.45	24	13.08	25	13.80
29	13.30	31	13.68	APR 3	13.82						



139N32W16AAA01

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	39.70	DEC 16	39.78	FEB 17	40.14	APR 16	39.20	JUN 19	39.38	AUG 15	39.80
NOV 14	39.60	JAN 13	39.96	MAR 16	40.18	MAY 17	39.29	JUL 16	41.44	SEP 17	40.52

GROUND-WATER LEVELS

HUBBARD COUNTY-Continued

465420094453901. Local number, 140N32W32BBA01.

LOCATION.--Lat $46^{\circ}54'20''$, long $94^{\circ}45'39''$, in NE $\frac{1}{4}$ NW $\frac{1}{4}$ 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 $1\frac{1}{4}$ in (0.03 m), depth 25.5 ft (7.8 m), screened 23.5 to 25.5 ft (7.2 to 7.8 m).

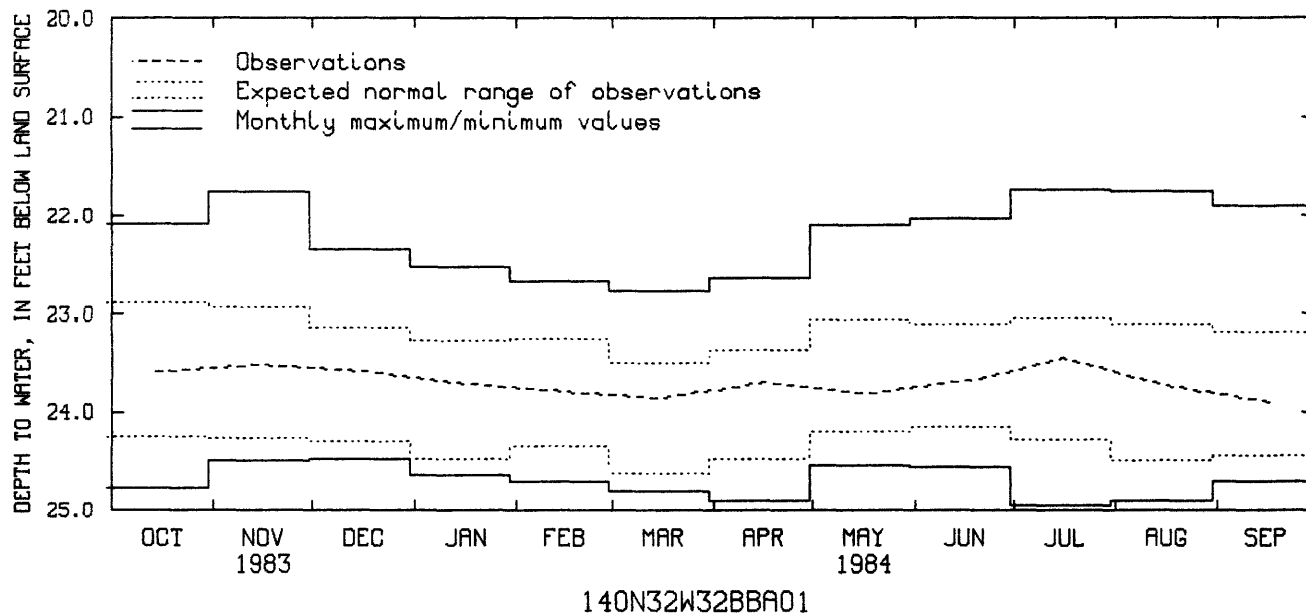
DATUM.--Altitude of land-surface datum is 1,423 ft (434 m). Measuring point: Top of casing, 2.50 ft (0.76 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	23.59	DEC 16	23.58	FEB 17	23.80	APR 16	23.70	JUN 19	23.67	AUG 15	23.72
NOV 14	23.52	JAN 13	23.70	MAR 16	23.86	MAY 17	23.82	JUL 16	23.46	SEP 17	23.91



140N32W32BBA01

465640095072101. Local number, 140N35W16BCC01.

LOCATION.--Lat $46^{\circ}56'40''$, long $95^{\circ}07'21''$, in SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ 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 $1\frac{1}{4}$ 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	15.79	DEC 16	16.07	FEB 17	16.34	APR 16	16.40	JUN 19	16.31	AUG 15	16.38
NOV 15	15.93	JAN 13	16.21	MAR 16	16.50	MAY 17	16.35	JUL 17	16.24	SEP 17	16.48

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL
OCT 16	12.70

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.

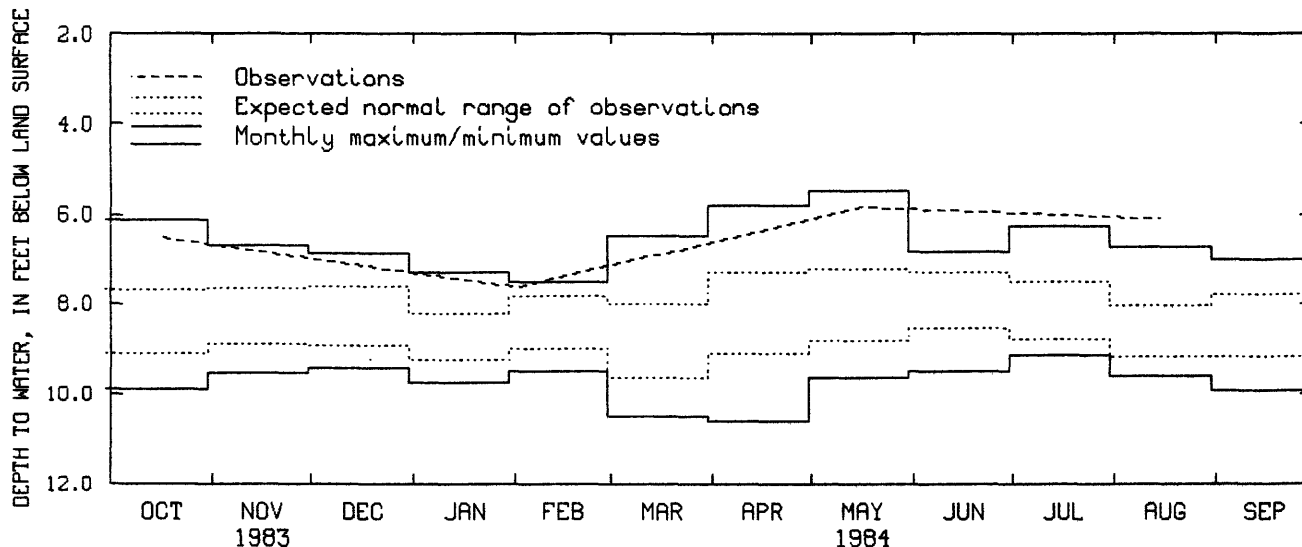
DATUM.--Altitude of land-surface datum is 930 ft (283 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

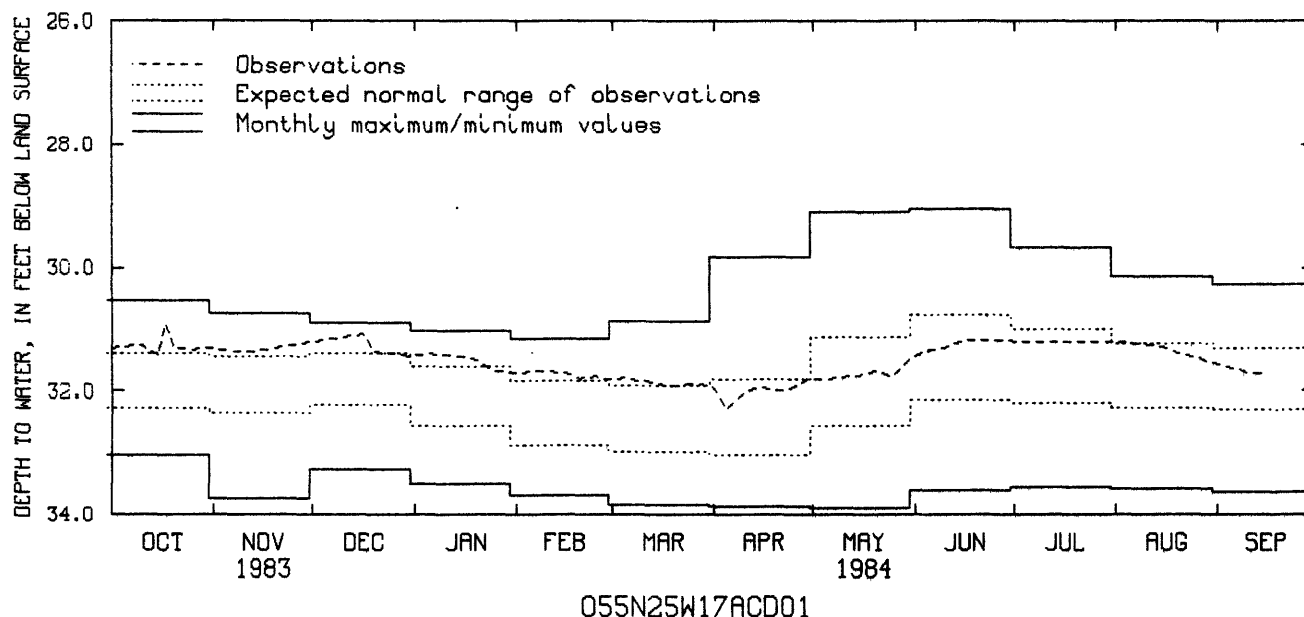
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	6.53	FEB 1	7.63	MAY 17	5.84	AUG 15	6.10



035N24W14CDC01

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	31.28	31.35	.....	31.40	31.68	31.79	32.30	31.80	31.35	.....	31.22	.....
10	31.27	31.37	.....	31.42	.....	31.84	32.03	31.78	31.32	.....	31.25	31.70
15	31.43	31.35	31.08	31.44	31.70	31.89	31.94	31.75	31.19	.....	31.29	31.72
20	31.31	.....	31.38	31.51	31.80	31.92	32.00	31.67	31.19	.....	31.39	.....
25	31.33	.....	31.39	31.67	31.77	31.89	31.94	31.77	.....	.....	.....	.....
EOM	31.32	.....	31.44	31.71	31.82	31.91	31.80	31.46	.....	.....	.....	.....
WTR YEAR 1984		HIGHEST	30.92	AUG 2, 1984		LOWEST	32.30	APR 5, 1984				

GROUND-WATER LEVELS
ITASCA COUNTY--Continued



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	64.34	DEC 20	63.19	FEB 9	63.07	JUL 18	62.38	SEP 26	63.05

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	13.06	JAN 17	12.96	MAR 20	12.63	MAY 20	12.09	JUL 15	11.70	AUG 19	12.14
NOV 15	13.02	FEB 15	13.07	APR 15	12.55	JUN 23	11.55	AUG 14	12.00	SEP 16	12.48
DEC 20	12.92										

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).

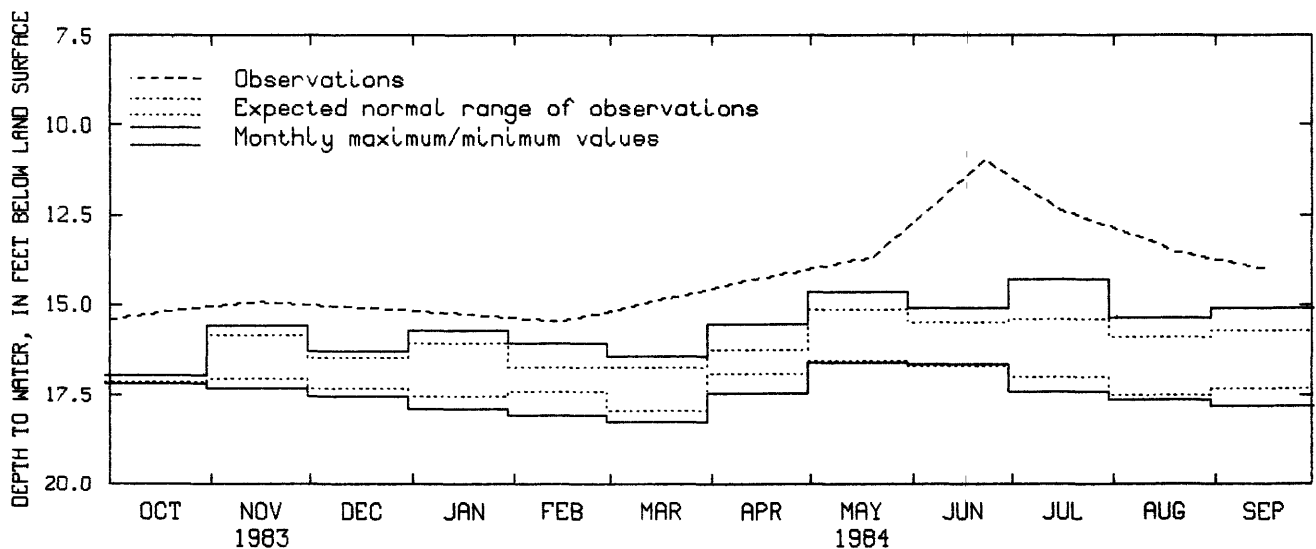
DATUM.--Altitude of land-surface datum is 1,030 ft (314 m). Measuring point: Top of casing, 4.00 ft (1.22 m) above land-surface datum.

PERIOD OF RECORD.--December 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 10.98 ft (3.35 m) below land-surface datum, June 23, 1984; 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 1983 TO SEPTEMBER 1984

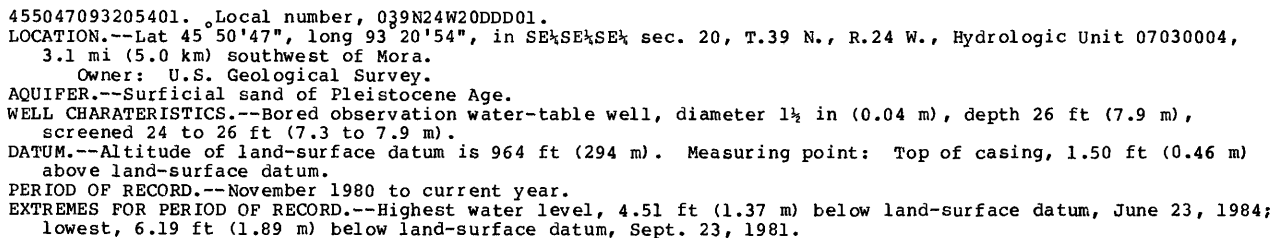
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	15.15	JAN 17	15.27	MAR 20	14.81	MAY 20	13.69	JUL 15	12.34	AUG 19	13.51
NOV 15	14.94	FEB 15	15.48	APR 15	14.28	JUN 23	10.98	AUG 14	13.29	SEP 16	14.02
DEC 20	15.11										



039N23W05DAC01

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, 30.26 ft (9.22 m) below land-surface datum, July 5, 1984;
lowest, 45.18 ft (13.77 m) below land-surface datum, Mar. 15, 1982.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 13	44.30	MAR 16	42.25	APR 17	41.91	JUN 5	34.40	JUL 5	30.26	AUG 30	32.81
23	44.73	19	42.19	23	41.73	15	31.79	7	32.13	6	33.06
27	44.51	28	41.51	MAY 29	34.29	21	30.52	17	32.30	12	32.81
MAR 7	42.21	APR 6	41.32								

[illegible]

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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	22.95	.....	21.02	19.86	19.40	19.19	.....	18.83	.....	.....	23.16	24.03
10	20.60	19.71	19.62	19.30	.....	.....	.....	.....	23.83	23.38
15	19.91	.....	20.06	19.48	.....	.....	.....	.....	24.51	24.41
20	20.17	.....	19.50	.....	.....	.....	20.75	23.08	24.98	24.36
25	21.40	19.91	19.73	19.60	.....	.....	.....	.....	22.77	24.55	22.71
EOM	21.13	19.97	19.84	19.62	.....	.....	.....	.....	23.29	24.85	22.93
WTR YEAR 1984			HIGHEST	18.83 MAY 5, 1984			LOWEST	25.06 AUG 19, 1984				

452415094503001. Local number, 122N33W04BCD01.

LOCATION.--Lat 45°24'15", long 94°50'30", in SE¼SW¼NW¼ 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, 3.03 ft (0.92 m) below land-surface datum, June 30, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	4.97	DEC 27	5.47	APR 28	4.68	JUN 30	3.03	AUG 31	5.72	SEP 27	6.00
NOV 28	5.13	MAR 26	3.28	JUN 4	4.99	JUL 30	4.78				

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).

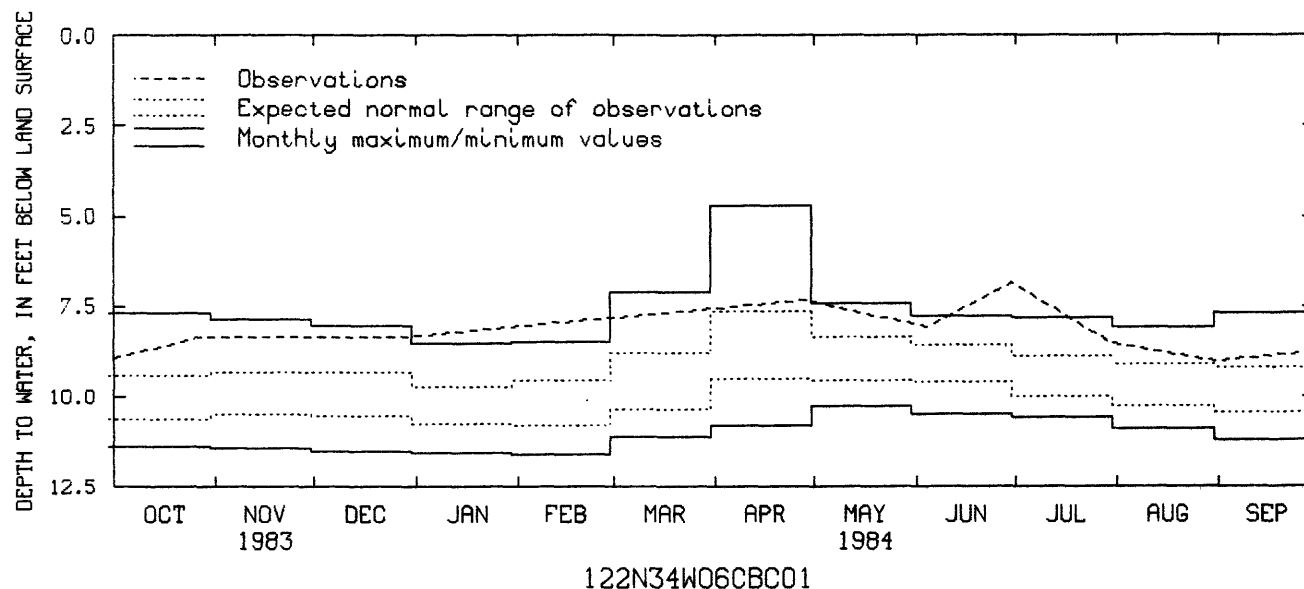
DATUM.--Altitude of land-surface datum is 1,237 ft (377 m). Measuring point: Top of platform, 0.80 ft (0.24 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	8.38	DEC 27	8.37	JUN 4	8.09	JUL 30	8.53	AUG 31	9.03	SEP 27	8.80
NOV 28	8.38	APR 28	7.33	30	6.85						



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, 17.35 ft (5.29 m) below land-surface datum, June 26, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	22.14	DEC 29	19.75	FEB 23	18.81	APR 25	17.88	JUN 26	17.35	AUG 23	27.07
26	20.93	JAN 24	19.11	MAR 26	18.19	MAY 25	18.12	JUL 24	30.56	SEP 25	21.85
NOV 29	20.10	FEB 22	18.82								

GROUND-WATER LEVELS
LAC QUI PARLE COUNTY--Continued

445122096224501. Local number, 116N46W15ADD01.

LOCATION.--Lat 44°51'22", long 96°22'45", in SE¼SE¼NE¼ 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, 9.82 ft (2.99 m) below land-surface datum, June 26, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	14.04	DEC 29	13.02	FEB 23	11.24	APR 25	11.23	JUN 26	9.82	AUG 23	12.69
26	13.54	JAN 24	12.84	MAR 26	10.67	MAY 25	11.67	JUL 24	12.17	SEP 25	12.12
NOV 29	12.03	FEB 22	11.66								

LE SUEUR COUNTY

442522093543901. Local number, 111N26W14ADA01.

LOCATION.--Lat 44°25'22", long 93°54'39", in NE¼SE¼NE¼ 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, 75.12 ft (22.90 m) below land-surface datum, Sept. 19, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	78.30	MAR 1	77.40	MAY 9	76.60	JUL 9	76.43	SEP 19	75.12

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, 94.67 ft (28.86 m) below land-surface datum, May 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	95.75	MAY 2	94.67	JUL 2	95.14	SEP 5	95.76

LE SUEUR COUNTY--Continued

443147093374501. Local number, 112N23W06DDD01.

LOCATION.--Lat 44°31'47", long 93°37'45", in SE¼SE¼SE¼ 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	151.2	JAN 11	151.3	MAR 9	151.4	MAY 2	150.9	JUL 2	151.2	SEP 5	152.0

LINCOLN COUNTY

441705096084501. Local number, 110N44W33DCD01.

LOCATION.--Lat 44°17'05", long 96°08'45", in SE¼SW¼SE¼ 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	249.4	JAN 9	249.0	MAR 30	248.6	JUN 27	248.7	SEP 7	248.8

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, 90.72 ft (27.65 m) below land-surface datum, May 9, 1984; lowest, 95.17 ft (29.01 m) below land-surface datum, Nov. 15, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	95.17	JAN 4	91.16	MAR 1	90.80	MAY 9	90.72	JUL 9	90.76	SEP 19	91.96

GROUND-WATER LEVELS

MARTIN COUNTY--Continued

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, May 9, Sept. 19, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	83.78	JAN 4	83.46	MAR 1	83.43	MAY 9	83.42	JUL 9	83.17	SEP 19	83.42

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.

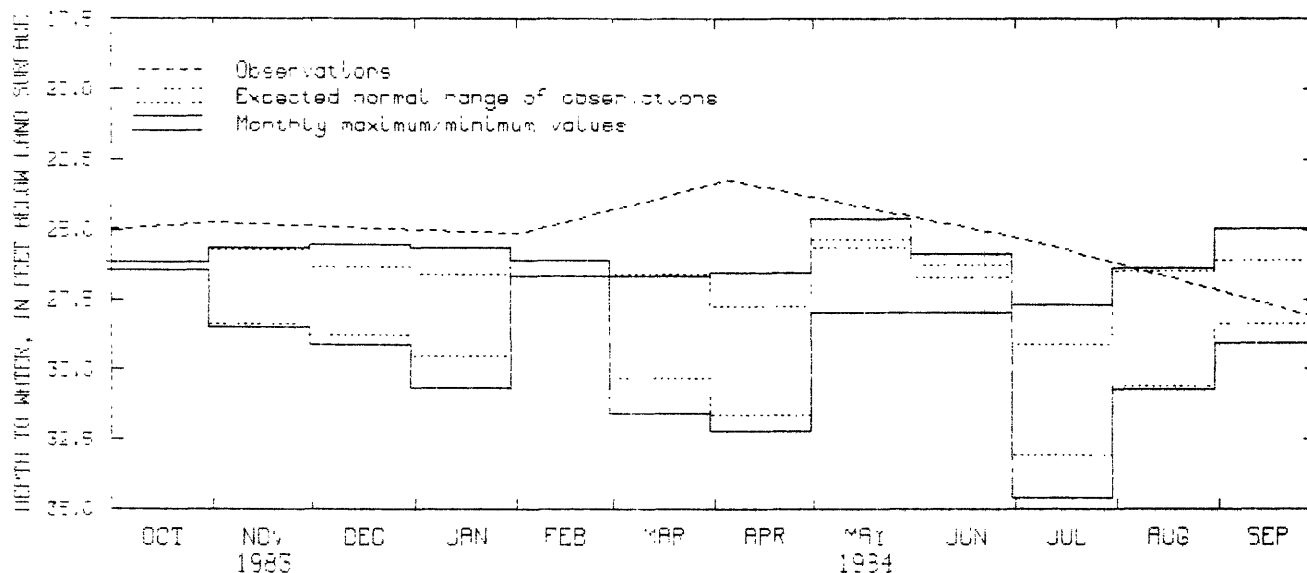
REMARKS.--Water level affected by pumping.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 23.22 ft (7.08 m) below land-surface datum, Apr. 5, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	24.74	FEB 2	25.14	APR 5	23.22	JUL 6	25.39



115N27W14ABA01

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	93.03	FEB 2	94.67	APR 5	85.07	JUL 6	87.50

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).

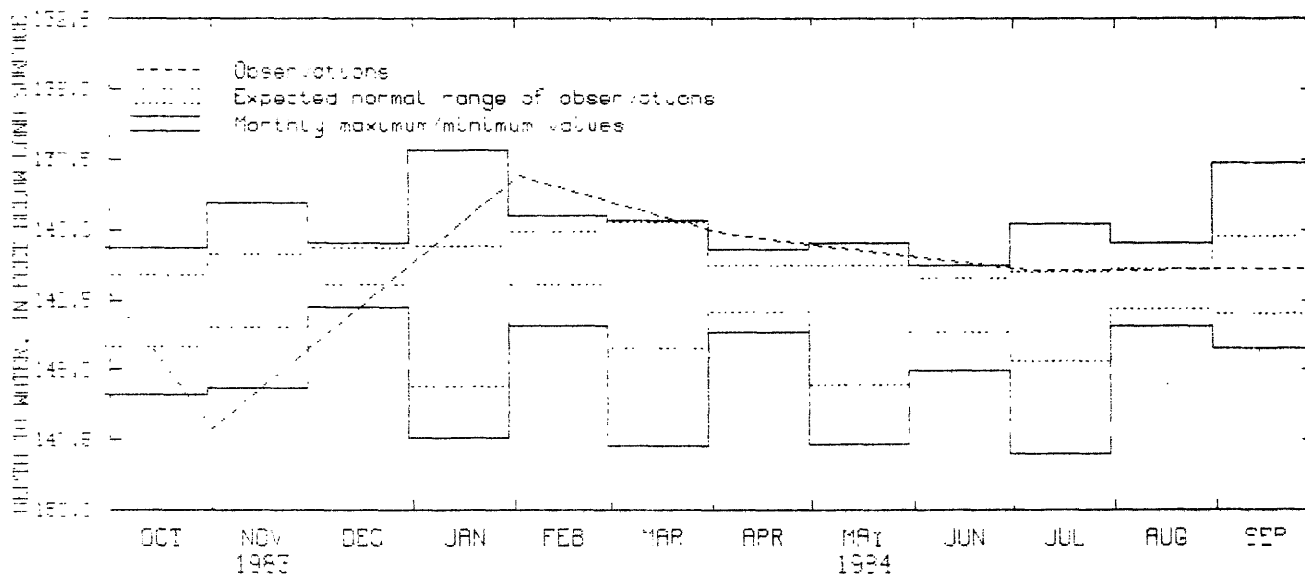
DATUM.--Altitude of land-surface datum is 1,020 ft (311 m). Measuring point: Top of casing, 1.00 ft (0.30 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	147.1	FEB 2	138.1	APR 5	140.2	JUL 6	141.4



115N28W11ADD01

GROUND-WATER LEVELS

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	27.52	APR 5	26.37	JUL 6	25.70

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).

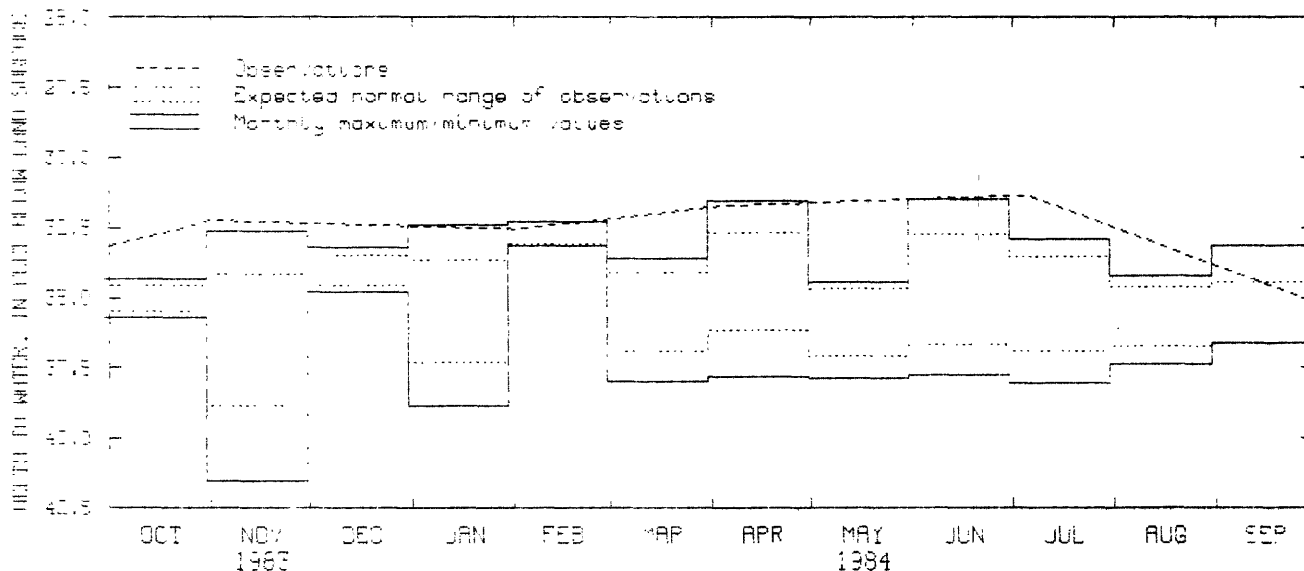
DATUM.--Altitude of land-surface datum is 1,015 ft (309 m). Measuring point: Top of casing, 1.40 ft (0.43 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.35 ft (9.56 m) below land-surface datum, July 6, 1984; lowest, 41.52 ft (12.66 m) below land-surface datum, Nov. 3, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	32.24	FEB 2	32.55	APR 5	31.72	JUL 6	31.35



117N27W10DAA01

GROUND-WATER LEVELS

341

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	3.85	NOV 25	2.82	JAN 23	3.54	MAR 16	2.91	MAY 4	3.82	JUL 17	3.12

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).

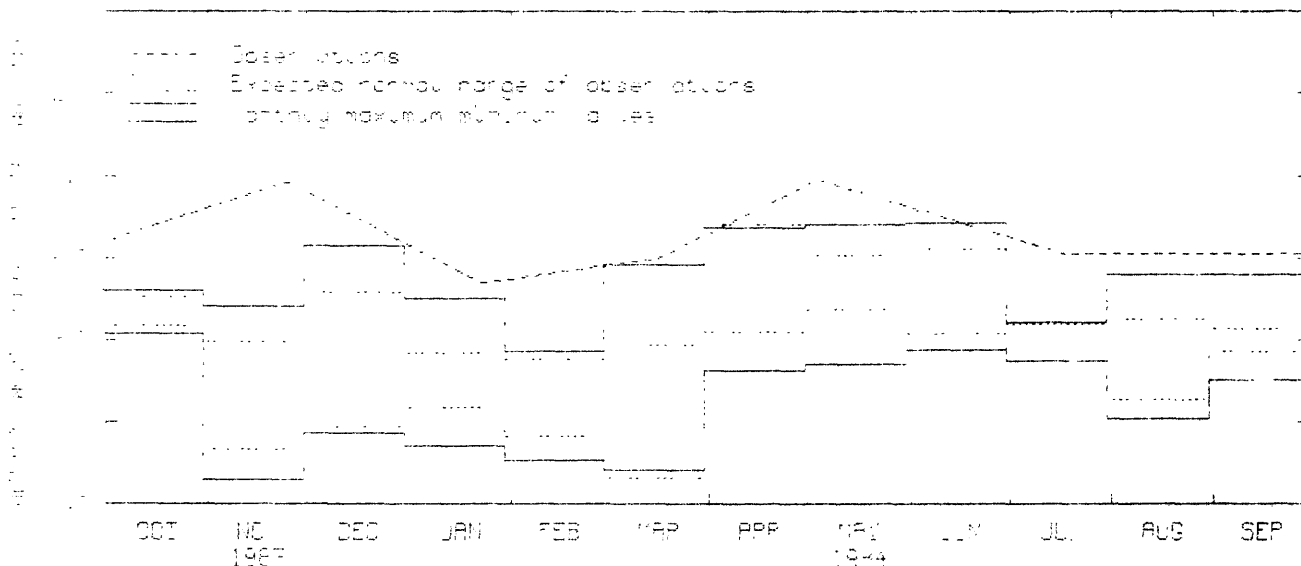
DATUM.--Altitude of land-surface datum is 1,112 ft (339 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

PERIOD OF RECORD.--November 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.05 ft (0.93 m) below land-surface datum, May 4, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	3.77	NOV 25	3.08	JAN 23	4.31	MAR 16	4.01	MAY 4	3.05	JUL 17	3.94



121 N31W26BDC01

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.

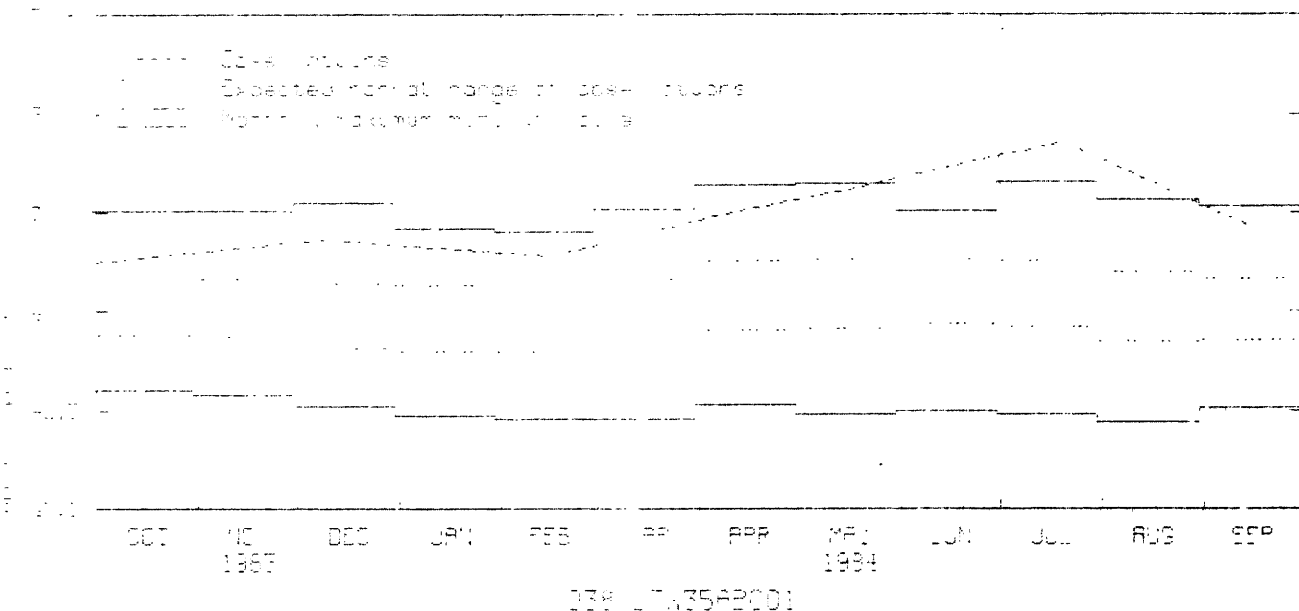
REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--September 1967 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 35.72 ft (10.89 m) below land-surface datum, July 20, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	38.19	FEB 16	38.60	APR 6	37.58	MAY 16	36.92	JUL 20	35.72	SEP 14	37.82



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.

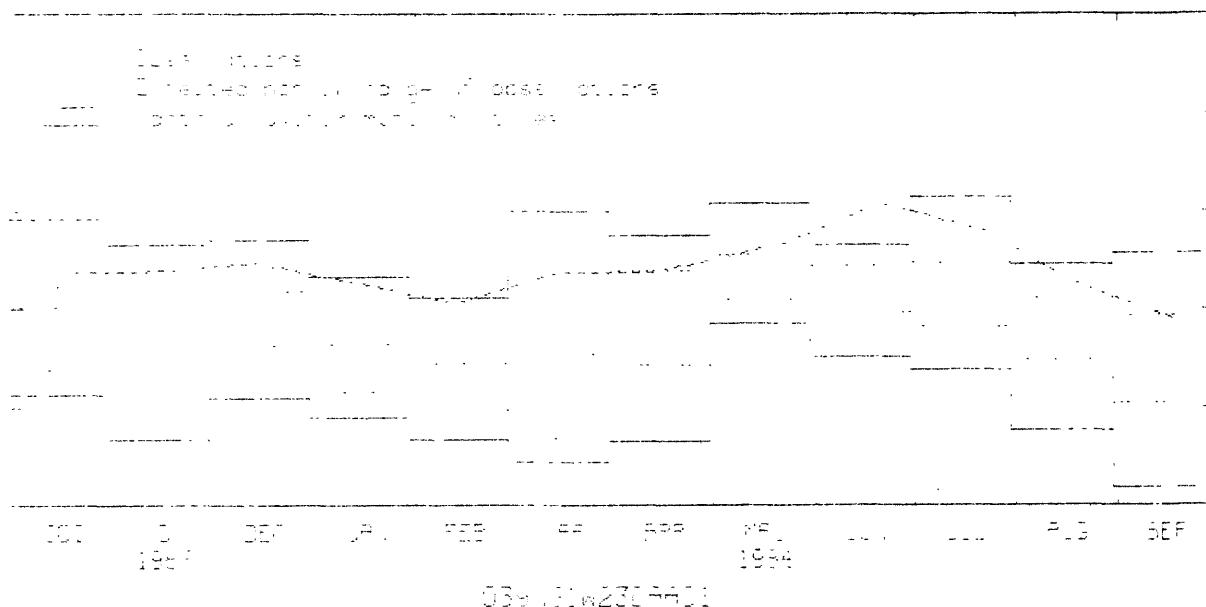
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.72 ft (1.13 m) below land-surface datum, July 14, 1978; lowest, dry below land-surface datum, July and Aug. 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	5.25	DEC 14	5.05	FEB 13	5.88	APR 13	5.25	JUN 21	3.85	AUG 17	5.40
NOV 16	5.22	JAN 17	5.50	MAR 15	5.25	MAY 23	4.65	JUL 23	4.40	SEP 20	6.25

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 OR ABOVE (+) LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	0.90	DEC 14	0.75	MAR 15	+1.10	MAY 23	1.00	JUL 23	1.00	SEP 20	3.25
NOV 16	0.70	JAN 17	1.05	APR 13	0.45	JUN 21	+0.25	AUG 17	3.25		

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, 8.80 ft (2.68 m) below land-surface datum, Aug. 17, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	3.96	DEC 14	4.10	FEB 13	4.80	APR 13	3.90	JUN 21	2.45	AUG 17	8.80
NOV 16	4.15	JAN 17	5.50	MAR 15	4.65	MAY 23	5.10	JUL 23	6.20	SEP 20	6.05

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	12.59	DEC 16	13.11	FEB 17	13.98	APR 20	13.28	JUN 15	12.98	AUG 10	12.82
14	12.61	23	13.17	24	14.00	27	13.35	22	13.00	17	13.12
21	12.70	30	13.31	MAR 2	14.00	MAY 4	13.18	29	12.80	24	13.18
28	12.64	JAN 7	13.57	9	14.00	11	13.18	JUL 6	13.00	31	13.29
NOV 3	12.70	13	13.53	16	13.96	18	13.06	13	12.72	SEP 7	13.00
10	12.75	20	13.57	23	13.94	25	13.01	20	12.51	14	13.02
18	12.76	27	13.24	30	13.82	JUN 1	12.86	27	12.46	21	12.91
DEC 2	12.83	FEB 3	13.58	APR 6	13.53	8	13.50	AUG 3	12.65	28	12.98
9	13.01	10	13.89	13	13.46						

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, 33.69 ft (10.27 m) below land-surface datum, May 10, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	35.52	MAR 2	35.32	MAY 10	33.69	JUL 10	35.16	SEP 20	36.75

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: Land 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, 35.97 ft (10.96 m) below land-surface datum, May 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	36.76	FEB 6	38.01	MAY 2	35.97	JUN 5	36.06	JUL 24	37.20	SEP 10	37.69
DEC 20	37.16	MAR 21	36.35	31	36.35						

GROUND-WATER LEVELS

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, 4.03 ft (1.23 m) below land-surface datum, Sept. 24, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	7.95	JAN 24	8.02	MAR 24	5.09	MAY 25	6.97	JUN 14	5.40	AUG 31	7.97
NOV 18	7.90	FEB 14	6.45	APR 17	4.76	JUN 6	7.42	JUL 13	7.47	SEP 24	4.03
DEC 21	7.96										

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).

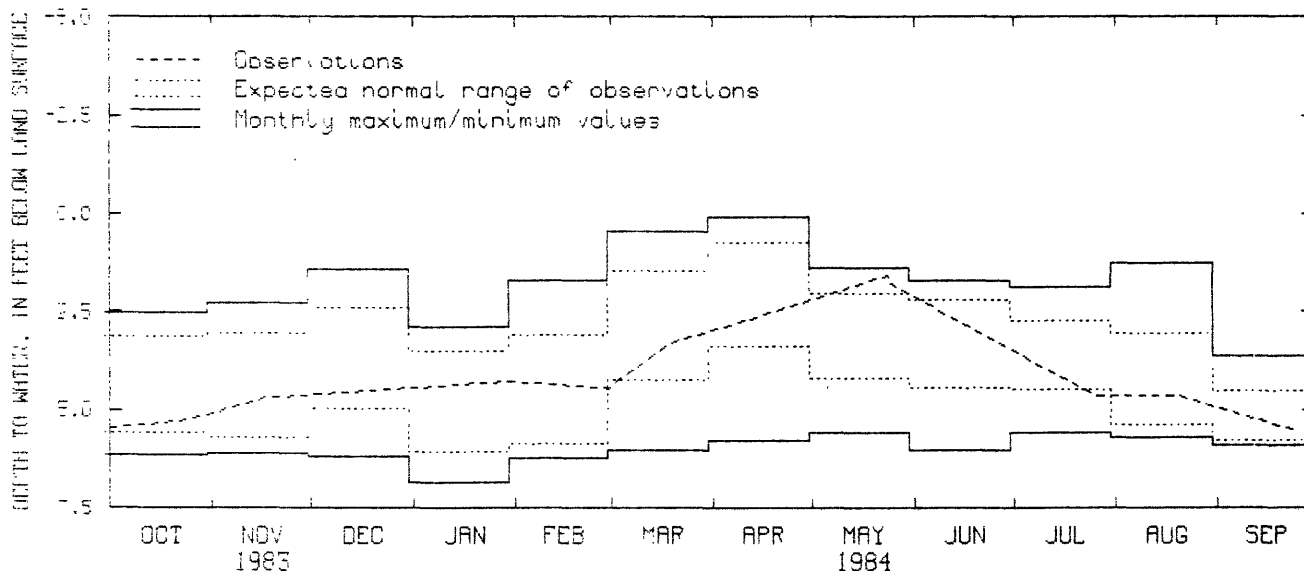
DATUM.--Altitude of land-surface datum is 1,450 ft (442 m). Measuring point: Top of casing, 3.40 ft (1.04 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	5.28	JAN 30	4.28	MAR 19	3.30	MAY 24	1.58	JUL 26	4.65	SEP 25	5.56
NOV 17	4.71	FEB 29	4.47	APR 16	2.60	MAY 25	1.81	AUG 20	4.65		



106N40W12ABB01

GROUND-WATER LEVELS

MURRAY COUNTY--Continued

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	1.37	APR 16	0.52	MAY 23	0.04	JUL 31	2.63	AUG 31	3.39	SEP 25	2.32
NOV 22	0.97	MAY 17	0.03	JUN 23	+0.27						

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.

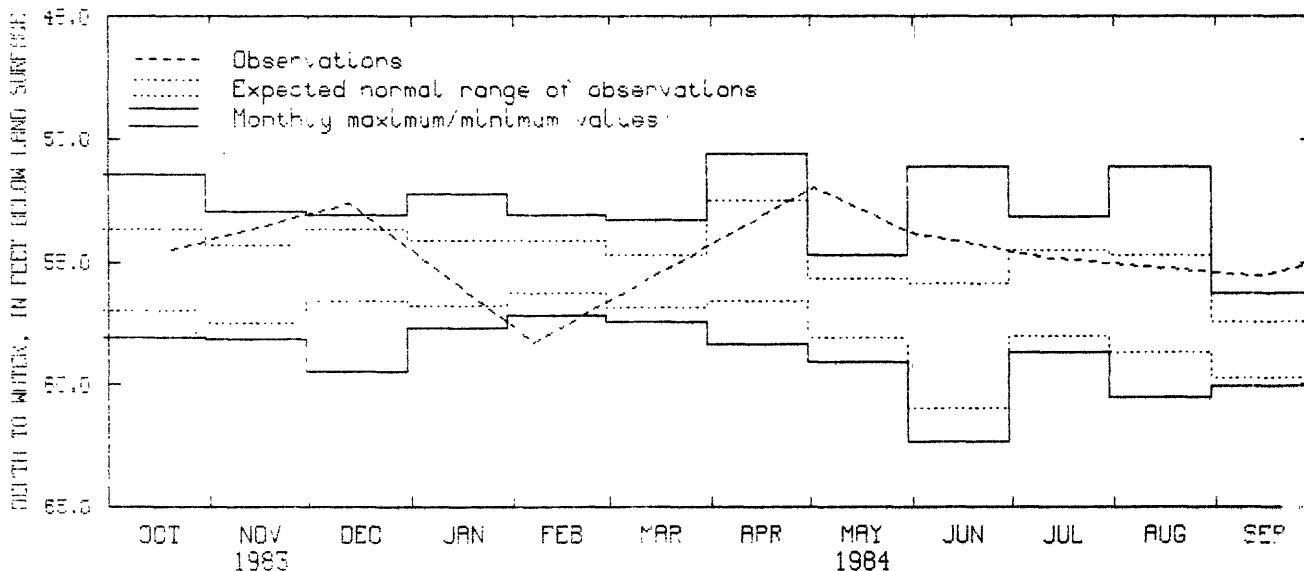
REMARKS.--Water level affected by pumping.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	54.51	FEB 7	58.29	MAY 2	51.94	MAY 31	53.77	JUL 11	54.79	SEP 13	55.56
DEC 13	52.60										



106N14W14ADB01

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).

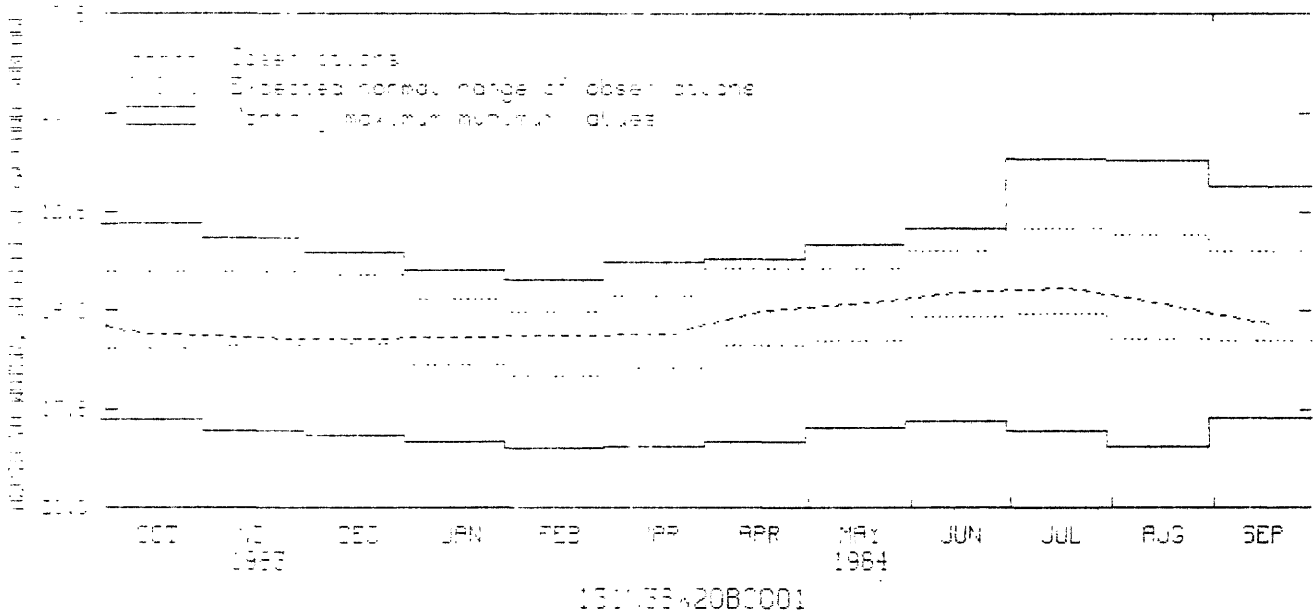
DATUM.--Altitude of land-surface datum is 1,442 ft (440 m). Measuring point: Top of casing, 3.00 ft (0.91 m) above land-surface datum.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	15.58	DEC 15	15.72	APR 18	14.99	JUN 18	14.52	AUG 14	14.78
NOV 17	15.70	MAR 20	15.60	MAY 23	14.76	JUL 19	14.41	SEP 18	15.34



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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	10.25	DEC 15	10.31	APR 18	9.30	JUN 18	8.42	AUG 14	8.79	SEP 18	9.38
NOV 17	10.31	MAR 20	10.19	MAY 23	8.91	JUL 19	8.36				

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.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	8.23	DEC 14	7.87	APR 17	7.83	JUN 21	7.50	AUG 15	7.90	SEP 14	8.11
NOV 15	7.86	MAR 19	7.50	MAY 23	7.83	JUL 17	7.55				

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, 26.32 ft (8.02 m) below land-surface datum, July 15, 1984;
lowest, 31.98 ft (9.75 m) below land-surface datum, Apr. 28, 1981.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	28.33	DEC 20	28.03	FEB 15	28.30	APR 23	28.14	JUN 23	27.04	AUG 19	26.64
NOV 15	28.15	JAN 17	28.14	MAR 20	28.40	MAY 20	27.94	JUL 15	26.32	SEP 16	26.97

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, 5.26 ft (1.60 m) below land-surface datum, June 23, 1984;
lowest, 11.27 ft (3.44 m) below land-surface datum, Mar. 20, 1981.

[illegible]

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	19.27	JAN 17	19.10	FEB 26	19.52	APR 15	19.58	JUN 23	18.55	AUG 14	18.90
16	19.23	22	19.28	MAR 4	19.54	MAY 17	18.77	30	18.39	19	19.10
22	19.34	29	19.34	11	19.58	20	18.92	JUL 6	18.36	20	18.99
NOV 15	19.33	FEB 5	19.40	20	19.75	JUN 5	18.73	22	18.56	26	18.88
DEC 20	19.26	12	19.40	25	19.67	10	18.75	AUG 2	18.74	SEP 3	19.20
JAN 1	19.15	15	19.57	APR 1	19.70	19	18.52	8	18.82	16	19.56
7	19.21	20	19.49								

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, 1.30 ft (0.40 m) below land-surface datum, June 14, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	6.06	JAN 24	5.15	MAR 24	2.54	MAY 28	2.47	JUN 14	1.30	AUG 31	5.51
NOV 18	5.70	FEB 22	3.21	APR 28	1.52	JUN 6	4.05	JUL 13	3.20	SEP 24	9.82

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, March 10, 1983, June 14, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	10.65	JAN 26	9.33	MAR 24	6.94	MAY 28	7.10	JUN 14	5.85	AUG 31	9.42
NOV 18	9.27	FEB 22	8.46	APR 23	6.03	JUN 6	7.86	JUL 31	8.47	SEP 24	9.56

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, 2.07 ft (0.63 m) below land-surface datum, June 29, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	4.20	DEC 30	4.47	FEB 29	3.75	APR 27	2.53	JUN 29	2.07	AUG 29	3.49
NOV 30	3.94	JAN 31	5.12	MAR 30	3.02	MAY 31	2.91	JUL 31	3.80		

POPE COUNTY--Continued

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, 5.37 ft (1.64 m) below land-surface datum, June 29, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	7.91	DEC 30	8.02	FEB 29	7.79	APR 27	6.97	JUN 29	5.37	AUG 29	7.74
NOV 30	7.86	JAN 31	8.28	MAR 30	7.30	MAY 31	6.85	JUL 31	6.79		

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	9.37	DEC 30	9.15	FEB 29	8.73	APR 27	7.94	JUN 29	7.54	AUG 16	9.12
NOV 30	9.18	JAN 31	9.23	MAR 30	8.06	MAY 31	7.91	JUL 31	9.73		

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	36.75	DEC 30	36.68	FEB 29	36.48	APR 27	35.86	JUN 29	35.49	AUG 29	36.12
NOV 30	36.74	JAN 31	37.25	MAR 30	36.20	MAY 31	36.17	JUL 31	36.32		

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	7.93	DEC 30	7.98	FEB 29	7.99	APR 27	7.12	JUN 29	4.89	AUG 29	6.90
NOV 30	7.91	JAN 31	8.19	MAR 30	7.30	MAY 31	6.89	JUL 31	5.88		

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	68.70	JAN 3	70.10	FEB 28	73.80	APR 30	65.80	SEP 4	79.60

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, 81.01 ft (24.69 m) below land-surface datum, June 26, 1984, 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	84.92	FEB 28	84.07	APR 25	84.09	JUN 26	81.01	SEP 4	82.19

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, 126.2 ft (38.47 m) below land-surface datum, May 4, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	128.2	MAR 8	127.8	MAY 4	126.2	JUN 27	133.5	SEP 6	130.4

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, 32.24 ft (9.83 m) below land-surface datum, June 27, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	33.78	MAY 4	33.55	MAY 17	33.31	JUN 27	32.24	SEP 6	32.66

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, 11.12 ft (3.39 m) below land-surface datum, June 27, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	13.70	MAR 8	13.77	MAY 4	13.36	MAY 17	12.85	JUN 27	11.12	SEP 6	11.99

GROUND-WATER LEVELS
RAMSEY COUNTY--Continued

450001093024701. Local number, 029N22W16ADD01.

LOCATION.--Lat 45°00'01", long 93°02'47", in SE½SE½NE½ 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, 70.20 ft (21.40 m) below land-surface datum, Sept. 6, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	70.90	JAN 9	71.06	MAR 7	70.66	MAY 1	70.65	JUN 27	70.26	SEP 6	70.20

445918092590901. Local number, 029N22W24ADA01.

LOCATION.--Lat 44°59'18", long 92°59'09", in NE½SE½NE½ 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, 133.3 ft (40.63 m) below land-surface datum, Apr. 30, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	135.3	JAN 12	136.1	MAR 12	134.8	APR 30	133.3	MAY 27	139.4

445700093051001. Local number, 029N22W31DDD01.

LOCATION.--Lat 44°57'00", long 93°05'10", in SE½SE½SE½ 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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	49.23	37.51	44.10	41.43	44.84	46.18	41.35	36.52	65.33	63.06	59.64	57.61
10	37.05	41.04	45.22	48.91	43.65	45.23	.....	49.67	46.89	65.89	69.11	56.20
15	35.87	39.46	45.27	46.04	45.49	45.60	.....	50.41	61.20	53.23	72.30	48.91
20	38.89	36.78	45.90	47.60	44.48	44.68	.....	44.71	63.53	67.50	68.72	.....
25	37.61	40.74	48.70	46.78	44.74	42.59	40.48	50.44	61.79	68.56	57.42	.....
EOM	40.04	42.02	44.85	45.26	44.92	42.65	41.30	60.01	54.39	68.85	64.98	.....
WTR YEAR 1984	HIGHEST	30.81	APR 29, 1984	LOWEST	72.81	AUG 17, 1984						

GROUND-WATER LEVELS
RAMSEY COUNTY--Continued

450026093084201. Local number, 029N23W11CCC01.

LOCATION.--Lat 45°00'26", long 93°08'42", in SW¼SW¼SW¼ 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	110.4	JAN 9	110.7	MAR 7	110.8	MAY 1	110.3	JUN 28	109.9	SEP 6	109.8

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, 205.9 ft (62.76 m) below land-surface datum, Sept. 29, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	192.4	.....	.....	191.8	191.4	191.1	191.5	191.5	192.5	196.7	201.0	203.7
10	192.2	.....	.....	192.3	190.8	191.8	191.2	191.6	193.7	197.4	201.7	203.3
15	192.5	.....	.....	192.8	190.8	191.8	191.5	192.0	194.6	198.6	201.9	204.6
20	.....	.....	.....	192.7	190.9	191.3	191.6	192.0	195.2	199.6	202.3	204.6
25	.....	.....	193.1	191.3	191.3	191.8	190.8	192.5	195.7	200.0	203.5	205.2
EOM	.....	.....	192.5	190.9	191.3	191.9	190.9	192.3	196.9	200.2	203.9	205.6

WTR YEAR 1984 HIGHEST 190.1 FEB 13, 1984

LOWEST 205.9 SEP 29, 1984

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	123.1	JAN 3	122.3	FEB 28	122.9	APR 25	122.1	JUN 26	122.1	SEP 4	122.6

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, 19.79 ft (6.03 m) below land-surface datum, July 11, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 12	20.87	JAN 12	21.30	MAR 7	21.04	MAY 1	20.53	JUL 11	19.78	SEP 11	20.12

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	26.88	MAR 7	25.90	MAY 1	25.30	MAY 16	24.96	JUL 11	25.36	SEP 11	26.30
JAN 9	27.05										

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, 133.4 ft (40.66 m) below land-surface datum, Apr. 23, 1984; 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 1983 TO SEPTEMBER 1984
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	139.1	136.7	137.2	137.3	136.2	134.4	134.1	134.0	135.2	136.4	138.7	135.6
10	138.5	137.3	137.8	137.8	136.5	134.6	134.0	134.2	135.4	136.2	138.9	135.0
15	138.2	137.3	137.6	137.1	137.0	134.6	134.3	134.8	135.2	138.4	139.2	136.8
20	138.1	136.9	137.8	137.2	136.8	133.9	134.4	134.9	135.1	138.7	138.6	137.0
25	137.9	137.0	137.6	137.0	136.7	134.2	134.4	135.3	134.9	138.7	138.8	136.8
BOM	135.9	137.2	137.5	136.1	136.5	134.5	134.0	134.8	136.1	138.5	137.3	136.0

WTR YEAR 1984 HIGHEST 133.4 APR 23, 1984 LOWEST 139.5 AUG 18, 1984

GROUND-WATER LEVELS

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	15.23	JAN 23	14.19	MAR 19	12.60	MAY 17	10.70	JUN 23	11.80	AUG 31	15.30
NOV 22	14.42	FEB 18	13.86	APR 28	10.86	23	12.20	JUL 26	11.33	SEP 27	15.35
DEC 20	14.28										

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 well seal, 0.55 ft (0.17 m) above land-surface datum.

PERIOD OF RECORD.--August 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 24.20 ft (7.37 m) below land-surface datum, April 3, 1984; lowest, 26.80 ft (8.16 m) below land-surface datum, Sept. 26, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	25.51	FEB 10	25.06	APR 3	24.20	MAY 23	24.93	JUL 12	26.18	SEP 26	26.80
DEC 20	25.20										

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, 3.10 ft (0.94 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, 9.07 ft (2.76 m) below land-surface datum, Sept. 27 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	8.06	NOV 22	7.36	APR 28	3.50	AUG 22	7.96	AUG 31	8.28	SEP 27	9.07

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 Michael Goebel. 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	38.87	DEC 9	38.29	FEB 10	38.28	APR 11	38.22	JUN 13	38.36	AUG 8	38.16
14	38.75	16	38.49	17	38.34	18	38.25	20	38.01	15	38.41
21	38.63	23	38.53	24	38.22	25	38.10	27	37.85	22	38.36
28	38.76	30	38.40	MAR 2	38.27	MAY 2	38.00	JUL 4	38.10	29	38.39
NOV 4	38.53	JAN 6	38.30	9	38.19	9	37.85	11	38.07	SEP 6	38.14
11	38.44	13	38.38	16	38.13	16	39.67	18	38.00	12	38.17
18	38.31	20	38.32	23	38.70	23	38.54	25	38.25	20	38.06
25	38.27	27	38.31	31	37.55	30	38.45	AUG 2	38.36	27	38.10
DEC 2	38.21	FEB 3	38.28	APR 4	38.69	JUN 7	38.53				

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	43.80	DEC 9	43.27	FEB 10	44.05	APR 11	43.40	JUN 13	43.79	AUG 8	43.86
14	44.00	16	43.68	17	43.54	18	43.70	20	43.00	15	44.20
21	43.91	23	43.70	24	43.41	25	43.40	27	43.38	22	44.00
28	44.17	30	43.95	MAR 2	43.53	MAY 2	43.14	JUL 4	43.62	29	44.06
NOV 4	43.44	JAN 6	43.69	9	44.03	9	43.30	11	43.70	SEP 6	43.66
11	43.38	13	43.79	16	43.81	16	43.59	18	43.66	12	43.83
18	43.30	20	43.56	23	43.47	30	43.34	25	43.88	20	43.50
25	43.19	27	43.74	31	44.10	JUN 7	44.05	AUG 2	43.92	27	43.44
DEC 2	43.32	FEB 3	43.60	APR 4	44.17						

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, 7.39 ft (2.25 m) below land-surface datum, June 23, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	11.94	JAN 23	11.61	MAR 19	10.84	MAY 17	8.80	JUN 23	7.39	AUG 31	11.55
NOV 22	11.45	FEB 18	11.43	APR 28	9.48	MAY 22	8.53	JUL 26	9.88	SEP 27	11.80

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, 0.43 ft (0.13 m) above land-surface datum, July 26, 1984; lowest, 7.12 ft (2.17 m) below land-surface datum, Sept. 26, 1983.

WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	6.71	JAN 23	5.20	MAR 19	4.07	MAY 17	3.09	JUN 23	+0.40	AUG 31	+0.02
NOV 22	6.06	FEB 18	5.62	APR 28	3.57	MAY 22	2.88	JUL 26	+0.43	SEP 27	0.43

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, 0.26 ft (0.08 m) above land-surface datum, June 23, 1984; lowest, 7.75 ft (2.36 m) below land-surface datum, Sept. 30, 1981.

WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	7.27	JAN 23	4.90	APR 28	3.29	MAY 22	4.77	JUL 26	5.88	SEP 27	7.08
NOV 22	6.48	FEB 18	4.33	MAY 17	3.45	JUN 23	+0.26	AUG 31	6.76		

GROUND-WATER LEVELS

RENVILLE 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, 32.29 ft (9.84 m) below land-surface datum, June 7, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	32.85	DEC 21	33.30	FEB 10	33.35	JUN 7	32.29

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, 6.02 ft (1.83 m) below land-surface datum, May 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	6.56	JAN 5	6.60	MAR 2	6.47	MAY 2	6.02	JUL 2	6.50	SEP 5	7.29

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, 22.32 ft (6.80 m) below land-surface datum, May 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	23.45	JAN 5	23.44	FEB 29	22.59	MAY 2	22.32	JUL 2	22.92	SEP 5	23.60

GROUND-WATER LEVELS

RICE COUNTY--Continued

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, 138.4 ft (42.18 m) below land-surface datum, May 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	139.4	JAN 11	139.3	MAR 9	139.0	MAY 2	138.4	JUL 2	139.2	SEP 5	138.4

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, 0.90 ft (0.27 m) below land-surface datum, Apr. 28, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	6.58	FEB 22	4.77	APR 28	0.90	JUN 6	3.82	JUL 13	3.68	SEP 24	6.19
NOV 18	6.29	MAR 24	4.34	MAY 28	2.47	14	1.32	AUG 31	6.02		

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, 0.10 ft (0.03 m) below land-surface datum, June 14, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	8.49	DEC 21	8.12	FEB 22	7.59	JUN 14	0.10	AUG 31	7.69	SEP 24	8.01
NOV 18	8.57	JAN 24	8.20	JUN 6	5.37	JUL 13	4.49				

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, 3.70 ft (1.13 m) below land-surface datum, June 12, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	7.98	JAN 24	7.34	MAR 24	6.90	MAY 28	5.60	JUN 12	3.70	AUG 31	7.23
NOV 18	7.26	FEB 22	6.84	APR 28	4.22	JUN 6	6.13	JUL 13	5.44	SEP 24	7.32
DEC 21	6.99										

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	134.6	NOV 30	133.7	FEB 21	118.6	APR 3	117.0	MAY 25	122.7

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 Sandstones 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, 131.7 ft (40.14 m) below land-surface datum, May 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	132.1	MAR 9	132.1	MAY 2	131.7	JUL 2	131.8	SEPT 5	132.1

GROUND-WATER LEVELS

SCOTT COUNTY--Continued

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, 221.1 ft (67.39 m) below land-surface datum, May 3, 1983; lowest, 222.4 ft (67.79 m) below land-surface datum, Sept. 15, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	LEVEL	DATE	LEVEL
NOV 1	220.0	MAR 9	221.9	MAY 2	221.5	JUL 2	221.5	SEPT 5	222.4

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 Sandstones 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, 5.83 ft (1.77 m) below land-surface datum, May 9, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	8.98	JAN 4	8.54	MAR 1	8.02	MAY 9	5.83	JUL 6	5.89	SEP 19	8.39

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, 35.84 ft (10.92 m) below land-surface datum, July 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	37.24	MAR 9	36.94	MAY 2	36.15	JUL 2	35.84	SEP 5	36.75

GROUND-WATER LEVELS

SCOTT COUNTY--Continued

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, 84.36 ft (25.71 m) below land-surface datum, Sept. 5, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	86.40	JAN 11	86.03	MAR 9	85.86	MAY 2	85.23	JUL 2	84.65	SEP 5	84.36

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, 57.22 ft (17.44 m) below land-surface datum, Sept. 7, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	50.71	JAN 4	48.88	MAR 1	44.09	MAY 3	44.90	JUL 3	51.73	SEP 7	57.22

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 3	9.04	JAN 4	9.08	MAR 1	8.16	MAY 3	8.18	JUL 3	8.05	SEP 7	8.93

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, 80.25 ft (24.46 m) below land-surface datum, Sept. 7, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	81.37	JAN 4	81.64	MAR 1	81.08	MAY 9	81.25	JUL 3	80.30	SEP 7	80.25

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, 8.64 ft (2.63 m) below land-surface datum, JULY 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	11.16	DEC 20	10.99	MAR 1	10.78	MAY 17	9.72	JUL 2	8.64	SEP 13	9.47
NOV 10	11.08	FEB 3	11.29	APR 10	10.55	JUN 7	9.62	AUG 2	9.05		

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	11.77	DEC 20	10.75	MAR 1	11.36	MAY 17	10.74	AUG 2	13.59
NOV 10	11.55	FEB 3	11.65	APR 10	10.68	JUN 7	9.60	SEP 13	12.45

GROUND-WATER LEVELS

SHERBURNE COUNTY--Continued

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, 8.87 ft (2.70 m) below land-surface datum, July 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	12.15	DEC 20	12.39	APR 10	10.38	JUN 7	10.01	AUG 2	9.80
NOV 3	12.03	MAR 1	11.92	MAY 17	9.57	JUL 2	8.87	SEP 13	10.31

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	18.06	DEC 20	18.29	APR 10	18.54	JUN 7	17.94	AUG 2	18.00
NOV 3	18.28	MAR 1	18.95	MAY 17	18.19	JUL 2	17.30	SEP 13	17.85

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	6.36	DEC 20	5.78	APR 10	4.87	JUN 7	4.72	AUG 2	5.07
NOV 3	5.65	MAR 1	4.99	MAY 17	4.00	JUL 2	3.85	SEP 13	6.02

GROUND-WATER LEVELS

SHERBURNE COUNTY--Continued

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, 16.00 ft (4.88 m) below land-surface datum, July 2, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	18.17	DEC 20	17.80	MAR 1	19.08	MAY 17	18.15	JUL 2	16.00	SEP 13	17.50
NOV 3	18.05	FEB 3	18.98	APR 10	18.57	JUN 7	17.78	AUG 2	16.53		

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, 10.64 ft (3.24 m) below land-surface datum, June 21, 1984; 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 1983 TO SEPTEMBER 1984

WATER DATE	LEVEL	WATER DATE	LEVEL	WATER DATE	LEVEL	WATER DATE	LEVEL	WATER DATE	LEVEL	WATER DATE	LEVEL
OCT 20	11.29	DEC 27	11.43	FEB 22	11.64	APR 18	11.25	JUN 21	10.64	AUG 28	12.06
NOV 17	11.20	JAN 23	11.69	MAR 21	11.86	MAY 23	11.29	AUG 23	12.08	SEP 18	12.29

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, 2.06 ft (0.63 m) below land-surface datum, June 21, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	4.42	DEC 27	5.29	FEB 22	5.92	APR 18	4.46	JUN 21	2.06	SEP 18	6.50
NOV 17	5.23	JAN 23	5.90	MAR 21	5.70	MAY 23	4.08	AUG 23	5.75		

GROUND-WATER LEVELS

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, 4.47 ft (1.36 m) below land-surface datum, July 21, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
CCT 20	5.42	DEC 27	5.51	FEB 22	6.16	APR 18	5.16	JUN 21	4.47	SEP 18	7.16
NOV 17	5.47	JAN 23	6.12	MAR 21	5.79	MAY 23	5.11	AUG 23	6.51		

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, 3.38 ft (1.03 m) below land-surface datum, June 21, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	3.93	DEC 27	4.63	FEB 22	4.27	APR 18	4.09	JUN 21	3.38	SEP 18	5.25
NOV 17	4.33	JAN 23	4.89	MAR 21	4.64	MAY 23	4.12	AUG 23	5.57		

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, 7.86 ft (2.40 m) below land-surface datum, June 21, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	10.34	DEC 27	10.23	FEB 22	10.16	APR 18	9.51	JUN 21	7.86	SEP 18	10.51
NOV 17	10.39	JAN 23	10.47	MAR 21	10.12	MAY 23	9.66	AUG 23	10.00		

GROUND-WATER LEVELS

369

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 commerical 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, 29.90 ft (9.11 m) below land-surface datum, May 10, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	32.69	JAN 5	31.82	MAR 2	30.13	MAY 10	29.90	JUL 10	31.50	SEP 20	33.74

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, 144.0 ft (43.89 m) below land-surface datum, Jan 13, 1984; lowest, 160.0 ft (48.77 m) below land-surface datum, Aug 6, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	146.0	JAN 13	144.0	AUG 3	151.0	AUG 31	153.00

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	23.64	DEC 16	23.71	FEB 15	23.69	APR 16	22.63	JUN 14	21.70	AUG 15	20.99
NOV 16	23.77	JAN 16	23.78	MAR 14	23.28	MAY 14	22.27	JUL 17	20.93	SEP 14	21.29

GROUND-WATER LEVELS

SWIFT COUNTY--Continued

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 casing 3.00 ft (0.91 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, 4.64 ft (1.41 m) below land-surface datum, June 25, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	8.04	JAN 23	8.48	MAR 16	7.62	MAY 4	6.55	JUN 25	4.64	JUL 17	11.74

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, 14.78 ft (4.50 m) below land-surface datum, July 17, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	16.50	DEC 16	17.73	FEB 15	17.41	APR 16	16.21	JUN 14	15.02	AUG 15	14.97
NOV 16	17.82	JAN 16	17.57	MAR 14	16.86	MAY 14	15.59	JUL 17	14.78	SEP 14	15.25

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, 22.10 ft (6.74 m) below land-surface datum, Sept. 18, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	22.78	DEC 15	22.98	FEB 13	23.09	APR 17	22.61	JUN 18	22.56	AUG 16	22.49
NOV 22	23.06	JAN 20	23.01	MAR 14	22.81	MAY 21	22.65	JUL 17	22.64	SEP 18	22.10

GROUND-WATER LEVELS

TODD COUNTY--Continued

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	13.53	DEC 15	13.56	FEB 14	13.65	APR 17	12.95	JUN 19	12.48	AUG 15	13.17
NOV 21	13.46	JAN 16	13.46	MAR 15	13.21	MAY 21	12.84	JUL 17	12.64	SEP 17	13.63

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	9.33	DEC 14	9.04	FEB 14	10.19	APR 17	10.26	JUN 19	9.63	AUG 15	9.41
NOV 21	9.88	JAN 16	10.42	MAR 15	10.49	MAY 21	9.84	JUL 17	9.21	SEP 17	9.73

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	4.25	DEC 14	3.99	FEB 14	3.52	APR 17	3.14	JUN 19	3.14	AUG 15	4.02
NOV 21	3.78	JAN 16	3.84	MAR 15	3.67	MAY 21	3.30	JUL 17	3.92	SEP 17	4.62

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	2.41	DEC 14	1.96	FEB 14	2.80	APR 17	1.71	JUN 19	1.62	AUG 15	4.01
NOV 21	1.86	JAN 16	2.84	MAR 15	2.73	MAY 21	2.22	JUL 16	2.90	SEP 17	3.59

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	9.82	DEC 5	8.90	FEB 6	10.11	APR 2	7.48	MAY 29	6.43	JUL 23	7.85
10	9.80	12	8.27	13	9.77	9	5.85	JUN 4	9.80	30	9.03
17	9.26	26	8.92	21	8.77	16	5.40	11	8.05	AUG 6	9.44
24	9.05	JAN 3	8.90	27	8.02	23	5.49	18	5.28	13	9.62
31	9.47	9	9.47	MAR 5	7.62	30	5.99	25	4.81	20	10.11
NOV 7	9.72	16	9.44	12	8.62	MAY 7	4.98	JUL 2	4.91	26	9.92
15	9.75	25	9.64	19	8.91	14	5.49	9	5.89	SEP 2	10.39
21	9.57	30	10.02	26	8.95	21	5.59	16	6.88	10	10.18
28	8.13										

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 1983 TO SEPTEMBER 1984

DAY	WATER LEVEL	DAY	WATER LEVEL	DAY	WATER LEVEL	DAY	WATER LEVEL	DAY	WATER LEVEL	DAY	WATER LEVEL
OCT 5	10.79	MAR 8	12.43	JUL 11	10.61	JUL 20	10.80	JUL 31	11.11	AUG 10	11.35
NOV 17	11.29	MAY 3	11.85	JUL 15	10.70	25	10.98	AUG 5	11.22	15	11.55
JAN 12	12.35	JUN 29	10.63								

GROUND-WATER LEVELS

WADENDA COUNTY--Continued

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 Cullen.

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	13.45	DEC 16	13.45	FEB 13	13.46	APR 17	12.82	JUN 13	12.72	AUG 15	13.07
NOV 16	13.68	JAN 13	13.37	MAR 15	13.11	MAY 16	12.67	JUL 18	12.36	SEP 14	13.64

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	40.11	DEC 16	40.04	FEB 13	40.20	APR 17	39.70	JUN 13	39.34	AUG 15	40.55
NOV 16	40.11	JAN 13	40.09	MAR 15	39.98	MAY 16	39.47	JUL 18	39.83	SEP 14	40.89

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	3.08	DEC 16	3.14	FEB 13	3.51	APR 17	1.84	JUN 13	1.55	AUG 15	3.83
NOV 16	3.12	JAN 13	3.39	MAR 15	3.08	MAY 16	1.72	JUL 18	2.84	SEP 14	4.15

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, 3.80 ft (1.16 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, 24.97 ft (7.61 m) above land-surface datum, Nov 2, 1983.

WATER LEVEL, IN FEET ABOVE LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	29.34	APR 4	26.24	MAY 11	28.18	JUN 27	28.87	SEP 6	27.49	SEP 21	27.72
NOV 2	24.97	MAY 4	27.72	JUN 4	28.41	AUG 1	27.49				

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, 3.80 ft (1.16 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	35.78	APR 4	32.09	MAY 11	33.93	JUN 27	34.39	SEP 6	33.47	SEP 21	33.70
NOV 2	31.64	MAY 4	33.93	JUN 4	34.16	AUG 1	33.47				

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, 3.40 ft (1.04 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, 8.00 ft (2.44 m) above land-surface datum, Sept. 21, 1984.

WATER LEVEL, IN FEET ABOVE LAND-SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	14.16	APR 4	11.45	MAY 11	12.37	JUN 27	12.37	SEP 6	10.07	SEP 21	8.00
NOV 2	8.87	MAY 4	12.37	JUN 4	12.14	AUG 1	10.30				

GROUND-WATER LEVELS

WASHINGTON COUNTY--Continued

444751092563101. Local number, 027N21W28BCC01.

LOCATION.--Lat 44°47'51", 92°56'31", 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	65.34	JAN 3	67.00	FEB 28	68.22	APR 25	67.33	JUN 26	65.94	SEP 4	65.79

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, 31.46 ft (9.59 m) below land-surface datum, June 27, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	37.55	MAR 12	36.33	APR 4	35.77	MAY 1	32.98	JUN 27	31.46	SEP 6	36.93
JAN 12	37.30										

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, 240.4 ft (73.27 m) below land-surface datum, June 27, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 4	243.6	JUN 4	243.2	JUN 27	240.4	SEP 6	242.1

GROUND-WATER LEVELS

WASHINGTON COUNTY--Continued

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, 73.24 ft (22.32 m) below land-surface datum, June 27 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	74.50	JAN 12	74.30	MAR 7	73.90	APR 30	73.54	JUN 27	73.24	SEP 6	74.05

450027092552101. Local number, 029N21W10CCC01.

LOCATION.--Lat 45°00'27", long 95°55'21", in SW¼SW¼SW¼ sec.10, T.29 N., R.21 W., Hydrologic Unit 07010206, Lake Jane Road, 0.7 mi (1.1 km) north of Highway 212.

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, 36.54 ft (11.14 m) below land-surface datum, Sept. 6, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	37.84	JAN 12	38.49	MAR 7	38.66	APR 30	38.30	JUN 27	36.88	SEP 6	36.54

445958092523901. Local number, 029N21W13CAB01.

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, 44.32 ft (13.51 m) below land-surface datum, Sept. 6, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	45.94	APR 4	45.68	MAY 1	45.66	JUN 27	44.84	SEP 6	44.32

GROUND-WATER LEVELS

WASHINGTON COUNTY--Continued

450646092473501. Local number, 030N20W03CAD01.

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.--Ironton-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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	130.2	DEC 30	129.2	FEB 4	129.4	MAR 17	129.5	APR 22	129.0	JUN 3	128.8
NOV 16	129.1										

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, 98.46 ft (30.01 m) below land-surface datum, Apr. 22, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	100.6	DEC 30	100.1	FEB 4	100.2	MAR 17	99.86	APR 22	98.46	JUN 3	99.50
NOV 16	100.4										

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, 8.50 ft

(2.59 m) below land-surface datum, July 11, 1984;

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	9.75	MAR 7	9.12	MAY 1	8.92	JUL 11	8.50	SEP 11	9.25

GROUND-WATER LEVELS

WASHINGTON--Continued

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, 51.99 ft (16.04 m) below land-surface datum, July 11, 1984; 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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 2	52.72	MAR 7	52.75	MAY 1	52.70	JUL 11	51.99	SEP 11	52.07

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	10.00	FEB 9	10.80	MAY 9	8.40	MAY 16	8.45	MAY 23	8.54	SEP 19	9.70
DEC 20	10.49	APR 17	8.70								

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	13.75	MAR 1	13.16	MAY 9	11.45	JUL 9	12.28	SEP 19	13.55

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	32.62	MAR 1	32.04	MAY 9	30.60	JUL 9	32.55	SEP 19	32.52

WINONA COUNTY

435746092034202. Local number, 106N10W19DDA02.

LOCATION.--Lat 43°57'46", LONG 92°03'42", in NE¼SE¼SE¼ sec. 19, T.106N., R.10W., Hydrologic Unit 07040003, at St. Charles.

Owner: City of St. Charles, Well 5.

AQUIFER.--Ironton-Galesville Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled public supply artesian well, diameter 12 in (0.30 m), depth 702 ft (214 m), cased to 645 ft (197 m).

DATUM.--Altitude of land-surface datum is 1,160 ft (354 m); Measuring point: Edge of vent pipe, 1.00 ft (0.30 m) above land-surface datum.

REMARKS.--Water level affected by pumping.

PERIOD OF RECORD.--May 1984 to September 1984.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 223.6 ft (68.15 m) below land-surface datum, May 18, 1984; lowest, 243.0 ft (74.07 m) below land-surface datum, Sept. 7, 1984.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 8	229.5	JUN 8	232.4	JUL 6	237.5	JUL 27	236.8	AUG 17	239.8	SEP 7	243.0
18	223.6	15	239.0	13	236.5	AUG 3	233.8	24	242.0	14	242.6
25	240.4	22	239.0	23	237.0	10	240.0	31	242.0	28	242.0
JUN 3	231.6										

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	152.0	FEB 2	149.9	APR 5	149.2	JUL 6	151.6

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	67.48	APR 5	66.64	JUL 6	65.82

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	4.62	DEC 5	4.62	FEB 2	5.11	MAY 4	3.99	JUL 2	4.17	SEP 10	4.78
NOV 8	4.69	JAN 5	4.75	MAR 7	4.47	JUN 1	4.33	AUG 4	4.63		

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 1983 TO SEPTEMBER 1984

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 1	75.56	FEB 2	74.93	APR 5	74.97	JUN 1	74.73	JUL 6	74.78

451738093492402. Local number, 121N25W15BBA02.

Owner: U.S. Geological Survey.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

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, 31.45 ft (9.59 m) below land-surface datum, July 2, Aug. 1, 1984; lowest, 35.85 ft (10.93 m) below land-surface datum, Mar. 1, 1982.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	33.27	DEC 5	33.52	FEB 2	33.70	MAY 4	32.88	JUL 2	31.45	SEP 10	31.49
NOV 8	33.41	JAN 6	33.62	MAR 7	33.49	JUN 7	33.09	AUG 1	31.45		

444219096165501. Local number, 114N45W04DCD01.

Owner: City of Canby, well 6.

AQUIFER.--Surficial sand and gravel of Pleistocene Age.

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.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	10.33	FEB 22	8.63	JUN 6	8.95	JUN 11	8.15	AUG 9	10.23	SEP 7	10.49
JAN 9	9.00	MAR 30	6.11								

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
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)
451418093122901	032N23W28AAC01MCCANN_S (A16)	1120TSH	84-05-24	1700	--	20.00
451418093122902	032N23W28AAC02MCCANN_HOUSE (A17)	112BRDO	84-05-24	1800	--	160
451441093271701	032N25W21DAC01PETERSON_S (A21)	1120TSH	84-05-09	1045	1.70	7.00
451441093271702	032N25W21DAC02PETERSON_D (A22)	1120TSH	84-05-09	1130	1.70	22.00
451442093193201	032N24W22CBC01SLYZUK_S (A1)	1120TSH	84-05-08	1515	13.80	20.00
451442093193202	032N24W22CBC01SLYZUK_S (A1)	1120TSH	84-05-21	1600	13.30	20.00
	032N24W22CBC02SLYZUK_D (A2)	1120TSH	84-05-08	1630	13.60	35.00
	032N24W22CBC02SLYZUK_D (A2)	1120TSH	84-05-21	1630	13.80	35.00
451442093271503	032N25W21DAC03PETERSON_HOUSE (A23)	112BRDO	84-05-22	1000	--	250
451513093263301	032N25W22BAC01SWANSON_S (A24)	1120TSH	84-05-22	1100	8.00	12.00
451534093263401	032N25W15CAC01FOSSEN_S (A18)	1120TSH	84-05-09	0850	8.70	14.00
451534093263402	032N25W15CAC02FOSSEN_D (A19)	1120TSH	84-05-09	0930	8.70	29.00
451535093263205	032N25W15CAC05FOSSEN_HOUSE (A20)	112BRDO	84-05-22	0830	--	160
452104093095703	033N23W14ADA03TAFF_HOUSE (A11)	1120TSH	84-05-23	0830	6.00	17.00
452105093100101	033N23W14ADB01TAFF_S (A9)	1120TSH	84-05-23	0930	2.20	9.00
452105093100102	033N23W14ADB02TAFF_D (A10)	1120TSH	84-05-23	1000	2.20	25.00
452120093102401	033N23W14ABB01ANDERSON_S (A25)	1120TSH	84-05-23	1800	--	21.00
452132093045301	033N22W10CCB01BROADBENT_FLD_S (A7)	1120TSH	84-05-18	1100	7.30	13.00
	033N22W10CCB01BROADBENT_FLD_S (A7)	1120TSH	84-06-29	1200	7.40	13.00
	033N22W10CCB01BROADBENT_FLD_S (A7)	1120TSH	84-08-30	1700	9.20	13.00
452132093045302	033N22W10CCB02BROADBENT_FLD_D (A8)	1120TSH	84-05-18	1130	7.30	28.00
	033N22W10CCB02BROADBENT_FLD_D (A8)	1120TSH	84-06-29	1230	7.40	28.00
	033N22W10CCB02BROADBENT_FLD_D (A8)	1120TSH	84-08-30	1730	9.17	28.00
452153093050201	033N22W09ADB01BROADBENT_S (A5)	1120TSH	84-05-18	1400	9.80	15.00
	033N22W09ADB01BROADBENT_S (A5)	1120TSH	84-06-29	1330	9.70	15.00
	033N22W09ADB01BROADBENT_S (A5)	1120TSH	84-08-30	1800	11.15	15.00
452153093050202	033N22W09ADB02BROADBENT_D (A6)	1120TSH	84-05-18	1500	--	87.00
	033N22W09ADB02BROADBENT_D (A6)	1120TSH	84-06-29	1400	--	87.00
	033N22W09ADB02BROADBENT_D (A6)	1120TSH	84-08-30	1830	--	87.00
452401093114801	034N23W27CDC01CEDARCREEK_S (A3)	1120TSH	84-05-22	1430	1.50	7.00
452401093114802	034N23W27CDC02CEDARCREEK_D (A4)	1120TSH	84-05-22	1515	2.30	22.00
452410093125003	034N23W28CDA03REILING_HOUSE (A14)	1120TSH	84-05-23	1230	--	24.00
452410093125201	034N23W28CDA01REILING_S (A12)	1120TSH	84-05-23	1315	20.20	24.00
	034N23W28CDA01REILING_S (A12)	1120TSH	84-08-30	1530	20.58	24.00
452410093125202	034N23W28CDA02REILING_D (A13)	1120TSH	84-05-23	1400	20.20	39.00

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE-CIFIC CONDUCTANCE (UMHOS) (00095)	SPE-CIFIC CONDUCTANCE LAB (UMHOS) (90095)	PH (STANDARD UNITS) (00400)	TEMPERATURE (DEG C) (00010)	NITROGEN DIS-SOLVED (MG/L AS N) (00602)	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 FIELD (MG/L AS CACO3) (00410)	ALKALINITY LAB (MG/L AS CACO3) (90410)
84-05-24	903.00	690	748	7.2	9.5	--	84	23	21	2.4	298	172
84-05-24	903.00	320	301	7.4	9.0	--	43	7.6	3.6	.90	105	104
84-05-09	867.00	320	361	6.8	8.0	11	41	13	2.1	.10	118	113
84-05-09	867.00	410	451	8.3	9.5	6.8	54	16	11	.90	164	160
84-05-08	891.00	345	316	7.9	7.5	6.1	46	9.6	2.3	.30	146	127
84-05-21	891.00	350	--	--	8.5	--	--	--	--	--	--	--
84-05-08	891.00	330	311	7.8	14.0	--	47	9.5	2.8	.60	130	143
84-05-21	891.00	325	--	--	8.0	--	--	--	--	--	--	--
84-05-22	880.00	360	341	7.9	10.0	--	42	15	5.0	1.3	164	168
84-05-22	872.00	630	659	7.4	10.5	--	76	21	15	1.3	262	191
84-05-09	881.00	375	339	8.2	8.0	4.2	35	8.1	15	.50	85	81
84-05-09	881.00	430	403	8.2	9.5	4.6	32	14	31	1.3	177	169
84-05-22	882.00	360	345	7.9	9.5	--	45	15	2.9	1.3	190	184
84-05-23	913.00	300	281	7.9	9.0	--	37	8.8	4.0	.60	105	99
84-05-23	913.00	210	200	7.4	7.5	--	28	6.1	1.7	.40	98	91

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

ANOKA COUNTY--Continued

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	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 FIELD (MG/L AS CACO3) (00410)	ALKA- LITY LAB (MG/L AS CACO3) (90410)
84-05-23	913.00	245	245	7.8	8.5	--	40	3.5	3.6	1.5	89	89
84-05-23	926.00	670	695	7.5	10.5	--	84	17	22	1.1	171	170
84-05-18	909.00	355	352	6.4	7.5	22	32	9.9	6.4	1.2	59	52
84-06-29	909.00	450	--	6.9	8.5	--	--	--	--	--	74	--
84-08-30	909.00	280	--	--	11.0	--	--	--	--	--	--	--
84-05-18	909.00	420	390	7.9	8.0	3.6	52	11	4.4	.60	134	133
84-06-29	909.00	390	--	8.6	7.5	--	--	--	--	--	130	--
84-08-30	909.00	360	--	E8.5	8.5	--	--	--	--	--	--	--
84-05-18	909.00	275	285	5.9	9.0	1.9	14	3.3	11	1.3	39	35
84-06-29	909.00	175	--	--	9.5	--	--	--	--	--	--	--
84-08-30	909.00	160	--	E6.5	11.5	--	--	--	--	--	--	--
84-05-18	909.00	340	320	7.9	9.5	--	45	10	5.5	.80	170	166
84-06-29	909.00	355	--	--	9.5	--	--	--	--	--	--	--
84-08-30	909.00	340	--	E7.9	10.0	--	--	--	--	--	--	--
84-05-22	913.00	140	108	6.1	7.5	--	10	2.3	4.0	.10	33	28
84-05-22	913.00	230	208	7.9	7.5	--	30	5.4	1.9	.40	92	92
84-05-23	923.00	440	441	7.7	10.5	--	60	13	3.9	.40	164	163
84-05-23	923.00	410	443	8.1	9.0	--	56	12	3.4	.70	68	61
84-08-30	923.00	410	--	E8.1	9.0	--	--	--	--	--	--	--
84-05-23	923.00	270	261	8.8	9.0	--	32	9.4	2.5	.60	79	75
DATE OF SAMPLE	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)	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)	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)
84-05-24	40	32	<.10	18	<.01	<.10	.28	.50	<.01	80	10000	860
84-05-24	44	3.8	.10	25	<.01	<.10	.18	2.1	.09	<20	2800	230
84-05-09	28	1.0	.10	19	.02	9.0	.49	1.6	<.01	20	540	83
84-05-09	19	19	.10	24	.03	5.0	.34	1.8	<.01	20	5	2
84-05-08	12	5.4	.10	19	<.01	4.6	.34	1.5	<.01	<20	11	4
84-05-21	--	--	--	--	--	--	--	--	--	--	--	--
84-05-08	19	2.8	.10	25	<.01	<.10	.39	2.0	.03	<20	87	340
84-05-21	--	--	--	--	--	--	--	--	--	--	--	--
84-05-22	16	1.1	.20	16	<.01	<.10	.23	.90	.04	<20	230	230
84-05-22	20	15	.10	23	<.01	5.0	.07	1.4	<.01	100	8	4
84-05-09	9.7	45	.10	17	<.01	1.3	.36	2.9	.09	20	3	<1
84-05-09	19	17	.20	6.8	.05	1.1	.33	3.5	<.01	120	7	30
84-05-22	2.6	.80	.10	15	<.01	<.10	.22	1.6	.05	<20	610	51
84-05-23	27	5.2	<.10	20	<.01	1.8	.20	1.3	.11	<20	20	3
84-05-23	7.8	.70	.10	14	<.01	.26	.03	1.7	.02	20	50	11
84-05-23	36	1.4	.10	13	<.01	<.10	.57	1.2	.02	80	77	250
84-05-23	33	37	.10	23	<.01	26	.21	.90	.09	30	15	1
84-05-18	32	6.0	<.10	23	--	20	.60	2.0	<.01	750	550	570
84-06-29	--	--	--	--	--	2.7	--	--	--	--	--	--
84-08-30	--	--	--	--	--	8.1	--	--	--	--	--	--
84-05-18	12	30	<.10	22	--	2.7	.04	.90	.05	<20	7	44
84-06-29	--	--	--	--	--	<.10	--	--	--	--	--	--
84-08-30	--	--	--	--	--	1.8	--	--	--	--	--	--
84-05-18	8.0	30	.10	23	<.01	1.1	.11	.80	.01	60	1800	150
84-06-29	--	--	--	--	--	<.10	--	--	--	--	--	--
84-08-30	--	--	--	--	--	1.1	--	--	--	--	--	--
84-05-18	1.0	2.0	.10	25	<.01	<.10	.13	2.2	.08	<20	100	230
84-06-29	--	--	--	--	--	.89	--	--	--	--	--	--
84-08-30	--	--	--	--	--	<.10	--	--	--	--	--	--
84-05-22	18	1.9	.10	38	<.01	<.10	.07	1.2	.02	20	1900	65
84-05-22	13	.80	<.10	24	<.01	<.10	.22	1.4	.02	<20	48	140
84-05-23	10	19	<.10	20	<.01	3.9	.06	1.1	.03	20	7	2
84-05-23	15	19	<.10	18	<.01	13	.20	1.8	.02	30	8	4
84-08-30	--	--	--	--	--	12	--	--	--	--	--	--
84-05-23	10	19	<.10	18	.26	4.2	.18	1.1	.03	50	6	2

E--estimated.

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

ANOKA COUNTY--Continued

DATE OF SAMPLE	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
84-05-24	1.7
84-05-24	1.4
84-05-09	2.2
84-05-09	1.4
84-05-08	--
84-05-21	1.4
84-05-08	--
84-05-21	3.1
84-05-22	.40
84-05-22	1.3
84-05-09	.80
84-05-09	1.0
84-05-22	1.1
84-05-23	.80
84-05-23	1.8
84-05-23	1.3
84-05-23	1.6
84-05-18	1.9
84-06-29	--
84-08-30	--
84-05-18	1.4
84-06-29	--
84-08-30	--
84-05-18	1.0
84-06-29	--
84-08-30	--
84-05-18	2.1
84-06-29	--
84-08-30	--
84-05-22	1.8
84-05-22	1.5
84-05-23	1.0
84-05-23	.90
84-08-30	--
84-05-23	1.0

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)
452410093125202	034N23W28CDA02REILING_D (A13)		1120TSH	84-08-30	1600	20.56	39.00
452414093140101	934N23W29DBC01WYATT_HOUSE (A15)		1120TSH	84-05-23	1615	--	24.00

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	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 FIELD (MG/L AS CACO3) (00410)	ALKA- LITY LAB (MG/L AS CACO3) (90410)
84-08-30	923.00	290	--	8.1	9.0	--	--	--	--	--	--	--
84-05-23	929.00	270	266	7.4	10.5	--	38	8.2	2.4	1.0	125	121

E--estimated.

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

ANOKA COUNTY--Continued

DATE OF SAMPLE	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)	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)	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)
84-08-30	--	--	--	--	--	2.6	--	--	--	--	--	--
84-05-23	14	1.4	.10	21	<.01	.22	.30	1.7	.05	20	1800	220

CARBON,
ORGANIC
DIS-
SOLVED
(MG/L
AS C)
(00681)

84-08-30 --
84-05-23 2.6

PESTICIDE ANALYSIS

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)
452132093045301	033N22W10CCB01BROADBENT_FLD_S(A7)		1120TSH	84-08-30	1700	9.20	13.00
452410093125201	034N23W28CDA01REILING_S(A12)		1120TSH	84-08-30	1530	20.58	24.00

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME- TRYNE TOTAL (82184)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	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- TRYNE TOTAL (UG/L) (39054)
84-08-30	909.00	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
84-08-30	923.00	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

BECKER COUNTY

STATION	NUMBER	LOCAL IDENT- I FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	ELEV. OF LAND SURFACE DATUM (FT.) ABOVE NGVD) (72000)
470203095252801	WAYNE KIVI T141NR38W13AAA		1120TSH	84-09-05	1700	59.00	1578.00

DATE OF SAMPLE	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)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	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)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
84-09-05	448	483	7.5	8.5	69	23	1.9	248	8.7	1.7	250	4.3

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

BECKER COUNTY--Continued

DATE OF SAMPLE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	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)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	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)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
84-09-05	<.01	.20	.20	<.01	<.01	1	42	<20	<1	10	3	6

DATE OF SAMPLE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, DIS- SOLVED (MG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)
84-09-05	2	2	<.1	<1	<1	34	<.01

BELTRAMI 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)
473418095055001	147N35W11BBB01	BEMIDJI WELL 405D		112WSCS 84-07-31	1700	35.00	1411.00
473425095052001	147N21W02CDA01	BEMIDJI WELL 417C		112WSCS 84-08-04	1630	30.70	1417.00
473425095052002	147N21W02CDA02	BEMIDJI WELL 417A		112WSCS 84-08-01	1045	55.20	1417.00
473425095052003	147N21W02CDA03	BEMIDJI WELL 417B		112WSCS 84-08-01	1300	44.50	1417.00
473425095052004	147N21W02CDA04	BEMIDJI WELL 417D		112WSCS 84-08-01	1400	33.50	1416.00
473425095052005	147N21W02CDA05	BEMIDJI WELL 420A		112WSCS 84-08-04	1300	56.90	1419.00
473425095052006	147N21W02CDA06	BEMIDJI WELL 420B		112WSCS 84-08-04	1100	45.30	1419.00
473425095052007	147N21W02CDA07	BEMIDJI WELL 420C		112WSCS 84-08-04	1000	55.90	1419.00
473425095052008	147N21W02CDA08	BEMIDJI WELL 318		112WSCS 84-08-04	1530	35.30	1419.00
473425095052009	147N21W02CDA09	BEMIDJI WELL 317		112WSCS 84-08-04	1400	32.60	1419.00

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)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	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)	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)
84-07-31	61	18	2.0	19	--	80	<.05	<1	<3	<10	460	40
84-08-04	150	49	5.3	36	--	230	<.05	<1	7	<10	350	<10
84-08-01	50	14	1.7	20	--	49	<.05	<1	<3	<10	18	10
84-08-01	59	16	1.8	20	--	63	<.05	<1	<3	<10	12	50
84-08-01	74	21	1.9	20	--	71	<.05	<1	<3	<10	30	<10
84-08-04	130	36	2.5	31	--	380	<.05	<1	10	<10	920	<10
84-08-04	58	16	1.7	20	--	61	<.05	<1	<3	<10	20	10
84-08-04	55	16	1.9	20	--	60	<.05	<1	<3	<10	24	10
84-08-04	140	38	3.0	22	<100	150	<.05	<1	10	<10	1500	<10
84-08-04	150	48	3.4	26	--	240	<.05	<1	20	<10	1800	<10

DATE OF SAMPLE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)
84-07-31	9	230	<10	78	<6
84-08-04	7	2800	<10	210	<6
84-08-01	6	15	<10	48	<6
84-08-01	10	20	<10	53	<6
84-08-01	5	8	<10	66	<6
84-08-04	6	5600	<10	190	<6
84-08-04	5	6	<10	53	<6
84-08-04	5	11	<10	59	<6
84-08-04	7	2600	<10	140	<6
84-08-04	6	4000	<10	170	<6

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

CHISAGO 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)
452836092525603	035N20W31DAB03WHEELER_H(C3)	1120TSH	84-06-06	1530	--	88.00
452837092525901	035N20W31DAB01WHEELER_S(C1)	1120TSH	84-06-06	1300	7.30	13.00
	035N20W31DAB01WHEELER_S(C1)	1120TSH	84-08-30	1200	7.39	13.00
452837092525902	035N20W31DAB02WHEELER_D(C2)	1120TSH	84-06-06	1430	7.40	25.00
	035N20W31DAB02WHEELER_D(C2)	1120TSH	84-08-30	1230	7.48	25.00
452936092561901	035N21W26BCC01GS-NO_BRANCH_D(C9)	1120TSH	84-06-07	0900	12.40	26.00
452942092531401	035N20W30ACB01OLSON_H(C8)	1120TSH	84-06-07	1045	24.00	30.00
453302092493401	035N20W03BDD01BOUDREAU_S(C4)	1120TSH	84-06-07	1230	9.80	15.00
	035N20W03BDD01BOUDREAU_S(C4)	1120TSH	84-08-30	1330	10.65	15.00
453302092493402	035N20W03BDD02BOUDREAU_D(C5)	1120TSH	84-06-07	1400	9.90	29.00
	035N20W03BDD02BOUDREAU_D(C5)	1120TSH	84-08-30	1400	10.73	29.00
453305092493903	035N20W03BDA03BOUDREAU_H(C6)	112BRDO	84-06-07	1430	--	232

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE-CIFIC CONDUCTANCE (UMHOS) (00095)	SPE-CIFIC CONDUCTANCE LAB (UMHOS) (90095)	PH (STANDARD UNITS) (00400)	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 FIELD (MG/L AS CACO3) (00410)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
84-06-06	873.00	275	236	8.1	10.5	32	6.6	5.9	.70	130	120	3.4
84-06-06	875.00	185	157	6.6	9.5	15	4.4	2.5	.50	32	29	12
84-08-30	875.00	170	--	E6.7	13.0	--	--	--	--	--	--	--
84-06-06	875.00	310	268	8.2	9.0	37	9.8	2.0	.40	130	129	8.0
84-08-30	875.00	260	--	E8.2	10.0	--	--	--	--	--	--	--
84-06-07	892.00	315	285	7.8	9.5	39	9.4	3.8	.80	140	135	13
84-06-07	883.00	340	302	7.0	12.0	33	11	2.7	.50	63	58	9.9
84-06-07	876.00	235	212	6.2	9.0	13	6.8	2.3	2.3	11	10	4.2
84-08-30	876.00	125	--	E6.1	11.0	--	--	--	--	--	--	--
84-06-07	876.00	175	145	8.6	9.5	16	5.8	1.6	.40	56	52	5.1
84-08-30	876.00	180	--	E8.5	9.0	--	--	--	--	--	--	--
84-06-07	865.00	275	250	8.3	10.5	14	3.1	35	1.3	130	123	2.0

DATE OF SAMPLE	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC DIS. (MG/L AS N) (00623)	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 DIS-SOLVED (MG/L AS C) (00681)
84-06-06	.90	.10	13	<.10	<.01	1.1	.04	<20	14	120	1.0
84-06-06	4.1	<.10	18	5.2	.01	1.2	<.01	<20	840	38	1.4
84-08-30	--	--	--	5.1	--	--	--	--	--	--	--
84-06-06	2.4	.10	15	.16	<.01	1.2	.01	20	10	29	1.1
84-08-30	--	--	--	1.4	--	--	--	--	--	--	--
84-06-07	1.6	<.10	17	<.10	<.01	2.1	<.01	<20	190	50	1.3
84-06-07	15	<.10	20	12	<.01	1.4	.01	<20	9	3	.80
84-06-07	18	<.10	16	11	<.01	1.6	<.01	<20	42	290	--
84-08-30	--	--	--	2.6	--	--	--	--	--	--	--
84-06-07	7.5	.10	21	2.5	<.01	1.3	.06	<20	14	3	1.4
84-08-30	--	--	--	2.8	--	--	--	--	--	--	--
84-06-07	3.0	.40	11	<.10	.09	2.2	.09	120	230	33	1.2

E--estimated.

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

CHISAGO COUNTY--Continued

PESTICIDE ANALYSIS

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)
452837092525901	035N20W31DAB01WHEELER_S(C1)	1120TSH	84-08-30	1200	7.39	13.00
453302092493401	035N20W03BDD01BOUDREAU_S(C4)	1120TSH	84-08-30	1330	10.65	15.00

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME-TRYNE TOTAL (UG/L) (82184)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	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-TRYNE TOTAL (UG/L) (39054)
84-08-30	875.00	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
84-08-30	876.00	<.1	1.7	<.1	<.1	<.1	<.1	<.1	<.1

DOUGLAS 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)
454912095170001	127N37W12CCB01 DON TWAIT (D7)	1120TSH	83-11-16	1030	--	18.00
454929095202801	127N37W09BDC01 ARLYS KAKEC (D5)	1120TSH	83-11-16	0930	15.50	18.40
455900095161502	129N36W18CBB02BEILKE IRR WELL	1120TSH	83-11-15	1420	8.90	60.00
455900095162001	129N36W18CBB RAY BIELKE	1120TSH	83-11-15	1400	8.80	19.40
455902095161511	129N36W18CBB11 RAY BEILKE (DEEP) (D8)	1120TSH	83-11-15	1345	8.80	30.60
455902095161512	129N36W18CBB11 RAY BEILKE (DEEP) (D8)	1120TSH	84-05-16	1800	7.60	31.00
	129N36W18CBB12 RAY BEILKE (SHALLOW) (D9)	1120TSH	83-11-15	1315	8.80	10.00
	129N36W18CBB12 RAY BEILKE (SHALLOW) (D9)	1120TSH	83-12-07	1715	8.70	10.00
	129N36W18CBB12 RAY BEILKE (SHALLOW) (D9)	1120TSH	84-05-16	1730	7.60	10.00
455920095163100	129N37W23DDA RAY BIELKE	1120TSH	83-11-15	1500	--	35.00
455926095122901	129N36W15BBB01 SCHOOL WELL, SCHUNEMAN, GEORGE (D2)	1120TSH	83-11-15	1130	6.20	18.00
460020095134301	129N36W09BBB01 DARRYL KLINDER (DEEP) (D4)	1120TSH	83-11-15	0945	5.00	19.20
460020095134302	129N36W09BBB01 DARRYL KLINDER (DEEP) (D4)	1120TSH	84-05-16	1920	3.40	19.00
	129N36W09BBB02 DARRYL KLINDER (SHALLOW) (D3)	1120TSH	83-11-15	0845	5.00	6.60
	129N36W09BBB02 DARRYL KLINDER (SHALLOW) (D3)	1120TSH	83-12-07	1615	4.70	6.60
460604095134402	129N36W09BBB02 DARRYL KLINDER (SHALLOW) (D3)	1120TSH	84-05-16	1930	3.30	6.00
	130N36W04BCC02 NO.CO.LINE ROAD DITCH (D1)	1120TSH	83-11-15	1045	4.30	6.80
	130N36W04BCC02 NO.CO.LINE ROAD DITCH (D1)	1120TSH	84-05-17	0745	3.20	6.00

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DOUGLAS COUNTY--Continued

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	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) (00623)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)
83-11-16	1394.00	355	--	7.4	11.0	--	--	--	.11	--	--	--
83-11-16	1395.00	885	--	7.4	9.5	--	--	--	37	--	--	--
83-11-15	1365.00	575	--	7.7	9.0	--	--	--	22	--	--	--
83-11-15	1363.00	660	--	7.8	9.5	--	--	--	22	--	--	--
83-11-15	1365.00	540	584	7.8	8.0	19	18	9.5	18	.12	.50	.05
84-05-16	1365.00	570	613	7.5	8.5	--	19	13	15	.05	--	--
83-11-15	1365.00	520	553	7.5	10.5	12	<5.0	14	10	.11	1.5	.07
83-12-07	1365.00	500	--	7.6	7.5	--	--	--	--	--	--	--
84-05-16	1365.00	630	650	7.1	8.5	--	11	23	12	.07	--	--
83-11-15	--	1380	--	7.5	7.5	--	--	--	41	--	--	--
83-11-15	1345.00	480	--	7.8	10.5	--	--	--	10	--	--	--
83-11-15	1352.00	560	616	7.3	10.0	.91	12	4.5	.11	.48	.80	.09
84-05-16	1352.00	570	612	7.0	7.0	--	15	5.0	.17	.50	--	--
83-11-15	1352.00	745	763	7.6	9.0	18	18	21	17	.08	.70	<.01
83-12-07	1352.00	660	--	7.3	5.0	--	--	--	--	--	--	--
84-05-16	1352.00	460	534	7.2	7.5	--	27	18	5.0	.27	--	--
83-11-15	1417.00	660	--	7.3	9.5	--	--	--	2.5	--	--	--
84-05-17	1417.00	480	598	6.6	8.5	--	2.0	4.0	1.9	.05	--	--

DATE OF SAMPLE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
83-11-16	--	--
83-11-16	--	--
83-11-15	--	--
83-11-15	--	--
83-11-15	20	10
84-05-16	--	--
83-11-15	80	<10
83-12-07	--	--
84-05-16	--	--
83-11-15	--	--
83-11-15	--	--
83-11-15	3900	240
84-05-16	--	--
83-11-15	240	30
83-12-07	--	--
84-05-16	--	--
83-11-15	--	--
84-05-17	--	--

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DOUGLAS COUNTY--Continued

PESTICIDE ANALYSIS

STATION	NUMBER	LOCAL IDENT- I PIER						GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE	DEPTH OF WELL,
											(WATER LEVEL) (FEET) (72019)	TOTAL (FEET) (72008)
455902095161512	129N36W18CBB12	RAY BEILKE (SHALLOW) (D9)						1120TSH	83-12-07	1715	8.70	10.00
460020095134302	129N36W09BBB02	DARRYL KLINDER (SHALLOW) (D3)						1120TSH	83-12-07	1615	4.70	6.60
DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME- TRYNE TOTAL (82184)	ATRA- TONE TOTAL (UG/L) (82185)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	CYPR- 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)
83-12-07	1365.00	<.1	<.1	.2	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
83-12-07	1352.00	<.1	.1	.4	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

HENNEPIN 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)					
445614093212802	117N21W16DCA02	SLP W120		364PLVL	83-11-30	1230	--					
445614093215301	117N21W17DDB2	SLP W11	MN UNIQUE NO 216039	112DSMO	83-12-16	1200	11.00					
445614093215302	117N21W17DDB3	SLP W17	MN UNIQUE NO 216045	112SPRO	84-01-10	1300	--					
	117N21W17DDB3	SLP W17	MN UNIQUE NO 216045	112SPRO	84-01-17	1200	--					
445614093220301	117N21W17DCA1	SLP W9	MN UNIQUE NO 216037	112DSMO	84-01-19	1200	--					
445614093220303	117N21W17DCA3	SLPW18 MN	UNIQUE NO 216046	364PLVL	84-01-18	1430	--					
445614093220305	117N21W17DCA05	SLP P14	MN UNIQUE NO 216123	112DSMO	84-01-12	1145	--					
	117N21W17DCA05	SLP P14	MN UNIQUE NO 216123	112DSMO	84-01-17	1430	--					
445614093220307	117N21W17DCA07	SLP P201		112DSMO	84-01-12	1415	--					
445615093220904	117N21W17DCB04	SLP P203		112DSMO	84-01-23	1530	--					
	117N21W17DCB04	SLP P203		112DSMO	84-01-23	1534	--					
445617093211502	117N21W16CDB3	SLP W117	MN UNIQUE NO 160031	112DSMO	83-12-02	1030	--					
445617093212002	117N21W16CCA02	SLP W133	MN UNIQUE NO 165588	364STPR	83-12-01	1330	--					
445617093212003	117N21W16CCA03	SLP W134		112DSMO	83-12-01	1045	--					
445634093213101	117N21W16BCC01	SLP W131	MN UNIQUE NO. 165586	364PLVL	83-12-13	1330	33.00					
445634093213103	117N21W16BCC03	SLP W136	MN UNIQUE NO. 165591	112DSMO	83-12-07	1330	33.00					
DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHCS) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE (DEG C) (00010)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	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- LITY LAB (MG/L AS CAC03) (90410)
83-11-30	--	1220	1520	--	10.5	--	.0	120	40	130	3.0	502
83-12-16	896.00	1080	1200	6.0	12.0	--	.0	140	30	75	9.8	489
84-01-10	896.00	1220	1350	6.5	10.0	--	.1	120	43	100	4.5	474
84-01-17	896.00	1210	1350	6.8	10.0	--	.0	120	44	100	4.5	416
84-01-19	890.00	1430	1590	6.8	11.0	--	.0	130	30	160	6.0	591
84-01-18	893.00	1010	1130	6.8	10.0	--	<.1	110	43	61	4.0	432
84-01-12	--	2010	2140	6.7	10.5	--	.0	100	41	310	7.5	652
84-01-17	--	2000	2180	6.9	8.5	--	.0	120	36	310	7.6	673
84-01-12	--	2000	2120	6.7	10.5	--	.0	110	42	300	7.6	669
84-01-23	--	2270	--	7.1	10.0	31	.0	--	--	--	--	--
84-01-23	--	2270	2430	7.1	10.0	--	.0	80	26	470	4.5	1080
83-12-02	915.00	1410	1530	5.9	12.0	--	.1	150	51	80	5.0	468
83-12-01	917.00	2500	2630	6.7	12.0	--	.0	130	54	350	3.1	492
83-12-01	--	1550	1970	6.9	--	--	1.5	180	59	130	4.7	481
83-12-13	916.00	148	190	--	13.0	--	2.4	--	--	--	--	--
83-12-07	916.00	1350	1450	6.1	12.0	9.1	3.8	140	45	86	3.9	310

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

HENNEPIN COUNTY--Continued

DATE OF SAMPLE	SULFATE DIS- SOLVED (MG/L AS SO ₄) (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 SiO ₂) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO ₂ +NO ₃ 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, DIS- SOLVED (MG/L AS P) (00666)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)
83-11-30	4.2	210	--	28	874	--	<.01	<.10	.27	1.1	.10	10
83-12-16	130	39	--	22	763	--	<.01	<.10	1.1	2.0	.17	<10
84-01-10	5.1	170	--	28	772	--	<.01	<.10	.77	1.2	<.02	<10
84-01-17	5.0	170	--	28	769	--	<.01	<.10	.58	1.1	.05	10
84-01-19	10	170	--	26	962	--	<.01	<.10	3.3	5.7	.08	10
84-01-18	3.1	110	--	32	652	--	<.01	<.10	.62	.80	.03	<10
84-01-12	13	360	--	29	1290	--	<.01	<.10	5.0	8.2	.06	10
84-01-17	15	350	.30	29	1280	--	<.01	<.10	5.0	7.2	.10	10
84-01-12	13	350	--	29	1270	--	<.01	<.10	5.0	8.0	.08	10
84-01-23	--	--	--	--	--	13	.02	13	.53	18	.47	--
84-01-23	30	220	--	5.8	1560	--	--	--	--	--	--	<10
83-12-02	13	220	--	20	866	--	<.01	<.10	.12	.20	.02	<10
83-12-01	15	570	--	26	1440	--	<.01	<.10	.13	1.3	.21	<10
83-12-01	25	350	--	24	1130	--	<.01	<.10	.14	.90	.04	<10
83-12-13	--	--	--	--	--	--	<.01	<.10	.06	.20	.01	--
83-12-07	50	230	--	24	859	--	<.01	8.6	.07	.20	.03	10

DATE OF SAMPLE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PR) (01049)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	Z INC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
83-11-30	6500	7	150	24	8.0
83-12-16	1700	1	1500	4	10
84-01-10	6300	2	330	9	12
84-01-17	6100	1	330	4	11
84-01-19	4600	2	950	5	28
84-01-18	2300	<1	300	9	6.8
84-01-12	5500	3	430	220	45
84-01-17	5300	1	400	150	44
84-01-12	4100	6	400	620	41
84-01-23	--	--	--	--	100
84-01-23	2500	4	300	460	--
83-12-02	8500	8	660	390	4.8
83-12-01	7100	6	100	90	6.8
83-12-01	11000	5	540	83	5.4
83-12-13	--	--	10	<10	3.9
83-12-07	180	1	29	79	2.7

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

HUBBARD COUNTY

STATION	NUMBER	LOCAL IDENT- I FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (72019)	DEPTH OF WELL, TOTAL (72008)					
464940094593001		139N34W28BCC01		1120TSH	84-05-30	1430	--	16.00				
465035095000001		139N34W20ADC01		1120TSH	84-05-30	1530	--	40.00				
465315094554001		139N34W01BCA01		1120TSH	84-05-30	1600	--	80.00				
465515094411001		140N32W26ABA01		1120TSH	84-05-30	1730	--	101				
465515095061501		140N35W28AAA01		1120TSH	84-05-30	1830	--	30.00				
465705094400702		140N32W12CAD3 WELL 5 ERICKSON SND PNT	112PLSC	83-11-12	1230	--	--	11.60				
		140N32W12CAD3 WELL 5 ERICKSON SND PNT	112PLSC	84-05-14	1320	--	--	--				
465707094400701		140N32W12CAD1 WELL 4 WILLIAMS LAKE	112PLSC	84-05-03	1400	--	--	--				
		140N32W12CAD1 WELL 4 WILLIAMS LAKE	112PLSC	84-07-19	1230	--	--	--				
		140N32W12CAD1 WELL 4 WILLIAMS LAKE	112PLSC	84-08-31	0830	36.30	--	--				
465708094403201		140N32W12CBD WELL 6 WILLIAMS LAKE	112PLSC	84-05-03	1330	--	--	--				
		140N32W12CBD WELL 6 WILLIAMS LAKE	112PLSC	84-07-10	1100	--	--	--				
		140N32W12CBD WELL 6 WILLIAMS LAKE	112PLSC	84-08-31	0930	26.80	--	--				
465710094395101		140N32W12DBD1 WELL 8 WILLIAMS LAKE	112PLSC	84-05-04	0730	--	--	--				
		140N32W12DBD1 WELL 8 WILLIAMS LAKE	112PLSC	84-07-19	1330	--	--	--				
		140N32W12DBD1 WELL 8 WILLIAMS LAKE	112PLSC	84-08-29	0845	19.10	--	--				
465727094402402		140N32W12BDC OBS WELL WLN-18 WATER TABLE NEST W	112PLSC	84-05-03	1030	--	--	25.00				
		140N32W12BDC OBS WELL WLN-18 WATER TABLE NEST W	112PLSC	84-07-18	1515	--	--	25.00				
		140N32W12BDC OBS WELL WLN-18 WATER TABLE NEST W	112PLSC	84-08-28	1430	18.70	--	25.00				
DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	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)
84-05-30	--	600	657	7.3	10.0	--	--	--	--	--	--	13
84-05-30	--	600	765	7.2	10.0	--	--	--	--	--	--	8.0
84-05-30	--	450	489	7.3	10.0	--	--	--	--	--	--	7.3
84-05-30	--	400	422	7.3	9.0	--	--	--	--	--	--	4.9
84-05-30	--	540	594	7.1	9.0	--	--	--	--	--	--	13
83-11-12	--	235	252	>6.6	7.0	--	37	8.2	1.9	1.4	134	<5.0
84-05-14	--	270	242	7.5	5.5	--	35	7.8	1.6	1.3	126	.4
84-05-03	--	284	429	7.5	9.0	--	67	13	3.7	2.5	224	1.0
84-07-19	--	428	438	7.4	10.5	--	70	13	3.5	2.5	251	9.8
84-08-31	--	413	433	7.4	9.0	763	69	13	2.7	1.9	227	1.6
84-05-03	--	266	410	7.5	10.0	--	61	16	2.6	.90	211	22
84-07-10	--	405	406	7.5	11.5	--	61	16	2.5	.90	212	15
84-08-31	--	420	423	7.6	9.0	763	64	16	2.5	.90	213	1.2
84-05-04	--	212	403	7.6	6.0	--	61	15	2.0	1.0	212	13
84-07-19	--	393	398	7.5	8.5	--	62	15	2.1	1.0	215	11
84-08-29	--	424	426	7.5	8.5	752	64	15	2.1	.90	215	12
84-05-03	1399.00	256	442	7.3	11.0	--	69	9.2	2.3	1.5	208	.6
84-07-18	1399.00	440	441	7.3	13.0	--	71	9.4	2.3	1.6	211	--
84-08-28	1399.00	449	471	7.3	14.5	757	74	--	2.3	1.5	245	--

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

HUBBARD COUNTY--Continued

DATE OF SAMPLE	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 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHORUS, DIS- SOLVED TOTAL (MG/L AS P) (00665)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
84-05-30	21	--	--	12	<.01	--	--	--
84-05-30	23	--	--	26	.18	--	--	--
84-05-30	4.2	--	--	4.3	.06	--	--	--
84-05-30	3.7	--	--	3.5	.05	--	--	--
84-05-30	21	--	--	17	.05	--	--	--
83-11-12	1.3	7.4	146	--	--	--	2900	360
84-05-14	.80	7.0	169	--	--	.004	360	360
84-05-03	3.1	13	--	--	--	.067	9	250
84-07-19	2.5	13	271	--	--	.226	6	250
84-08-31	1.7	13	250	--	--	.053	10	250
84-05-03	1.1	12	--	--	--	.001	100	150
84-07-10	1.3	12	328	--	--	.007	22	150
84-08-31	17	12	254	--	--	<.001	38	150
84-05-04	.90	15	--	--	--	.001	6	<1
84-07-19	1.2	15	259	--	--	.008	6	3
84-08-29	.90	16	227	--	--	<.001	5	1
84-05-03	1.2	20	--	--	--	.013	14	280
84-07-18	1.8	20	269	--	--	.035	2900	290
84-08-28	1.3	20	255	--	--	.027	690	300

ISANTI COUNTY

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)
452545093211901	034N24W17DCC01JENSEN_S(I1)	1120TSH	84-06-01	1030	5.60	12.00
452545093211902	034N24W17DCC02JENSEN_D(I2)	1120TSH	84-06-01	1130	5.70	18.00
452548093211903	034N24W17DCC03JENSEN_H(I3)	1120TSH	84-06-01	0915	--	19.00
453242093143501	035N23W05CCC01GOLDENWOOD_S(I7)	1120TSH	84-06-05	1030	13.70	17.00
453242093143502	035N23W05CCC02GOLDENWOOD_D(I8)	1120TSH	84-06-05	1200	13.70	22.00
453242093143803	035N23W05CCC03OSLUND_H(I16)	1120TSH	84-06-05	1330	34.00	145
453325093114703	035N23W03BAB03MONKBERG_HOUSE(I-11)	112BRDO	84-05-24	1130	--	120
153328093114701	035N23W03BAB01MONKBERG_S(I-9)	1120TSH	84-05-24	1330	21.60	--
	035N23W03BAB01MONKBERG_S(I-9)	1120TSH	84-08-29	1000	21.21	26.00
153328093114702	035N23W03BAB02MONKBERG_D(I-10)	1120TSH	84-05-24	1445	21.60	41.00
	035N23W03BAB02MONKBERG_D(I-10)	1120TSH	84-08-29	1100	21.20	41.00
453559093105803	036N23W23BBC03VAVRE_H(I-4)	1120TSH	84-06-05	1530	--	32.00
453606093105901	036N23W23BBB01VAVRE_S(I-2)	1120TSH	84-06-01	1430	9.80	16.00
	036N23W23BBB01VAVRE_S(I-2)	1120TSH	84-08-29	1130	10.09	16.00
453606093105902	036N23W23BBB02VAVRE_D(I-3)	1120TSH	84-06-01	1530	9.80	31.00
	036N23W23BBB02VAVRE_D(I-3)	1120TSH	84-08-29	1230	10.11	31.00
453625093262803	036N25W15CAD03MORAN_H(I6)	1120TSH	84-05-31	1245	40.00	50.00
453626093270101	036N25W15CBB01HAUBENSCHILD_H(I15)	1120TSH	84-05-31	1415	34.00	42.00
453631093263701	036N25W15CAB01MORAN_S(I4)	1120TSH	84-05-31	1000	15.90	21.00
453631093263702	036N25W15CAB02MORAN_D(I5)	1120TSH	84-05-31	1100	15.90	36.00

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER NEAR OCTOBER 1983 TO SEPTEMBER 1984
ISANTI COUNTY--Continued

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (90095)	PH (STAND- ARD UNITS) (00400)	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 FIELD (MG/L AS CACO3) (00410)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
84-06-01	935.00	250	227	6.2	8.5	25	5.2	2.9	.90	14	14	21
84-06-01	935.00	640	605	7.7	8.0	69	21	5.8	1.1	56	50	24
84-06-01	935.00	590	597	6.7	10.5	69	23	8.1	1.5	180	182	12
84-06-05	948.00	725	780	7.6	8.5	100	22	19	1.2	220	208	15
84-06-05	948.00	1020	974	7.5	8.5	120	25	27	1.2	240	234	15
84-06-05	948.00	430	415	7.8	9.5	56	17	3.4	1.1	230	220	3.6
84-05-24	977.00	610	631	7.5	9.0	82	22	5.9	1.4	180	181	56
84-05-24	972.00	655	685	7.3	8.5	89	26	5.5	.40	262	258	63
84-08-29	972.00	795	--	E7.5	8.5	--	--	--	--	--	--	--
84-05-24	972.00	410	396	7.9	8.5	50	15	3.9	.50	148	141	30
84-08-29	972.00	400	--	E8.2	8.5	--	--	--	--	--	--	--
84-06-05	972.00	870	818	7.6	10.5	97	29	6.1	.60	130	133	36
84-06-01	958.00	685	628	7.5	8.5	72	32	10	.30	220	215	57
84-08-29	958.00	635	--	E7.5	9.5	--	--	--	--	--	--	--
84-06-01	958.00	610	598	7.7	9.0	79	21	6.3	2.1	220	214	55
84-08-29	958.00	550	--	E7.9	9.0	--	--	--	--	--	--	--
84-05-31	995.00	295	263	7.7	9.5	36	10	2.9	.80	110	107	8.7
84-05-31	991.00	530	506	7.7	9.0	64	19	6.5	.70	190	185	7.6
84-05-31	975.00	335	320	7.2	9.0	31	8.2	3.4	1.2	52	61	4.9
84-05-31	975.00	420	423	7.6	9.0	53	18	4.7	1.7	230	226	5.3
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, 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)	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)
84-06-01	16	.10	13	<.01	10	.03	1.1	<.01	60	22	7	2.5
84-06-01	61	<.10	19	<.01	29	.03	.70	<.01	20	6	2	1.0
84-06-01	43	.10	22	.05	13	.02	.80	.01	<20	28	490	4.7
84-06-05	99	<.10	17	.02	8.8	<.01	.80	<.01	<20	52	18	1.0
84-06-05	130	<.10	18	<.01	12	<.01	1.7	.02	<20	4	4	1.0
84-06-05	1.3	.10	21	<.01	<.10	<.01	1.5	.01	<20	710	280	1.5
84-05-24	22	.10	23	<.01	22	.08	2.8	.08	<20	5	1	1.2
84-05-24	14	.20	27	.01	4.8	.22	2.6	.09	30	14	20	1.8
84-08-29	--	--	--	--	2.7	--	--	--	--	--	--	--
84-05-24	9.7	.10	23	<.01	4.8	.14	1.4	.14	40	6	6	1.7
84-08-29	--	--	--	--	4.4	--	--	--	--	--	--	--
84-06-05	62	.20	27	<.01	35	<.01	1.8	.01	<20	11	<1	1.3
84-06-01	8.9	.20	29	<.01	16	<.01	.60	.13	<20	5	8	2.2
84-08-29	--	--	--	--	16	--	--	--	--	--	--	--
84-06-01	20	.20	17	.10	5.7	.06	.70	<.01	20	15	240	1.4
84-08-29	--	--	--	--	3.8	--	--	--	--	--	--	--
84-05-31	6.6	.20	19	<.01	5.6	.01	.80	.16	40	3	2	.80
84-05-31	21	.20	24	<.01	11	<.01	.70	.22	30	7	2	1.0
84-05-31	11	.10	15	.01	13	.10	.70	.04	40	8	12	.70
84-05-31	1.3	.20	22	<.01	<.10	.24	1.4	.03	30	750	1300	3.9

E--estimated.

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

ISANTI COUNTY--Continued

PESTICIDE ANALYSIS

STATION NUMBER		LOCAL IDENTIFIER	GEOLOGIC UNIT		DATE OF SAMPLE		TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)			
453328093114701		035N23W03BAB01MONKBERG_S(I-9)	1120TSH		84-08-29		1000	21.21	26.00			
453606093105901		036N23W23BBB01VAVRE_S(I12)	1120TSH		84-08-29		1130	10.09	16.00			
DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME-TRYNE TOTAL (82184)	ATRA-TONE TOTAL (UG/L) (82185)	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)
84-08-29	972.00	<.1	.2	<.1	<.1	--	<.1	<.1	.1	<.1	--	<.1
84-08-29	958.00	<.1	.4	<.1	.2	<.1	<.1	<.1	.1	<.1	<.1	<.1

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)
451526094484801	121N33W27DCB1WILLIAMSON HOUSE(I)	1120TSH	83-11-03	0930	--	20.00
451528094494001	121N33W28DAD1DENDERUD(C)	1120TSH	83-11-03	1030	--	28.00
452056094553501	122N34W26BCC1BAJARI L(N)	1120TSH	83-11-03	1250	--	29.00
452103094591703	122N34W29BCB3OLETJBRUENS HOUSE(I)	1120TSH	83-12-12	1030	--	20.00
452104094591901	122N34W29BCB1OLETJBRUENS(I) DEEP	1120TSH	83-12-12	1215	4.80	20.20
452104094591902	122N34W29BCB1OLETJBRUENS(I) DEEP	1120TSH	84-05-15	1830	4.30	20.00
	122N34W29BCB2OLETJBRUENS(I) SHALLOW	1120TSH	83-12-12	1130	4.80	9.00
	122N34W29BCB2OLETJBRUENS(I) SHALLOW	1120TSH	84-05-15	1800	4.30	9.00
452206094491801	122N33W22BBA1HOEKSTRA(I) JERRY	1120TSH	83-11-03	1530	11.40	22.00
452300095020301	122N35W14AAB1THORSON(C) DEEP	1120TSH	83-12-12	1430	1.70	21.80
452300095020302	122N35W14AAB1THORSON(C) DEEP	1120TSH	84-05-16	0950	1.60	22.00
	122N35W14AAB2THORSON(C) SHALLOW	1120TSH	83-12-12	1400	1.70	8.70
	122N35W14AAB2THORSON(C) SHALLOW	1120TSH	84-05-16	0940	1.60	9.00
452305095021901	122N35W11DCC1LUNDGREN HOUSE(C)	1120TSH	83-12-12	1730	--	31.00
452309095014401	122N35W12CCB1THORSON HOUSE(C)	1120TSH	83-12-12	1630	--	14.00
452400095004001	122N34W06CBB01BELGRADE OBS WELL	1120TSH	83-11-03	1430	8.50	22.50
452415094503001	122N33W04BCD01REGAL OBS WELL	1120TSH	83-11-02	1645	--	17.50

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	NITRO-GEN, DIS-SOLVED (MG/L AS N) (00602)	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 + ORTHO-ORGANIC DIS. (MG/L AS N) (00623)	PHOS-PHORUS, ORTHO-ORGANIC DIS-SOLVED (MG/L AS P) (00671)
83-11-03	1165.00	815	--	7.3	--	--	--	--	15	--	--	--
83-11-03	1164.00	595	--	7.1	10.0	--	--	--	<.10	--	--	--
83-11-03	1224.00	515	--	7.4	11.0	--	--	--	2.8	--	--	--
83-12-12	1227.00	810	--	7.0	12.5	--	--	--	20	--	--	--
83-12-12	1225.00	680	713	7.1	10.0	17	22	17	17	.10	.30	.01
84-05-15	1225.00	500	537	6.5	7.5	--	15	10	8.5	.02	--	--
83-12-12	1225.00	785	811	6.9	6.0	6.3	8.0	4.9	5.5	.48	.80	<.01
84-05-15	1225.00	400	430	6.7	7.0	--	1.0	2.0	2.2	.06	--	--
83-11-03	1229.00	710	--	7.2	--	--	--	--	21	--	--	--
83-12-12	1240.00	655	677	7.2	9.0	6.3	17	21	5.8	.13	.50	<.01
84-05-16	1240.00	650	696	6.6	7.5	--	17	18	7.9	.08	--	--
83-12-12	1240.00	400	392	6.5	8.0	.78	2.0	2.2	.18	.20	.60	<.01
84-05-16	1240.00	300	286	6.4	7.5	--	2.0	3.0	.22	.21	--	--
83-12-12	1262.00	640	--	7.2	9.5	--	--	--	.15	--	--	--
83-12-12	1252.00	655	--	7.3	8.0	--	--	--	2.5	--	--	--
83-11-03	1239.00	800	--	6.9	9.0	--	--	--	<.10	--	--	--
83-11-02	1217.00	650	--	7.1	13.0	--	--	--	<.10	--	--	--

DATE OF SAMPLE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
83-11-03	--	--
83-11-03	--	--
83-11-03	--	--
83-12-12	--	--
83-12-12	60	<10
84-05-15	--	--
83-12-12	620	540
84-05-15	--	--
83-11-03	--	--
83-12-12	70	1100
84-05-16	--	--
83-12-12	8600	340
84-05-16	--	--
83-12-12	--	--
83-12-12	--	--
83-11-03	--	--
83-11-02	--	--

STATION	NUMBER	LOCAL IDENTIFIER					GEOLOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	SPECIFIC CONDUCTANCE (UMHOS) (00095)
455030094191501		039N32W27CBB01					1120TSH	84-06-01	1000	17.00	360
460030094210001		041N32W26BCA01					1120TSH	84-05-31	1530	21.00	340
			SPECIFIC CONDUCTANCE LAB (UMHOS) (90095)	PH (STANDARD UNITS) (00400)	TEMPERATURE (DEG C) (00010)	SULFATE SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)		
			84-06-01	406	6.9	23	5.8	5.0	.05		
			84-05-31	384	7.0	16	17	2.5	.07		

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

OTTER TAIL COUNTY

STATION	NUMBER	LOCAL IDENT- I FIER			GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	SPE- CIFIC CON- DUCT- ANCE
									(UMHOS) (00095)
461235095162501	132N37W25DDC01				1120TSH	84-05-30	0900	20.00	520

POPE 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)
452652095114401	123N36W21DAA01 ALLEN THORSON (DEEP) (P10)	1120TSH	83-12-09	1200	8.10	41.40
452652095114402	123N36W21DAA02 ALLEN THORSON (SHALLOW) (P11)	1120TSH	83-12-09	1130	8.90	13.70
452938095081502	123N36W01ACA02 CLINT WELTE (SHALLOW) (P13)	1120TSH	83-12-08	1400	8.20	16.10
	123N36W01ACA02 CLINT WELTE (SHALLOW) (P13)	1120TSH	84-05-16	1300	7.40	16.00
452939095081501	123N36W01ACA01 CLINT WELTE (DEEP) (P12)	1120TSH	83-12-08	1515	9.30	37.70
	123N36W01ACA01 CLINT WELTE (DEEP) (P12)	1120TSH	84-05-16	1315	--	37.00
453050095113701	124N36W28DDD01 GERALD VANDERBEEK (GANNON,A) (P8)	1120TSH	83-12-09	1045	--	22.00
453531095121901	125N36W33DAB02 THEO BRUHN (P7)	1120TSH	83-12-09	0930	--	14.00
453830095185202	125N37W15ABB02 MIKE SAHLIN (SHALLOW) (P5)	1120TSH	83-12-08	1100	25.20	32.70
	125N37W15ABB02 MIKE SAHLIN (SHALLOW) (P5)	1120TSH	84-05-29	1500	24.20	32.00
453832095185101	125N37W15ABB01 MIKE SAHLIN (DEEP) (P6)	1120TSH	83-12-08	2000	32.60	55.00
	125N37W15ABB01 MIKE SAHLIN (DEEP) (P6)	1120TSH	84-05-29	1600	--	55.00
454002095120703	125N36W04ADA3MCKIGNEY BARN(I)	1120TSH	83-12-08	1700	--	40.00
454003095120401	125N36W04ADA MCKIGNEY(I) USGS	1120TSH	84-05-16	1410	--	18.00
454004095120502	125N36W04ADA02 LEO MCKIGNEY (P4)	1120TSH	83-12-08	1630	--	18.00
454024095192201	126N37W34CCC01 JIMMIE JACOBS (P1)	1120TSH	83-11-16	1445	--	35.00
454033095170302	126N37W35DAD02 D. GARY REENTS (P2)	1120TSH	83-11-16	1530	--	36.00
454228095123901	126N36W21DDB01 BRUCE HANSON (P3)	1120TSH	83-11-16	1215	--	26.00

DATE OF SAMPLE	ELEV. OF LAND SURFACE (FT. NGVD) (72000)	SPE-CIFIC CONDUCTANCE (UMHOS) (00095)	PH (STANDARD) (00400)	TEMPERATURE (DEG C) (00010)	NITRO-GEN DIS-SOLVED (MG/L AS N) (00602)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, 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, AMMONIA + ORGANIC DIS-SOLVED (MG/L AS N) (00623)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)
83-12-09	1302.00	515	537	7.2	8.0	.71	2.0	3.7	.11	.60	.02
83-12-09	1302.00	555	588	7.2	9.0	7.1	18	4.3	6.6	.04	.01
83-12-08	1305.00	630	674	7.6	9.5	17	25	25	17	.10	.02
84-05-16	1305.00	725	775	7.3	7.5	--	34	37	11	.06	--
83-12-08	1305.00	375	512	7.6	9.0	2.3	61	5.2	2.0	.24	<.01
84-05-16	1305.00	540	580	7.4	8.0	--	42	19	2.3	.97	--
83-12-09	1328.00	525	--	7.4	9.5	--	--	--	13	--	--
83-12-09	1342.00	630	--	7.3	11.5	--	--	--	12	--	--
83-12-08	1365.00	415	459	7.5	8.0	4.9	13	4.5	4.6	.07	.30
84-05-29	1365.00	400	459	6.9	9.5	--	13	4.3	6.0	.10	--
83-12-08	1372.00	410	503	7.4	7.5	.89	36	9.8	.29	.39	.02
84-05-29	1372.00	435	502	7.1	8.5	--	44	9.8	.34	.60	--
83-12-08	1345.00	460	--	7.6	8.0	--	--	--	.22	--	--
84-05-16	1345.00	460	483	7.5	8.5	--	19	33	4.3	.26	--
83-12-08	1345.00	520	--	7.6	14.0	--	--	--	8.2	--	--
83-11-16	1375.00	560	--	7.3	8.0	--	--	--	11	--	--
83-11-16	1355.00	580	--	7.4	10.5	--	--	--	9.2	--	--
83-11-16	1342.00	535	--	7.3	11.0	--	--	--	4.8	--	--

DATE OF SAMPLE	COPPER, DIS- SOLVED (UG/L AS CU (01040)	IRON, DIS- SOLVED (UG/L AS FE (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN (01056)
83-12-09	<10	4400	82
83-12-09	--	<20	<10
83-12-08	--	10	10
84-05-16	--	--	--
83-12-08	--	840	210
84-05-16	--	--	--
83-12-09	--	--	--
83-12-09	--	--	--
83-12-08	--	530	40
84-05-29	--	--	--
83-12-08	--	<20	110
84-05-29	--	--	--
83-12-08	--	--	--
84-05-16	--	--	--
83-12-08	--	--	--
83-11-16	--	--	--
83-11-16	--	--	--
83-11-16	--	--	--

PESTICIDE ANALYSIS

[illegible]

QUALITY OF GROUND WATER

399

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

SHERBURNE 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)
451822093424003	033N27W33CAB03ZIMMERMAN_H(SH26)	1120TSH	84-06-08	1130	--	60.00
451823093424002	033N27W33CAB02ZIMMERMAN_D(SH4)	1120TSH	84-06-08	1000	11.00	26.00
451825093422101	033N27W33ACC01ZIMMERMAN_S(SH3)	1120TSH	84-06-08	1230	5.40	11.00
	033N27W33ACC01ZIMMERMAN_S(SH3)	1120TSH	84-08-01	1330	5.10	11.00
451954093424801	033N27W21CCA01BROMELING_S(SH30)	1120TSH	84-06-28	1130	9.30	20.00
451957093412701	033N27W22CBD01HUDSON_S(SH1)	1120TSH	84-06-08	1545	13.00	20.00
	033N27W22CBD01HUDSON_S(SH1)	1120TSH	84-08-01	1130	12.20	20.00
451957093412702	033N27W22CBD02HUDSON_D(SH2)	1120TSH	84-06-08	1700	13.00	35.00
	033N27W22CBD02HUDSON_D(SH2)	1120TSH	84-08-01	1230	12.20	35.00
452030093511401	033N28W20BAC01NSP_S(SH5)	1120TSH	84-06-12	1000	16.80	23.00
	033N28W20BAC01NSP_S(SH5)	1120TSH	84-08-01	1500	17.10	23.00
452030093511402	033N28W20BAC02NSP_D(SH6)	1120TSH	84-06-12	1145	16.80	35.00
	033N28W20BAC02NSP_D(SH6)	1120TSH	84-08-01	1530	17.10	35.00
452259093574001	033N29W04BBC01TOREN_H(SH9)	1120TSH	84-06-13	0945	--	85.00
452309093573701	033N29W04BBA01GOENNERE_S(SH7)	1120TSH	84-06-13	1100	13.10	20.00
	033N29W04BBA01GOENNERE_S(SH7)	1120TSH	84-08-01	1600	15.00	20.00
452309093573702	033N29W04BBA02GOENNERE_D(SH8)	1120TSH	84-06-13	1300	13.20	35.00
	033N29W04BBA02GOENNERE_D(SH8)	1120TSH	84-08-01	1630	15.00	35.00
452545093571002	034N29W21ABB02GOENNERM_D(SH13)	1120TSH	84-06-13	1530	18.00	37.00
	034N29W21ABB02GOENNERM_D(SH13)	1120TSH	84-08-01	1730	18.60	37.00
452545093571003	034N29W21ABB03GOENNERM_DD(SH14)	1120TSH	84-06-13	1700	17.90	111
452545093571004	034N29W21ABB04GOENNERM_S(SH12)	1120TSH	84-06-13	1400	18.00	23.00
	034N29W21ABB04GOENNERM_S(SH12)	1120TSH	84-08-01	1700	18.60	23.00
452549093571301	034N29W16CDD01GOENNERC_H(SH15)	1120TSH	84-06-13	1830	--	60.00
452638093402802	034N27W10DD02SHERB-NWR2_S(SH32)	1120TSH	84-06-28	1730	23.80	35.00
452720093552201	034N29W10AAD01BERGER_S(SH10)	1120TSH	84-06-12	1500	7.90	14.00
	034N29W10AAD01BERGER_S(SH10)	1120TSH	84-08-01	1830	10.60	14.00
452720093552202	034N29W10AAD02BERGER_D(SH11)	1120TSH	84-06-12	1630	7.90	25.00
	034N29W10AAD02BERGER_D(SH11)	1120TSH	84-08-01	1900	10.70	25.00
452807093491401	034N28W04ADA02KOB_S(SH29)	1120TSH	84-06-27	2000	3.10	13.00
452909094045501	035N30W33BAB01LAYERS_H(SH20)	1120TSH	84-06-14	1400	--	30.00
452914094045601	035N30W28CDC01LAYERS_S(SH18)	1120TSH	84-06-14	1030	3.40	10.00
	035N30W28CDC01LAYERS_S(SH18)	1120TSH	84-08-28	1830	4.55	10.00
452914094045602	035N30W28CDC02LAYERS_D(SH19)	1120TSH	84-06-14	1200	3.50	23.00
	035N30W28CDC02LAYERS_D(SH19)	1120TSH	84-08-28	1900	4.58	23.00

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
SHERBURNE COUNTY, Continued

DATE	ELEVATION OF LAND SURFACE DATE OF SURFACE SAMPLE	DEPTH OF WELL (FEET)	CONDUCTANCE (UMHOS)	TEMPERATURE (DEG C)	CALCIUM DIS-SOLVED (MG/L)	MAGNE- SIUM, DIS-SOLVED (MG/L)	SODIUM, DIS-SOLVED (MG/L)	POTAS- SIUM, DIS-SOLVED (MG/L)	ALKALINITY FIELD (MG/L)	ALKALINITY LAB (MG/L)	SULFATE DIS-SOLVED (MG/L)	
DATE	ELEVATION OF LAND SURFACE DATE OF SURFACE SAMPLE	DEPTH OF WELL (FEET)	CONDUCTANCE (UMHOS)	TEMPERATURE (DEG C)	CALCIUM DIS-SOLVED (MG/L)	MAGNE- SIUM, DIS-SOLVED (MG/L)	SODIUM, DIS-SOLVED (MG/L)	POTAS- SIUM, DIS-SOLVED (MG/L)	ALKALINITY FIELD (MG/L)	ALKALINITY LAB (MG/L)	SULFATE DIS-SOLVED (MG/L)	
84-06-08	931.00	400	416	7.4	10.5	54	16	3.3	.90	170	167	36
84-06-08	931.00	705	732	7.4	11.0	100	30	3.9	1.1	360	177	27
84-06-08	921.00	435	422	7.1	7.5	49	14	1.8	2.4	95	93	16
84-06-08	921.00	900	436	7.0	12.0	--	--	1.8	2.4	140	140	16
84-06-28	936.00	440	436	7.8	9.5	57	16	1.8	.60	170	167	14
84-06-08	934.00	720	775	7.7	9.0	74	17	5.3	1.0	240	239	15
84-06-08	934.00	840	775	7.6	10.0	--	--	1.0	1.0	240	239	15
84-06-08	934.00	705	697	7.4	9.5	83	22	1.9	1.1	270	264	24
84-06-08	934.00	720	697	7.4	10.0	--	--	1.9	1.1	270	264	24
84-06-12	929.00	625	597	7.7	9.0	76	23	2.4	1.1	170	143	35
84-08-01	929.00	680	477	7.6	9.0	--	--	2.4	1.1	170	143	35
84-06-12	929.00	580	457	7.6	10.5	76	23	2.6	1.2	160	102	39
84-08-01	929.00	680	477	7.6	9.5	--	--	2.6	1.2	160	102	39
84-06-12	942.80	760	747	7.5	10.0	88	25	2.5	2.7	250	135	72
84-06-12	947.00	705	659	7.5	9.0	89	27	3.2	.90	210	128	64
84-08-01	947.00	705	659	7.3	9.5	--	--	3.2	.90	210	128	64
84-06-12	947.00	590	542	7.7	9.5	75	21	1.8	1.1	200	191	66
84-08-01	947.00	610	542	7.4	9.0	--	--	1.8	1.1	200	191	66
84-06-12	985.00	860	755	7.4	9.0	78	26	3.8	1.7	270	262	16
84-08-01	985.00	840	755	7.4	10.5	--	--	3.8	1.7	270	262	16
84-06-13	985.00	505	451	7.6	9.5	63	20	3.0	1.3	200	202	49
84-06-13	985.00	630	567	7.6	--	77	25	5.1	.60	270	225	28
84-08-01	985.00	590	567	7.3	9.0	--	--	5.1	.60	270	225	28
84-06-13	983.80	805	709	7.4	9.5	84	26	2.4	1.5	260	142	31
84-06-28	972.00	460	--	--	12.0	--	--	2.4	1.5	260	142	31
84-06-12	970.00	585	584	7.4	8.5	83	25	5.2	1.0	240	222	25
84-06-12	970.00	700	--	7.3	10.0	--	--	5.2	1.0	240	222	25
84-06-12	970.00	595	585	7.7	9.0	80	26	3.9	1.6	210	215	54
84-06-12	970.00	740	--	7.5	10.0	--	--	3.9	1.6	210	215	54
84-06-27	998.00	120	103	7.9	9.0	13	3.5	1.6	.40	49	47	5.0
84-06-14	1008.00	580	528	7.4	10.0	75	24	2.4	.90	280	168	20
84-06-14	1000.00	655	612	7.4	9.5	85	27	2.1	.40	320	219	14
84-08-28	1000.00	710	--	7.3	14.0	--	--	2.1	.40	320	219	14
84-06-14	1000.00	760	686	7.4	8.0	100	31	2.3	1.3	370	177	13
84-08-28	1000.00	725	--	7.2	10.5	--	--	2.3	1.3	370	177	13

E--estimated.

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

SHERBURNE 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, 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)	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)
84-06-08	8.7	.10	15	--	.22	<.01	2.1	<.01	<20	1300	190	2.3
84-06-08	15	.10	15	--	.12	<.01	1.2	<.01	<20	600	210	1.1
84-06-08	16	<.10	8.4	--	19	<.01	1.3	.04	<20	250	14	1.4
84-08-01	--	--	--	--	44	--	--	--	--	--	--	--
84-06-28	14	.60	15	.91	18	.38	.38	<.01	50	82	4	1.3
84-06-08	93	<.10	15	--	2.7	<.01	2.5	<.01	<20	24	21	1.6
84-08-01	--	--	--	--	3.5	--	--	--	--	--	--	--
84-06-08	55	.10	17	--	<.10	.10	2.3	<.01	<20	2400	380	1.7
84-08-01	--	--	--	--	<.10	--	--	--	--	--	--	--
84-06-12	29	.10	15	<.01	16	<.01	.30	<.01	40	12	7	.90
84-08-01	--	--	--	--	19	--	--	--	--	--	--	--
84-06-12	37	<.10	15	.11	17	.13	.30	<.01	70	6	14	.90
84-08-01	--	--	--	--	19	--	--	--	--	--	--	--
84-06-13	60	.10	17	<.01	<.10	<.01	.40	<.01	<20	1900	360	1.2
84-06-13	16	.10	21	<.01	15	<.01	.40	<.01	100	8	11	1.0
84-08-01	--	--	--	--	22	--	--	--	--	--	--	--
84-06-13	11	.10	20	.12	3.9	.02	.50	<.01	<20	9	10	1.2
84-08-01	--	--	--	--	3.1	--	--	--	--	--	--	--
84-06-13	92	.10	15	<.01	<.10	.08	.60	<.01	30	7500	220	1.5
84-08-01	--	--	--	--	.45	--	--	--	--	--	--	--
84-06-13	3.2	.10	21	<.01	<.10	.06	.30	<.01	<20	280	540	1.0
84-06-13	11	.10	16	<.01	4.8	<.01	.60	<.01	20	8	39	1.9
84-08-01	--	--	--	--	4.8	--	--	--	--	--	--	--
84-06-13	55	<.10	17	<.01	6.3	<.01	.50	<.01	50	<3	1	1.0
84-06-28	--	--	--	--	.79	--	--	--	--	--	--	--
84-06-12	20	<.10	14	<.01	11	<.01	.30	<.01	180	5	13	1.5
84-08-01	--	--	--	--	16	--	--	--	--	--	--	--
84-06-12	21	.10	18	.11	12	<.01	.30	.02	90	25	140	.90
84-08-01	--	--	--	--	17	--	--	--	--	--	--	--
84-06-27	.50	.10	19	.08	<.10	.20	.20	.01	<20	32	2	1.0
84-06-14	12	.10	15	<.01	.82	<.01	.30	<.01	<20	17	23	1.4
84-06-14	19	.10	15	<.01	<.10	<.01	.50	<.01	<20	19	14	2.7
84-08-28	--	--	--	--	<.10	--	--	--	--	--	--	--
84-06-14	15	<.10	18	<.01	3.1	<.01	.40	<.01	<20	42	64	2.1
84-08-28	--	--	--	--	.63	--	--	--	--	--	--	--

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)
452930094024401		035N30W26CBC01JONASON_H(SH17)	1120TSH	84-06-14	1830	--	26.00
452938093432701		035N27W29DBB02SHERB-NWR3_S(SH33)	1120TSH	84-06-28	1500	4.10	15.00
453003094022701		035N30W26BAB01BENSEN_S(SH16)	1120TSH	84-06-14	1700	5.20	14.00
453058093393501		035N27W14DCD01SHERB-NWR4_S(SH34)	1120TSH	84-06-28	1900	13.30	21.00
453121093334401		035N26W15DBB01WEISSENFLUH_DD(SH25)	1120TSH	84-06-19	1800	3.00	56.00
453121093334402		035N26W15DBB01WEISSENFLUH_DD(SH25)	1120TSH	84-08-29	1700	5.90	56.00
		035N26W15DBB02WEISSENFLUH_D(SH24)	1120TSH	84-06-19	1600	3.00	15.00
		035N26W15DBB02WEISSENFLUH_D(SH24)	1120TSH	84-08-29	1630	5.98	15.00
453121093334403		035N26W15DBB03WEISSENFLUH_S(SH23)	1120TSH	84-06-19	1500	3.00	9.00
		035N26W15DBB03WEISSENFLUH_S(SH23)	1120TSH	84-08-29	1600	6.04	9.00
453215093315101		035N26W12BCC01UBL_S(SH21)	1120TSH	84-06-15	1000	3.60	11.00
		035N26W12BCC01UBL_S(SH21)	1120TSH	84-08-29	1130	--	11.00
		035N26W12BCC01UBL_S(SH21)	1120TSH	84-08-29	1400	5.99	11.00
453215093315102		035N26W12BCC02UBL_D(SH22)	1120TSH	84-06-15	1200	3.70	37.00
		035N26W12BCC02UBL_D(SH22)	1120TSH	84-08-29	1430	6.05	37.00
453230093530001		035N29W12AAD01MORTENSEN_D(SH28)	1120TSH	84-06-27	1830	0.20	28.00
453230093530002		035N29W12AAD02MORTENSEN_S(SH27)	1120TSH	84-06-27	1730	0.10	12.00

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
SHERBURNE COUNTY--Continued

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	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 FIELD (MG/L AS CACO3) (00410)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
84-06-14	1015.00	585	556	7.4	10.0	69	19	16	1.8	250	246	18
84-06-28	985.00	490	391	6.7	9.0	62	9.0	3.5	1.0	200	198	4.2
84-06-14	995.00	440	392	7.6	--	54	17	1.9	.90	190	181	22
84-06-28	975.00	500	487	7.6	8.5	68	17	4.5	.70	210	200	11
84-06-19	965.00	365	367	7.7	9.0	44	15	4.0	1.1	190	180	9.0
84-08-29	965.00	350	--	E7.7	9.0	--	--	--	--	--	--	--
84-06-19	965.00	260	258	7.1	7.5	29	8.7	5.4	.70	81	80	28
84-08-29	965.00	265	--	E7.2	10.0	--	--	--	--	--	--	--
84-06-19	965.00	165	136	6.1	10.0	3.8	1.5	8.4	.30	35	<1.0	44
84-08-29	965.00	175	--	E6.2	13.0	--	--	--	--	--	--	--
84-06-15	959.00	95	97	6.4	8.5	10	2.5	1.9	1.5	28	29	12
84-08-29	959.00	--	--	--	13.5	--	--	--	--	--	--	--
84-08-29	959.00	150	--	E6.5	13.5	--	--	--	--	--	--	--
84-06-15	959.00	230	228	7.9	9.0	35	7.5	2.8	.80	91	92	26
84-08-29	959.00	280	--	E7.9	9.5	--	--	--	--	--	--	--
84-06-27	1012.00	430	405	7.3	9.5	61	14	2.5	.90	220	209	3.1
84-06-27	1012.00	290	242	6.2	8.5	33	8.7	3.5	.40	160	121	<.2

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, 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)	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)
84-06-14	26	.10	17	<.01	1.8	<.01	.20	.04	30	5	7	1.7
84-06-28	3.5	.10	23	.07	<.10	.10	.10	<.01	<20	16000	2200	2.4
84-06-14	4.1	<.10	19	<.01	4.4	<.01	.40	<.01	<20	10	120	.90
84-06-28	11	.10	19	.07	7.9	.04	.60	<.01	<20	160	13	1.1
84-06-19	1.4	.20	23	<.01	<.10	.09	.30	.02	<20	1200	190	1.4
84-08-29	--	--	--	--	<.10	--	--	--	--	--	--	--
84-06-19	3.8	<.10	25	<.01	3.5	<.01	.60	.05	110	110	10	1.9
84-08-29	--	--	--	--	<.10	--	--	--	--	--	--	--
84-06-19	1.1	.10	26	<.01	<.10	<.01	.40	<.01	30	20000	240	2.4
84-08-29	--	--	--	--	<.10	--	--	--	--	--	--	--
84-06-15	3.0	<.10	9.7	<.01	2.4	<.01	.40	<.01	<20	21	17	.90
84-08-29	--	--	--	--	--	--	--	--	--	--	--	--
84-08-29	--	--	--	--	4.2	--	--	--	--	--	--	--
84-06-15	6.9	.10	16	<.01	<.10	<.01	.40	<.01	<20	210	150	.80
84-08-29	--	--	--	--	<.10	--	--	--	--	--	--	--
84-06-27	1.4	.10	26	.05	.12	.07	.80	<.01	<20	1800	210	4.7
84-06-27	4.2	.10	15	.05	<.10	.07	1.7	<.01	<20	5300	350	17

E--estimated.

SHERBURNE COUNTY--Continued

PESTICIDE ANALYSIS

STATION	NUMBER	LOCAL IDENT- I PIER	GEO- LOGIC UNIT	DATE	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)
451825093422101	033N27W33ACC01	ZIMMERMAN_S(S	1120TSH	84-08-01	1330	5.10	11.00	921	<0.1
451957093412701	033N27W22CBD01	HUDSON_S(SH1)	1120TSH	84-08-01	1130	12.20	20.00	934	<0.1
452030093511401	033N28W20BAC01	NASP_S(SH5)	1120TSH	84-08-01	1500	17.10	23.00	929	<0.1
452309093573701	033N29W04BBA01	GOENNERE_S(SH	1120TSH	84-08-01	1600	15.00	20.00	947	<0.1
452545093571004	034N29W21ABB04	GOENNERM_S(SH	1120TSH	84-08-01	1700	18.60	23.00	985	<0.1
452720093552201	034N29W10AAD01	BERGER_S(SH10	1120TSH	84-08-01	1830	10.60	14.00	970	<0.1
452914094045601	035N30W28CDC01	AYERS_S(SH18)	1120TSH	84-08-28	1830	4.55	10.00	1000	<0.1
453121093334403	035N26W15DDB03	WEISSENFLUH_S	1120TSH	84-08-29	1600	6.04	9.00	965	<0.1
453215093315101	035N26W12BCC01	UBL_S(SH21)	1120TSH	84-08-29	1130	--	11.00	959	<0.1

[illegible]

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
STEARNS COUNTY

STATION	NUMBER	LOCAL IDENT- I PIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)
451955094165601		122N29W36CBC01SCHOOLSCTLK_DD(S48)	1120TSH	84-08-02	1300	3.30	25.50
		122N29W36CBC01SCHOOLSCTLK_DD(S48)	1120TSH	84-08-28	1300	3.40	25.50
451955094165602		122N29W36CBC02SCHOOLSCTLK_D(S47)	1120TSH	84-08-02	1230	3.20	17.70
		122N29W36CBC02SCHOOLSCTLK_D(S47)	1120TSH	84-08-28	1200	3.40	17.70
451955094165603		122N29W36CBC03SCHOOLSCTLK_S(S46)	1120TSH	84-08-02	1200	3.20	6.30
		122N29W36CBC03SCHOOLSCTLK_S(S46)	1120TSH	84-08-28	1100	3.40	6.30
452245094144601		122N28W18ADC01FOSSUM_S(S31)	1120TSH	84-06-21	1600	16.70	23.00
		122N28W18ADC01FOSSUM_S(S31)	1120TSH	84-08-28	1530	18.35	23.00
452245094144602		122N28W18ADC02FOSSUM_D(S32)	1120TSH	84-06-21	1700	16.70	38.00
		122N28W18ADC02FOSSUM_D(S32)	1120TSH	84-08-28	1630	18.38	38.00
452526094420701		123N32W33AAD01 STEPHEN GOTTWALD (S10)	1120TSH	83-11-01	1810	--	20.00
452543094191902		123N29W27CCC02GRANDLK_S(S33)	1120TSH	84-06-26	1700	11.10	20.00
452631095073501		123N35W19CCD	112PLSC	83-11-02	1230	--	17.00
452632094145102		123N28W30ABA02ALBERSMILL_S(S34)	1120TSH	84-06-26	1900	10.30	20.00
		123N28W30ABA02ALBERSMILL_S(S34)	1120TSH	84-08-28	1700	11.76	20.00
452636095064001		123N35W19DDA01 JOHN BROWER (S6)	1120TSH	83-11-02	1115	--	20.00
452647094571602		123N34W21DBD02 BORGERDING (RENT, N. YOUNG) (S4)	1120TSH	83-11-02	0930	--	20.00
452721094293601		123N30W19ABA01 EDWIN TORBORG (S11)	1120TSH	83-11-01	1215	4.00	12.70
452731094585901		123N34W17CDB01 GEORGE RUTER (HOUSE) (S5)	1120TSH	83-11-02	1030	--	22.00
452748095053704		123N35W17ADC04SANDVIG DOM	112BRDO	83-11-02	1330	15.00	196
452750095054001		123N35W09ADC01 HARLAN SANDVIG (DEEP) (S7)	1120TSH	83-11-02	1430	15.90	30.30
		123N35W09ADC01 HARLAN SANDVIG (DEEP) (S7)	1120TSH	84-05-16	1130	--	70.00
452750095054002		123N35W09ADC02 HARLAN SANDVIG (SHALLOW) (S8)	1120TSH	83-11-02	1445	15.80	21.00
		123N35W09ADC02 HARLAN SANDVIG (SHALLOW) (S8)	1120TSH	83-12-07	1030	15.70	21.00
		123N35W09ADC02 HARLAN SANDVIG (SHALLOW) (S8)	1120TSH	84-05-16	1115	--	21.00
452759094302801		123N31W13AAC4TORBORG (I) MEL	1120TSH	83-11-01	1345	4.50	28.00
452843094230501		123N30W12ADD01 LEANDER HANSEN (DEEP) (S13)	1120TSH	83-10-31	1630	5.70	34.00
		123N30W12ADD01 LEANDER HANSEN (DEEP) (S13)	1120TSH	84-05-18	1230	5.70	34.00
452843094230502		123N30W12ADD02 LEANDER HANSEN (SHALLOW) (S14)	1120TSH	83-10-31	1600	5.50	15.00
		123N30W12ADD02 LEANDER HANSEN (SHALLOW) (S14)	1120TSH	84-05-18	1215	5.40	15.00
453107094394601		124N32W26DAC01TERRES TRAILER	112BRDO	83-11-01	1700	--	70.00
453124094395201		124N32W26ADB01 RALPH TERRES (S12)	1120TSH	83-11-01	1630	--	27.00
453141094091004		124N28W25BBA04TEIGEN_H(S38)	112BRDO	84-06-21	1430	--	80.00
453145094091003		124N28W25BBA03TEIGEN_SS(S37)	1120TSH	84-06-21	1330	10.40	17.50

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
STEARNS COUNTY--Continued

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (Q0400)	TEMPER- ATURE (DEG C) (00010)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	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- LINIT- FIELD (MG/L AS CACO3) (00410)	ALKA- LINIT- LAB (MG/L AS CACO3) (90410)
84-08-02	1145.00	630	--	7.5	10.0	--	--	--	--	--	230	--
84-08-28	1145.00	630	632	E7.6	11.0	--	85	27	1.5	1.9	260	224
84-08-02	1145.00	665	--	7.6	11.0	--	--	--	--	--	230	--
84-08-28	1145.00	630	622	E7.6	11.0	--	80	25	2.0	1.5	240	235
84-08-02	1145.00	630	--	7.5	16.5	--	--	--	--	--	250	--
84-08-28	1145.00	630	624	E7.5	18.0	--	82	25	4.2	1.4	260	260
84-06-21	1145.00	610	612	7.5	8.0	--	78	22	2.7	1.1	210	205
84-08-28	1145.00	545	--	E7.4	9.0	--	--	--	--	--	--	--
84-06-21	1145.00	395	379	8.6	9.0	--	56	26	3.3	2.0	150	155
84-08-28	1145.00	395	--	E8.2	9.5	--	--	--	--	--	--	--
83-11-01	1187.00	690	--	7.0	13.0	--	--	--	--	--	--	--
84-06-26	1121.00	550	512	7.6	8.0	--	71	21	3.7	1.6	260	256
83-11-02	1300.00	700	--	7.2	15.5	--	--	--	--	--	--	--
84-06-26	1115.00	610	563	7.2	8.5	--	78	23	3.2	.80	280	266
84-08-28	1115.00	660	--	E7.0	10.5	--	--	--	--	--	--	--
83-11-02	1295.00	535	--	7.4	11.5	--	--	--	--	--	--	--
83-11-02	1245.00	740	--	7.0	12.5	--	--	--	--	--	--	--
83-11-01	1102.00	1100	--	7.1	12.0	--	--	--	--	--	--	--
83-11-02	1263.00	520	--	7.4	13.0	--	--	--	--	--	--	--
83-11-02	1290.00	490	--	7.4	10.5	--	--	--	--	--	--	--
83-11-02	1294.00	790	811	7.3	9.0	--	--	--	--	--	--	--
84-05-16	1294.00	710	774	7.2	9.0	--	--	--	--	--	--	--
83-11-02	1294.00	1030	1060	7.2	13.0	53	--	--	--	--	--	--
83-12-07	1294.00	1030	--	7.5	8.5	--	--	--	--	--	--	--
84-05-16	1294.00	880	941	7.1	8.5	--	--	--	--	--	--	--
83-11-01	1116.00	885	--	7.1	10.5	--	--	--	--	--	--	--
83-10-31	1110.00	670	659	7.2	8.0	--	--	--	--	--	--	--
84-05-18	1110.00	620	679	7.2	8.0	--	--	--	--	--	--	--
83-10-31	1110.00	1030	1040	7.3	12.5	45	--	--	--	--	--	--
84-05-18	1110.00	740	791	7.2	7.5	--	--	--	--	--	--	--
83-11-01	1178.00	740	--	6.9	9.0	--	--	--	--	--	--	--
83-11-01	1140.00	480	--	7.3	10.5	--	--	--	--	--	--	--
84-06-21	970.00	400	398	7.6	9.0	--	47	17	6.0	2.2	210	200
84-06-21	961.00	795	799	7.3	10.5	--	90	27	23	2.0	270	264

E--estimated.

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
STEARNS COUNTY--Continued

DATE OF SAMPLE	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)	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. (MG/L AS N) (00623)	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)
84-08-02	--	--	--	--	--	12	--	--	--	--	--	--
84-08-28	33	25	.10	23	--	13	.03	.30	<.01	<20	20	20
84-08-02	--	--	--	--	--	13	--	--	--	--	--	--
84-08-28	13	.00	.10	23	--	13	.04	.30	<.01	<20	<10	40
84-08-02	--	--	--	--	--	8.9	--	--	--	--	--	--
84-08-28	9.2	.00	.10	18	--	10	.06	.50	<.01	30	10	30
84-06-21	15	30	<.10	19	<.01	14	<.01	.70	<.01	170	8	9
84-08-28	--	--	--	--	--	11	--	--	--	--	--	--
84-06-21	20	16	.10	16	.03	1.0	.04	.90	<.01	<20	1400	260
84-08-28	--	--	--	--	--	3.4	--	--	--	--	--	--
83-11-01	--	--	--	--	--	12	--	--	--	--	--	--
84-06-26	17	15	.20	25	.05	<.10	.05	.30	<.01	30	4800	190
83-11-02	--	--	--	--	--	23	--	--	--	--	--	--
84-06-26	18	12	.20	23	.06	5.6	.03	.60	<.01	20	6500	600
84-08-28	--	--	--	--	--	<.10	--	--	--	--	--	--
83-11-02	--	--	--	--	--	6.0	--	--	--	--	--	--
83-11-02	--	--	--	--	--	3.2	--	--	--	--	--	--
83-11-01	--	--	--	--	--	.23	--	--	--	--	--	--
83-11-02	--	--	--	--	--	2.8	--	--	--	--	--	--
83-11-02	--	--	--	--	--	<.10	--	--	--	--	--	--
83-11-02	12	46	--	--	--	32	<.01	<.10	.01	--	100	<10
84-05-16	15	49	--	--	--	9.8	.84	--	--	--	--	--
83-11-02	9.0	52	--	--	--	52	.15	1.2	.01	--	730	30
83-12-07	--	--	--	--	--	--	--	--	--	--	--	--
84-05-16	13	23	--	--	--	17	.06	--	--	--	--	--
83-11-01	--	--	--	--	--	19	--	--	--	--	--	--
83-10-31	35	21	--	--	--	<.10	.08	.70	.02	--	6300	110
84-05-18	41	23	--	--	--	<.10	.09	--	--	--	--	--
83-10-31	39	33	--	--	--	45	.13	.40	<.01	--	350	740
84-05-18	52	23	--	--	--	18	.29	--	--	--	--	--
83-11-01	--	--	--	--	--	2.2	--	--	--	--	--	--
83-11-01	--	--	--	--	--	12	--	--	--	--	--	--
84-06-21	5.1	1.7	.70	12	<.01	<.10	.49	.60	.05	340	120	33
84-06-21	37	67	.10	18	<.01	4.0	<.01	.70	<.01	80	8	2

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

STEARNS COUNTY--Continued

DATE OF SAMPLE	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
84-08-02	--
84-08-28	2.2
84-08-02	--
84-08-28	1.4
84-08-02	--
84-08-28	3.7
84-06-21	1.4
84-08-28	--
84-06-21	1.2
84-08-28	--
83-11-01	--
84-06-26	1.2
83-11-02	--
84-06-26	3.8
84-08-28	--
83-11-02	--
83-11-02	--
83-11-01	--
83-11-02	--
83-11-02	--
83-11-02	--
84-05-16	--
83-11-02	--
83-12-07	--
84-05-16	--
83-11-01	--
83-10-31	--
84-05-18	--
83-10-31	--
84-05-18	--
83-11-01	--
83-11-01	--
84-06-21	1.2
84-06-21	1.5

STATION NUMBER	LOCAL IDENT- I PIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)
453146094091101	124N28W25BBA01TEIGEN_S(S35)	1120TSH	84-06-21	1030	8.70	17.50
453146094091102	124N28W25BBA02TEIGEN_D(S36)	1120TSH	84-06-21	1130	8.60	22.00
453439094140502	124N28W05CBD02STMICHAELS_H(S41)	1120TSH	84-06-20	1330	20.00	100
453440094135801	124N28W05CAC01STMICHAELS_S(S39)	1120TSH	84-06-20	1000	16.00	22.00
453440094135802	124N28W05CAC02STMICHAELS_D(S40)	1120TSH	84-06-20	1200	16.00	37.00
453441094140701	124N28W05CBD01STMICHAELS_C(S42)	1120TSH	84-06-20	1430	--	75.00
454320094131401	126N28W16CBC01STEARNSCOPK_D(S44)	1120TSH	84-06-22	1400	--	4.20
454320094131402	126N28W16CBC02STEARNSCOPK_S(S43)	1120TSH	84-06-22	1530	--	8.00
454328094135901	126N28W17CAA01HISCOCK_D(S45)	1120TSH	84-06-26	1230	13.30	42.00
454428095051701	126N35W09BAD01 GERALD BEUNING (DEEP) (S1)	1120TSH	83-11-16	1145	6.10	26.00
454428095051702	126N35W09BAD01 GERALD BEUNING (DEEP) (S1)	1120TSH	84-05-16	1515	4.40	26.00
	126N35W09BAD02 GERALD BEUNING (SHALLOW) (S2)	1120TSH	83-11-16	1130	6.10	10.30
	126N35W09BAD02 GERALD BEUNING (SHALLOW) (S2)	1120TSH	84-05-16	1500	4.60	10.00

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
STEARNS COUNTY--Continued

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	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)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	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- L INITY FIELD (MG/L AS CACO3) (00410)	ALKA- L INITY LAB (MG/L AS CACO3) (90410)
84-06-21	960.00	735	734	7.4	9.0	--	78	24	27	1.9	260	258
84-06-21	960.00	775	774	7.3	9.0	--	85	27	28	2.2	260	262
84-06-20	1062.00	590	576	7.3	10.0	--	75	23	3.3	1.5	250	245
84-06-20	1061.00	530	524	7.6	9.0	--	67	20	3.4	.80	260	251
84-06-20	1061.00	770	772	7.5	10.0	--	81	24	25	1.6	280	163
84-06-20	1062.00	870	869	7.3	9.5	--	87	26	33	2.0	260	236
84-06-22	1023.00	450	451	7.5	9.0	--	60	17	3.1	1.0	210	188
84-06-22	1023.00	255	239	7.6	10.5	--	24	12	3.1	<.10	110	114
84-06-26	1047.00	485	367	7.9	9.5	--	56	23	6.3	1.7	250	197
83-11-16	1312.00	530	572	7.2	9.0	--	--	--	--	--	--	--
84-05-16	1312.00	530	565	7.3	8.0	--	--	--	--	--	--	--
83-11-16	1312.00	810	861	7.4	10.0	30	--	--	--	--	--	--
84-05-16	1312.00	750	793	7.3	8.0	--	--	--	--	--	--	--

DATE OF SAMPLE	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)	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. (MG/L AS N) (00623)	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)
84-06-21	34	58	.20	17	<.01	3.4	<.01	.80	<.01	50	12	4
84-06-21	40	68	.20	15	<.01	3.4	<.01	.40	<.01	40	20	130
84-06-20	40	7.6	.20	20	<.01	<.10	.07	.40	<.01	20	2400	160
84-06-20	9.2	1.9	.10	18	<.01	2.8	<.01	.50	<.01	90	9	6
84-06-20	26	53	.10	14	<.01	3.2	<.01	.60	<.01	40	9	5
84-06-20	52	93	.10	18	<.01	<.10	.07	.20	<.01	<20	2400	200
84-06-22	18	4.9	.20	19	<.01	.51	<.01	1.1	<.01	<20	15	1
84-06-22	5.6	4.0	.20	24	<.01	.11	<.01	.60	<.01	<20	610	8
84-06-26	12	2.8	.20	17	.05	<.10	.12	.30	<.01	20	310	97
83-11-16	30	8.1	--	--	--	<.10	.11	.80	.03	--	990	270
84-05-16	31	6.0	--	--	--	<.10	.11	--	--	--	--	--
83-11-16	25	8.1	--	--	--	30	.18	.20	.06	--	70	<10
84-05-16	51	47	--	--	--	11	.07	--	--	--	--	--

CARBON,
ORGANIC
DIS-
SOLVED
(MG/L
AS C)
(00681)

84-06-21 1.3
84-06-21 .80
84-06-20 1.4
84-06-20 1.1
84-06-20 1.2

84-06-20 1.2
84-06-22 1.2
84-06-22 2.4
84-06-26 2.1
83-11-16 --

84-05-16 --
83-11-16 --
84-05-16 --

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

STEARNS COUNTY--Continued

PESTICIDE ANALYSIS

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)
451955094165603	122N29W36CBC03SCHOOL_S(46)		1120TSH	84-08-28	1100	3.40	6.30
452245094144601	122N28W18ADC01FOSSUM_S(S31)		1120TSH	84-08-28	1530	18.35	23.00
452632094145102	123N28W30ABA02ALBERSMILL_S(S34)		1120TSH	84-08-28	1700	11.76	20.00
452750095054002	123N35W09ADC02 HARLAN SANDVIG(SHALLOW)(S8)		1120TSH	83-12-07	1030	15.70	21.00

DATE OF SAMPLE	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD) (72000)	AME- TRYNE TOTAL (82184)	ATRA- TONE TOTAL (82185)	ATRA- ZINE, TOTAL (39630)	CYAN- AZINE TOTAL (81757)	CYPRA- ZINE TOTAL (82187)	PROME- TONE TOTAL (39056)	PROME- TRYNE TOTAL (39057)	PRO- PAZINE TOTAL (39024)	SIMA- ZINE TOTAL (39055)	SIME- TONE TOTAL (82188)	SIME- TRYNE TOTAL (39054)
84-08-28	1145.00	<.1	.3	.3	<.1	--	<.1	<.1	.1	<.1	--	<.1
84-08-28	1145.00	<.1	--	.5	<.1	--	<.1	<.1	<.1	<.1	--	<.1
83-12-07	1294.00	<.1	.1	.2	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

WADENA COUNTY

STATION	NUMBER	LOCAL IDENT- I FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	TIME	DEPTH OF WELL, TOTAL (FEET) (72008)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)
462315094480016	134N33W35ABD01	S-16	1120TSH	84-05-17	1415	30.00	490
462315094480018	134N33W35ABD03	S-18	1120TSH	84-05-17	1430	19.00	610
462530095050001	134N35W10CDC01		1120TSH	84-05-31	1100	24.00	610
462815094532001	135N33W30DCD01		1120TSH	84-05-17	1200	87.00	460
463000094583001	135N34W16DBC01		1120TSH	84-05-31	1000	65.00	425
464300094533001	137N33W06AAA01		1120TSH	84-05-31	0830	13.00	600

DATE OF SAMPLE	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	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)
84-05-17	501	7.0	9.5	1.0	4.0	.13	.55
84-05-17	641	7.0	9.0	17	17	13	.08
84-05-31	671	6.8	10.5	37	15	<.10	.16
84-05-17	486	7.2	9.0	15	11	12	.14
84-05-31	471	6.8	8.0	13	2.1	<.10	.04
84-05-31	641	6.5	9.0	37	78	.72	2.2

CHEMICAL QUALITY OF PRECIPITATION

461458094295000 PRECIPITATION STATION AT CAMP RIPLEY, MN
(National atmospheric deposition program station)

LOCATION.--Lat 46°41'58", long 94°29'50", in NE¼ sec.18, T.132 N., R.30 W, Morrison County, Hydrologic Unit 07010106, about 500 feet southwest of the abandoned Gilgal Church and approximately 5 miles south of Pillager.

PERIOD OF RECORD.--October 1983 to September 1984 (weekly composite).

INSTRUMENTATION.--Samples are collected in a polyethylene bucket by an electrically operated wet/dry collector. A recording rain gage and a standard U.S. Weather Service bulk rain gage measure rainfall quantity.

REMARKS.--An observer collects only the wetfall bucket and services the rain gages every Tuesday around 0900 hours. The observer weighs the bucket and if there is enough wetfall, determines specific conductance and pH. The bucket with its remaining contents is then sent to the Illinois State Water Survey Lab for analysis.

CHEMICAL ANALYSIS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

WEEKLY COMPOSITE

DATE	PRECIP- ITATION (46529) INCHES	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)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
OCT , 1983							
18-25	.95	7	9	5.8	5.1	.14	.02
NOV							
*08-15	.49	9	7	5.2	5.4	.16	.02
*15-22	1.2	--	12	4.4	4.8	.37	.07
*22-29	1.4	--	3	4.9	5.3	.06	.01
DEC							
*13-20	.22	10	10	5.9	4.9	.19	.03
*20-27	.15	12	12	5.2	6.0	.90	.18
JAN , 1984							
10-17	.20	18	20	4.5	4.5	.18	.06
24-31	.19	4	4	5.7	6.0	.14	.04
31-31	.15	9	8	5.2	5.5	.21	.05
FEB							
01-07	.15	9	8	5.2	5.5	.21	.05
*14-21	.30	70	68	4.7	3.9	.71	.10
28-29	.42	7	9	5.3	6.3	.36	.13
MAR							
01-06	.42	7	9	5.3	6.3	.36	.13
06-13	.19	12	--	4.7	--	--	--
APR							
10-17	.85	72	64	3.9	4.0	.61	.18
24-30	.80	17	17	6.0	6.8	1.3	.21
MAY							
01-01	.80	17	17	6.0	6.8	1.3	.21
01-08	2.3	13	9	5.0	5.5	.20	.04
15-22	.37	25	27	6.3	7.0	1.0	.27
29-31	.90	11	10	5.7	5.8	.41	.08
JUN							
01-05	.90	11	10	5.7	5.8	.41	.08
19-26	.62	10	9	5.0	5.3	.24	.06
26-30	.84	9	8	5.5	6.2	.26	.07
JUL							
01-03	.84	9	8	5.5	6.2	.26	.07
03-10	.28	12	17	4.9	6.6	1.3	.26
10-17	.82	11	6	4.8	5.9	.20	.06
17-24	.15	23	13	4.5	5.2	.52	.05
24-31	.20	13	11	5.1	5.1	.28	.08
31-31	1.3	8	8	5.3	5.9	.17	.04
AUG							
01-07	1.3	8	8	5.3	5.9	.17	.04
07-14	.45	5	6	5.1	6.0	.12	.04
14-21	.75	11	11	5.2	6.0	.40	.09
21-28	.24	14	15	4.8	6.4	.84	.22
28-31	1.0	9	10	5.1	6.2	.29	.07
SEP							
01-04	1.0	9	10	5.1	6.2	.29	.07
04-11	.30	9	9	5.1	6.1	.44	.11
11-18	.28	15	14	4.7	4.9	.26	.05

* Bulk sample

CHEMICAL QUALITY OF PRECIPITATION

461458094295000 PRECIPITATION STATION AT CAMP RIPLEY, MN--Continued

CHEMICAL ANALYSIS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

WEEKLY COMPOSITE

DATE	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)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)
OCT , 1983							
18-25	.04	.02	1.0	.03	.17	.170	<.001
NOV							
*08-15	.10	.06	.9	.14	.21	.190	<.001
*15-22	.03	.10	1.4	.09	.30	.100	<.001
*22-29	.06	.01	.3	.09	.05	.040	<.001
DEC							
*13-20	.13	.03	.9	.11	.35	.060	<.001
*20-27	.15	.12	.9	.23	.51	<.016	<.001
JAN , 1984							
10-17	.08	.02	.7	.19	.61	.080	<.001
24-31	.05	.02	.3	.07	.11	.050	<.001
31-31	.13	.04	.8	.14	.22	.050	<.001
FEB							
01-07	.13	.04	.8	.14	.22	.050	<.001
*14-21	.13	.05	5.4	.25	1.6	1.10	<.001
28-29	.18	.04	.8	.15	.26	.260	<.001
MAR							
01-06	.18	.04	.8	.15	.26	.260	<.001
06-13	--	--	--	--	--	--	--
APR							
10-17	.05	.10	6.4	.21	1.2	.630	.003
24-30	.31	.10	2.2	.31	.22	.610	<.001
MAY							
01-01	.31	.10	2.2	.31	.22	.610	<.001
01-08	.03	.02	1.7	<.02	.24	.510	<.001
15-22	.51	.32	1.9	.55	.68	1.15	<.001
29-31	.11	.05	1.6	.15	.35	.570	<.001
JUN							
01-05	.11	.05	1.6	.15	.35	.570	<.001
05-12	.07	.02	.6	<.02	.13	.140	<.001
19-26	.03	.03	1.0	.12	.38	.340	<.001
26-30	.05	.11	1.0	.10	.40	.310	<.001
JUL							
01-03	.05	.11	1.0	.10	.40	.310	<.001
03-10	.52	.46	2.1	.60	.40	.240	<.001
17-24	.06	.07	1.7	.13	.54	.570	<.001
24-31	.07	.03	1.5	.09	.32	.390	<.001
31-31	.02	.02	1.2	.07	.22	.560	<.001
AUG							
01-07	.02	.02	1.2	.07	.22	.560	<.001
07-14	.04	.02	.8	.07	.17	.360	.002
14-21	.03	.05	1.6	.08	.25	.270	<.001
21-28	.16	.10	1.6	.21	.52	.680	<.001
28-31	.07	.07	1.0	.12	.27	.280	<.001
SEP							
01-04	.07	.07	1.0	.12	.27	.280	<.001
04-11	.25	.09	1.3	.20	.26	.290	<.001
11-18	.10	.04	1.8	.13	.31	.370	<.001

* Bulk sample



INDEX

	Page		Page
Access to WATSTORE data.....	19	Collection and computation of ground-water levels.....	18
Accuracy of the records.....	14	ground-water quality.....	19
Acre-foot, definition of.....	19	stage and water discharge.....	12
Adenosine triphosphate, definition of.....	19	Color unit, definition of.....	21
Aitkin, Mississippi River at.....	52,266	Concord, Milliken Creek near.....	258
Akeley, Williams Lake near.....	37-40	Contents, definition of.....	21
Alden, Foster Creek near.....	255	Control, definition of.....	21
Aldrich, Leaf River near.....	251	Cooperation.....	1
Algae, definition of.....	19	Cottage Grove, Mississippi River at Grey Cloud Island near.....	187-193
Algal growth potential, definition of.....	20	Cottonwood River near New Ulm.....	151,270
Altura, South Fork Whitewater River near.....	258	near Springfield.....	255
Analyses of water-quality samples collected at partial-record stations.....	265	tributary near Balatan.....	255
Anoka, Mississippi River near.....	69-72,268	tributary No. 2 near Sanborn.....	255
Appleton, Pomme de Terre River at.....	93,269	Courtland, Little Cottonwood River near.....	152,171
Aquifer, definition of.....	20	Crooked Creek at Freeburg.....	259
Arendahl, Pine Creek near.....	259	Crooked Creek basin, high-flow partial-record stations in.....	259
Arrangement of records.....	15	Cross Lake, Pine River at Cross Lake Dam, at.. Pine River Reservoir at.....	54
Artesian, definition of.....	20	Crow River at Rockford.....	65,267
Artificial substrate, definition of.....	24	Middle Fork near Spicer.....	64,267
Ash mass, definition of.....	20	North Fork, at Paynesville.....	252
Austin, Cedar River near.....	238,275	tributary near Paynesville.....	252
		South Fork, near Mayer.....	253
Bacteria, definition of.....	20	Crow River basin, gaging-station records in.....	64-65,267
Balatan, Cottonwood River tributary near.....	255	high-flow partial-record stations in.....	252-253
Bear Creek, South Fork, near Grand Meadow.....	258	Crow Wing River at Nimrod.....	250
Beaver Creek at Beaver Falls.....	254	near Pillager.....	58,267
tributary above Slayton.....	260	Crow Wing River basin, gaging-station records in.....	55-58,266
tributary No. 2 near Slayton.....	259	high-flow partial-record stations in.....	250-251
Beaver, Whitewater River near.....	224,274	Crystal, North Fork Bassett Creek at.....	263
Beaver Falls, Beaver Creek at.....	254	Cubic foot per second, definition of.....	21
Becida, Hennepin Creek near.....	250	Cubic feet per second per square mile, definition of.....	21
Bed material, definition of.....	20		
Bemidji, Mississippi River at.....	250	Data presentation, ground-water levels.....	18
Big Lake, Elk River near.....	63,267	ground-water quality.....	19
Big Sioux River basin, high-flow partial-record stations in.....	260-261	stage and water discharge.....	12
Big Stone City, SD, Whetstone River near.....	80-83,268	surface-water quality.....	16
Big Stone Lake at Ortonville.....	84	Day, Stanchfield Creek tributary near.....	253
Biochemical oxygen demand, definition of.....	20	Deer River, Mississippi River at Winnibigoshish Dam near.....	36
Biomass, definition of.....	20	Winnibigoshish Lake near.....	35
Blue Earth, East Branch Blue Earth River tributary near.....	255	Definition of terms.....	19
Blue Earth River, East Branch, near Bricelyn.. East Branch, tributary near Blue Earth.....	255	Delft, Watonwan River near.....	255
East Branch, near Walters.....	255	Des Moines River at Jackson.....	239,275
Blue Earth River near Rapidan.....	154,271	tributary near Jackson.....	260
Blue-green algae, definition of.....	23	tributary No. 2 near Lakefield.....	260
Bottom material, definition of.....	20	Des Moines River basin, gaging-station records in.....	239,275
Brainerd, Gull Lake near.....	56	high-flow partial-record stations in.....	259-260
Gull River at Gull Lake Dam near.....	57	low-flow partial-record stations in.....	255-256
Bricelyn, East branch Blue Earth River near.....	255	Dexter, Rose Creek tributary near.....	259
Brownton, Buffalo Creek tributary near.....	252	Diatoms, definition of.....	23
Buffalo Creek tributary near Brownton.....	252	Dillon-Syltie Impoundment Inlet near Porter.. near Porter.....	110-114
Burr, Florida Creek near.....	100-105	Outlet near Porter.....	115-118
		Discharge at partial-record stations and miscellaneous sites.....	119-123
Calumet, Swan River near.....	48,266,267	high-flow partial-record stations.....	240-264
Canby, Lac qui Parle River near.....	94-99	low-flow partial-record stations.....	240-245
Lazarus Creek tributary near.....	253	miscellaneous sites.....	262-264
Cannon River at Northfield.....	257	Discharge, definition of.....	21
at Welch.....	257	Discontinued gaging stations.....	31-34
Cannon River basin, gaging-station records in.....	218,273	Dissolved, definition of.....	21
high-flow partial-record stations in.....	257	Diversity index, definition of.....	21
low-flow partial-record stations in.....	242-243	Downstream order system and station number, definition of.....	11
Cat River near Nimrod.....	250	Drainage area, definition of.....	21
Cedar River near Austin.....	238,275	Drainage basin, definition of.....	21
Cells/volume, definition of.....	20	Dry Creek near Jeffers.....	146-150
Cfs/day, definition of.....	20	Dry mass, definition of.....	20
Champlin, Elm Creek near.....	68,268	Dunnell, Fourmile Creek near.....	260
Chanarambie Creek near Edgerton.....	260	Duschee Creek near Lanesboro.....	259
Chatfield, Mill Creek near.....	258		
Chemical oxygen demand, definition of.....	20	East Branch Blue Earth River near Bricelyn.... near Walters.....	255
Chemical quality of precipitation.....	410-411	tributary near Blue Earth.....	255
Chippewa River below diversion near Watson.... diversion near Watson.....	262	East Branch Raven Stream near New Prague.....	256
Chippewa River near Milan.....	108,269		
Chlorophyll, definition of.....	21		
Classification of records.....	15		
Clearwater, Mississippi River at.....	252		
Cobb River tributary near Mapleton.....	256		

INDEX

	Page		Page
Edgerton, Chanarambie Creek near.....	260	Jackson, Des Moines River at.....	239,275
Elba, North Fork Whitewater River near.....	221-223,274	tributary near.....	260
Elk River basin, gaging-station records in.....	62-63-267	Jeffers, Dry Creek near.....	146-150
high-flow partial-record stations in.....	252	Johnson Creek basin, high-flow partial-record	
Elk River near Big Lake.....	63,267	stations in.....	251
Elm Creek basin, gaging-station records in.....	68,268	Johnson Creek near St. Augusta.....	251
Elm Creek near Champlin.....	68,268	tributary at Luxemburg.....	251
Empire, Vermillion River near.....	210-217,273	Jordan, Minnesota River near.....	161-169,272
Explanation of the records.....	11	Sand Creek tributary No. 2 near.....	256
Factors for converting Inch-Pound Units		Kanaranzi Creek tributary No. 2 near Wilmont..	261
to International System (SI)		Keewatin, Initial Tailings Basin Outflow	
Units.....	Inside back cover	near.....	45-47,266
Faribault, Straight River near.....	218,273	Kellogg, Zumbro River at.....	220,273
Fecal coliform bacteria, definition of.....	20	Kenyon, Little Cannon River tributary near....	257
Fecal streptococcal bacteria, definition of...	20	Kettle River, Glaisby Brook near.....	257
Federal Dam, Leech Lake at.....	41	Kettle River below Sandstone.....	203,272
Leech Lake River at.....	42	Knife River near Mora.....	204,272
Florida Creek near Burr.....	100-105	La Bolt Impoundment Inlet at La Bolt, SD.....	86-87
Foley, Stony Brook tributary near.....	252	Outlet at La Bolt, SD.....	88
Fort Ripley, Mississippi River near.....	251	La Bolt, SD, La Bolt Impoundment Inlet at....	86-87
Foster Creek near Alden.....	255	La Bolt Impoundment Outlet at.....	88
Fountain Creek near Montrose.....	252	Laboratory measurements, surface-water quality	16
Fourmile Creek near Dunnell.....	260	Lac qui Parle, Lac qui Parle River near.....	106,269
Freeburg, Crooked Creek at.....	259	Minnesota River near.....	107,269
Fridley, Mississippi River at.....	73-79	Lac qui Parle River near Canby.....	94-99
Gage height, definition of.....	21	near Lac qui Parle.....	106,269
Gaging station, definition of.....	21	West Branch near Gary, SD.....	253
Gaging stations, discontinued.....	31-34	Lakefield, Des Moines River tributary	
records.....	35-239	No. 2 near.....	260
Garden City, Watonwan River near.....	153-271	Lake Laura near Walnut Grove.....	137-140
Garrison, Mille Lacs Lake at.....	66	North Inlet near Walnut Grove.....	133-136
Garvin Brook near Minnesota City.....	228-230,274	Outlet near Walnut Grove.....	141-145
Garvin Brook basin, gaging-station		South Inlet near Walnut Grove.....	128-132
records in.....	225-231,274	Lakes and Reservoirs:	
Gary, West Branch Lac qui Parle River near....	253	Big Stone Lake at Ortonville.....	84
Gaylord, Middle Branch Rush River near.....	256	Gull Lake near Brainerd.....	56
Glaisby Brook near Kettle River.....	257	Laura Lake near Walnut Grove.....	137-140
Goodhue, Trout Brook tributary near.....	258	Leech Lake at Federal Dam.....	41
Gorman Creek basin, low-flow partial-record		Mille Lacs Lake at Garrison.....	66
stations in.....	244	Pokegama Lake near Grand Rapids.....	43
Grand Meadow, South Fork Bear Creek near.....	258	Pine River Reservoir at Cross Lake.....	53
Grand Rapids, Mississippi River at.....	44,266	Sandy Lake at Libby.....	49
Mississippi River near.....	262	Williams Lake near Akeley.....	37-40
Pokegama Lake near.....	43	Winnibigoshish Lake near Deer River.....	35
Granite Falls, Yellow Medicine River near....	125,270	Lanesboro, Duschee Creek near.....	259
Green algae, definition of.....	23	Root River near.....	237,274
Gribben Creek near Whalan.....	259	South Branch Root River at.....	259
Ground water, chemical analyses of.....	382-409	Latitude-longitude system for wells and	
Ground-water-level records, by county.....	280-381	miscellaneous sites.....	11
Ground-water levels, records of.....	17	Lazarus Creek tributary near Canby.....	253
in summary of hydrologic conditions.....	7	Leaf River near Aldrich.....	251
Ground-water records, by county, quality.....	382-409	Leech Lake at Federal Dam.....	41
Gull Lake near Brainerd.....	56	Leech Lake River at Federal Dam.....	42
Gull River at Gull Lake Dam, near Brainerd....	57	Leech Lake River basin, gaging-station	
Gull River basin, gaging station records in...	56-57	records in.....	37-42
Hardness of water, definition of.....	21	Le Sueur River near Rapidan.....	155,271
Hardwick, Mound Creek near.....	260	tributary near Mankato.....	256
Mound Creek tributary at.....	260	Lester Prairie, Otter Creek near.....	252
Hastings, Mississippi River at Lock and		Otter Creek tributary near.....	252
Dam 2.....	196-202	Libby, Mississippi River below Sandy	
Hawk Creek near Maynard.....	254	River near.....	51
Hay Creek basin, low-flow partial-record		Sandy Lake at.....	49
stations in.....	243	Sandy River at Sandy Lake Dam at.....	50
Henderson, High Island Creek near.....	160,272	Lindstrom, Sunrise River near.....	205,273
Hennepin Creek near Becida.....	250	List of counties for which ground-water-	
High-flow partial-record stations.....	247-261	level records are published.....	VIII-XI
High Island Creek near Henderson.....	160,272	for which ground-water-quality records	
Hill City, Smith Creek near.....	250	are published.....	XI
Hillman Creek near Pierz.....	251	List of gaging stations, in downstream order,	
Hinckley, Mission Creek near.....	257	for which records are published.....	VI-VII
Houston, Root River near.....	275	Little Cannon River tributary near Kenyon....	257
South Fork Root River near.....	275	Little Chippewa River near Starbuck.....	253
Hydrologic bench-mark network, definition of..	7	Little Cottonwood River near Courtland.....	152,271
Hydrologic conditions, graphs of.....	3-6,8-9	Little Sioux River basin, high-flow	
Hydrologic unit, definition of.....	21	partial-record stations in.....	261
Initial Tailings Basin Outflow near Keewatin..	45-47,266	Little Sioux River near Spafford.....	261
Introduction.....	1	Long Creek near Potsdam.....	258
Instantaneous discharge, definition of.....	21	Long Prairie, Long Prairie River at.....	55,266
Iowa River basin, gaging-station records in...	238,275	Long Prairie River at Long Prairie.....	55,266
high-flow partial-record stations in.....	259	Low-flow partial-record stations.....	240-245
low-flow partial-record stations in.....	244-245	Luverne, Rock River at.....	260
Ivanhoe, North Branch Yellow Medicine		Luxemburg, Johnson Creek tributary at.....	251
River near.....	254	Mankato, Le Sueur River tributary near.....	256
		Minnesota River at.....	156-159,271

INDEX

	Page		Page
Map of Minnesota, ground-water observation wells.....	278-279	National stream-quality accounting network (NASQAN), definition of.....	7
high-flow partial record stations.....	248-249	National trends network (NTN), definition of..	7
water-discharge stations.....	26-27	Natural substrate, definition of.....	24
water-quality stations.....	28-29	Newport, Mississippi River at Fifth Street at.....	180-186
Maple River near Rapidan.....	256	New Prague, East Branch Ravine Stream near....	256
tributary near Mapleton.....	256	Sand Creek near.....	256
Mapleton, Cobb River tributary near.....	256	New Ulm, Cottonwood River near.....	151,270
Maple River tributary near.....	256	Nimrod, Cat River near.....	250
Marshall, Prairie Ravine near.....	254	Crow Wing River at.....	250
Redwood River near.....	126,270	Nininger, Mississippi River at.....	194-195
Mayer, South Fork Crow River near.....	253	Nokasippi River basin, low-flow partial-record stations in.....	241
Maynard, Hawk Creek near.....	254	North Branch Root River tributary near Stewartville.....	258
Mean concentration, definition of.....	24	North Branch Yellow Medicine River near Ivanhoe.....	254
Mean discharge, definition of.....	21	tributary near Wilno.....	254
Methylene blue active substance, definition of.....	22	North Fork Crow River at Paynesville.....	252
Metamorphic stage, definition of.....	21	tributary near Paynesville.....	252
Micrograms per gram, definition of.....	22	North Fork Whitewater River near Elba.....	221-223,274
Micrograms per kilogram, definition of.....	22	Northfield, Cannon River at.....	257
Micrograms per liter, definition of.....	22	Numbering system for wells and miscellaneous sites.....	11
Middle Branch Rush River near Gaylord.....	256	Odessa, Yellow Bank River near.....	89-92,269
Middle Fork Crow River near Spicer.....	64,267	Onamia, Robinson Brook near.....	253
Milan, Chippewa River near.....	108,269	Rum River tributary near.....	253
Mill Creek near Chatfield.....	258	On-site measurement and collection.....	15
Mille Lacs Lake at Garrison.....	66	Organic mass, definition of.....	20
Miller Creek basin, low-flow-partial record stations in.....	243	Organism, definition of.....	22
Milligrams per liter, definition of.....	22	count/area, definition of.....	22
Milligrams of carbon per area or volume per unit time for periphyton, macrophytes, and phytoplankton.....	23	count/volume, definition of.....	22
Milligrams of oxygen per area or volume per unit time for periphyton, macrophytes, and phytoplankton.....	23	Ormsby, South Fork Watonwan River near.....	255
Milliken Creek near Concord.....	258	Ortonville, Big Stone Lake at.....	84
Minnesota, South Branch Yellow Medicine River at.....	124	Minnesota River at.....	85,268
Minnesota City, Garvin Brook near.....	228-230,274	Osage, Straight River near.....	265
Minnesota River at Mankato.....	156-159,271	Other records available.....	15
at Montevideo.....	109,270	Otsego Creek basin, high-flow partial-record stations in.....	252
at Ortonville.....	85,268	Otsego Creek near Otsego.....	252
near Jordan.....	161-169,272	Otsego, Otsego Creek near.....	252
near Lac qui Parle.....	107,269	Otter Creek near Lester Prairie.....	252
Minnesota River basin, gaging-station records in.....	80-169,268-272	tributary near Lester Prairie.....	252
high-flow partial-record stations in.....	253-256	Outlet Creek tributary near Starbuck.....	254
low-flow partial-record stations in.....	242	Palisade, Willow River below.....	250
measurements at miscellaneous sites in.....	262	Parameter code numbers.....	22
Minnesota, South Branch Yellow Medicine River at.....	124	Partial-record station, definition of.....	22
Miscellaneous analysis of streams in Minnesota, water-quality data at streamflow stations.....	266-275	discharge at.....	240-264
Miscellaneous sites, discharge measurements at.....	262-264	water quality at.....	265
Mission Creek near Hinckley.....	257	Particle size, definition of.....	22
Mississippi River at Aitkin.....	52,266	Particle-size classification, definition of...	22
at Bemidji.....	250	Paynesville, North Fork Crow River at.....	252
at Clearwater.....	252	North Fork Crow River tributary near.....	252
at Fifth Street at Newport.....	180-186	Percent composition, definition of.....	22
at Fridley.....	73-79	Periphyton, definition of.....	22
at Grand Rapids.....	44,266	Pesticides, definition of.....	22
at Grey Cloud Island near Cottage Grove....	187-193	Phytoplankton, definition of.....	23
at Industrial Molasses, at St. Paul.....	173-179	Picocurie, definition of.....	23
at lock and dam 2, at Hastings.....	196-202	Pierz, Hillman Creek near.....	251
at Nininger.....	194-195	Pillager, Crow Wing River near.....	58,267
at Prescott, WI.....	209,273	Sevenmile Creek near.....	251
at St. Paul.....	170-172,272	Pine City, Snake River near.....	257
at Winnibigoshish Dam, near Deer River.....	36	Pine Creek near Arendahl.....	259
at Winona.....	232-236,274	Pine River at Cross Lake Dam, at Cross Lake...	54
below Sandy River near Libby.....	51	Pine River basin, gaging-station records in...	53-54
near Anoka.....	69-72,268	Pine River Reservoir at Cross Lake.....	53
near Fort Ripley.....	251	Plankton, definition of.....	23
near Grand Rapids.....	262	Platte River above Royalton.....	251
near Royalton.....	59-61,267	Platte River basin, high-flow partial-record stations in.....	251
Montevideo, Minnesota River at.....	109,270	low-flow partial-record stations in.....	241
Spring Creek near.....	254	Pokegama Lake near Grand Rapids.....	43
Montgomery, Rice Lake tributary near.....	256	Polychlorinated biphenyls, definition of.....	23
Montrose, Fountain Creek near.....	252	Pomme de Terre River at Appleton.....	93,269
Mora, Knife River near.....	204,272	Porter, Dillon-Syltie Impoundment Inlet near..	110-114
Mound Creek near Hardwick.....	260	Dillon-Syltie Impoundment near.....	115-118
tributary at Hardwick.....	260	Dillon-Syltie Impoundment Outlet near.....	119-123
National Geodetic Vertical Datum of 1929 (NGVD), definition of.....	22	Potsdam, Long Creek near.....	258
		Prairie Ravine near Marshall.....	254
		Pratt, Turtle Creek tributary No. 2 near.....	257
		Precipitation, chemical quality of.....	410-411
		in summary of hydrologic conditions.....	2
		Prescott, WI, Mississippi River at.....	209,273
		Primary productivity, definition of.....	23

INDEX

	Page		Page
Publications on techniques of water-resources investigations.....	30	Smith Creek basin, high-flow partial-record stations in.....	250
Quality of ground-water, by county.....	382,409	Smith Creek near Hill City.....	250
Radiochemical program, definition of.....	7	Snake River near Pine City.....	257
Rapidan, Blue Earth River near.....	154,271	Solute, definition of.....	24
Le Sueur River near.....	154,271	South Branch Root River at Lanesboro.....	259
Maple River near.....	256	Yellow Medicine River at Minneota.....	124
Raven Stream, East Branch near New Prague.....	256	South Fork Bear Creek near Grand Meadow.....	258
Records, accuracy of.....	14	Crow River near Mayer.....	253
other available.....	15	Root River near Houston.....	275
Records of ground-water levels.....	17	Watonswan River near Ormsby.....	255
ground-water quality.....	19	Whitewater River near Altura.....	258
stage and water discharge.....	12	Zumbro River at Rochester.....	219,273
surface-water quality.....	15	South Troy, Zumbro River tributary near.....	258
Recoverable from bottom material, definition of.....	23	Spafford, Little Sioux River near.....	261
Redwood Falls, Redwood River near.....	127,270	Special networks and programs.....	7
Redwood River near Marshall.....	126,270	Specific conductance, definition of.....	24
near Redwood Falls.....	127,270	Specific conductance and temperature at streamflow stations.....	266-275
Remark codes, surface-water quality.....	17	Spicer, Middle Fork Crow River near.....	64,267
Reservoirs (see lakes and reservoirs)		Spring Creek basin, low-flow partial-record stations in.....	243
Rice Lake tributary near Montgomery.....	256	Spring Creek near Montevideo.....	254
Robinson Brook near Onamia.....	253	near Sleepy Eye.....	254
Rochester, South Fork Zumbro River at.....	219,273	tributary near Sleepy Eye.....	254
Rock River at Luverne.....	260	near Wanamingo.....	258
Rockford, Crow River at.....	65,267	Springfield, Cottonwood River near.....	255
Rollingstone, Straight Valley Creek near.....	231,274	Spring Hill, Sauk River tributary at.....	251
Root River near Houston.....	275	Stage-discharge relation, definition of.....	24
near Lanesboro.....	237,274	Stanchfield Creek tributary near Day.....	253
North Branch, tributary near Stewartville..	258	Starbuck, Little Chippewa River near.....	253
South Branch, at Lanesboro.....	259	Outlet Creek tributary near.....	254
South Fork, near Houston.....	275	Station identification numbers.....	11
Root River basin, gaging-station records in.....	237,274-275	Steele Center, Turtle Creek tributary near...	257
high-flow partial-record stations in.....	258-259	Stewartville, North Branch Root River tributary near.....	258
Rose Creek tributary near Dexter.....	259	Stockton, Stockton Valley Creek at.....	225-227,274
Royalton, Mississippi River near.....	59-61,267	Stockton Valley Creek at Stockton.....	225-227,274
Platte River above.....	251	Stony Brook tributary near Foley.....	252
Rum River near St. Francis.....	67,268	Straight River near Faribault.....	218,273
tributary near Onamia.....	253	near Osage.....	265
Rum River basin, gaging-station records in....	66-67,268	Straight Valley Creek near Rollingstone.....	231,274
high-flow partial-record stations in.....	253	Streamflow, definition of.....	24
Runoff in inches, definition of.....	23	in summary of hydrologic conditions.....	2
Rush Creek near Rushford.....	259	Substrate, definition of.....	24
Rushford, Rush Creek near.....	259	Summary of hydrologic conditions.....	2
Rush River, Middle Branch near Gaylord.....	256	ground-water levels.....	7
St. Augusta, Johnson Creek near.....	251	precipitation.....	2
St. Croix Falls, WI, St. Croix River at.....	206-208	streamflow.....	2
at St. Croix Falls, WI.....	206-208	water quality.....	2
St. Croix River basin, gaging-station records in.....	203-208,272-273	Sunrise River near Lindstrom.....	205,273
high-flow partial-record stations in.....	257	Surface area, definition of.....	24
low-flow partial-record stations in.....	242	Surficial bed material, definition of.....	24
miscellaneous sites in.....	264	Suspended, definition of.....	24
St. Francis River above Zimmerman.....	62	Suspended recoverable, definition of.....	24
St. Francis, Rum River near.....	67,268	Suspended sediment, definition of.....	23
St. Martin, Sauk River tributary No. 2 near...	251	definition of.....	23
St. Michael, School Lake Creek tributary near.....	253	Suspended-sediment discharge, definition of...	24
St. Paul, Mississippi River at.....	170-172,272	Suspended-sediment load, definition of.....	24
Mississippi River at Industrial Molasses at.....	173-179	Suspended total, definition of.....	24
Sanborn, Cottonwood tributary No. 2 near.....	255	Swan River basin, gaging-station records in....	45-48,266
Sand Creek near New Prague.....	256	high-flow partial-record stations in.....	250
tributary No. 2 near Jordan.....	256	Swan River near Calumet.....	48,266
Sandstone, Kettle River below.....	203,272	tributary at Warba.....	250
Wolf Creek tributary near.....	257	Taxonomy, definition of.....	25
Sandy Lake at Libby.....	49	Time-weighted average, definition of.....	25
Sandy River at Sandy Lake Dam, at Libby.....	50	Tons per acre-foot, definition of.....	25
Sandy River basin, gaging-station records in..	49-50	Tons per day, definition of.....	25
Sauk River tributary at Spring Hill.....	251	Total, definition of.....	25
tributary No. 2 near St. Martin.....	251	bottom material, definition of.....	25
Sauk River basin, high-flow partial-record stations in.....	251	coliform bacteria, definition of.....	20
School Lake Creek tributary near St. Michael..	253	load, definition of.....	25
Sediment, definition of.....	23	organism count, definition of.....	22
surface-water quality.....	16	recoverable, definition of.....	25
Sevenmile Creek near Pillager.....	251	sediment discharge, definition of.....	24
Slayton, Beaver Creek tributary above.....	260	Tritium network, definition of.....	7
Beaver Creek tributary No. 2 near.....	259	Trout Brook tributary near Goodhue.....	258
Sleepy Eye, Spring Creek near.....	254	Turtle Creek tributary near Steele Center....	257
Spring Creek tributary near.....	254	tributary No. 2 near Pratt.....	257
		Upper Iowa River basin, low-flow partial-record stations in.....	244
		Vadnais Lake basin, miscellaneous sites in....	263-264

INDEX

	Page		Page
Vermillion River near Empire.....	210-217,273	Whitewater River near Beaver.....	224,274
Vermillion River basin, gaging-station		North Fork, near Elba.....	221-223,274
records in.....	210-217,273	South Fork, near Altura.....	258
		Whitewater River basin, gaging-station	
		records in.....	221-224,274
		high-flow partial-record stations in.....	258
Walnut Grove, Lake Laura near.....	137-140	Williams Lake near Akeley.....	37-40
Lake Laura North Inlet near.....	133-136	Willow River basin, high-flow partial-record	
Outlet near.....	141-145	stations in.....	250
South Inlet near.....	128-132	Willow River below Palisade.....	250
Walters, Blue Earth River East Branch near....	255	Wilmont, Kanaranzi Creek tributary No. 2 near,	261
Wanamingo, Spring Creek near.....	258	Wilno, North Branch Yellow Medicine River	
Warba, Swan River tributary at.....	250	tributary near.....	254
Warren Lake tributary near Windom.....	260	Windom, Warren Lake tributary near.....	260
Water quality, in summary of hydrologic		Winnibigoshish Lake near Deer River.....	35
conditions.....	2	Winona, Mississippi River at.....	232-236,274
Water-quality records, analyses of samples		Wolf Creek tributary near Sandstone.....	257
collected at ground-water wells.....	382-409	WDR, definition of.....	25
at partial-record stations.....	265	WRD, definition of.....	25
miscellaneous analyses at streamflow		WSP, definition of.....	25
stations.....	266-275		
Water temperature, surface-water quality.....	16	Yellow Bank River near Odessa.....	89-92,269
Watsonwan River, near Delft.....	255	Yellow Medicine River near Granite Falls.....	125,270
near Garden City.....	153,271	North Branch, near Ivanhoe.....	254
South Fork near Ormsby.....	255	tributary near Wilno.....	254
Watson, Chippewa River below diversion near...	262	South Branch, at Minneota.....	124
Chippewa River diversion near.....	262		
Weighted average, definition of.....	25	Zimmerman, St. Francis River above.....	62
Welch, Cannon River at.....	257	Zooplankton, definition of.....	23
Wells Creek basin, low-flow partial-record		Zumbro River at Kellogg.....	220,273
stations in.....	243	South Fork, at Rochester.....	219,273
West Branch Lac qui Parle River near		tributary near South Troy.....	258
Gary, SD.....	253	Zumbro River basin, gaging-station records	
Wet mass, definition of.....	20	in.....	219-220,273
Whalan, Gribben Creek near.....	259	high-flow partial-record stations in.....	258
Whetstone River near Big Stone City, SD.....	80-83,268	low-flow partial-record stations in.....	243-244

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)	2.54×10^1	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^0	kilometers (km)
<i>Area</i>		
acres	4.047×10^3	square meters (m ²)
	4.047×10^{-1}	square hectometers (hm ²)
	4.047×10^{-3}	square kilometers (km ²)
square miles (mi ²)	2.590×10^0	square kilometers (km ²)
<i>Volume</i>		
gallons (gal)	3.785×10^0	liters (L)
	3.785×10^0	cubic decimeters (dm ³)
	3.785×10^{-3}	cubic meters (m ³)
million gallons	3.785×10^3	cubic meters (m ³)
	3.785×10^{-3}	cubic hectometers (hm ³)
cubic feet (ft ³)	2.832×10^1	cubic decimeters (dm ³)
	2.832×10^{-2}	cubic meters (m ³)
cfs-days	2.447×10^3	cubic meters (m ³)
	2.447×10^{-3}	cubic hectometers (hm ³)
acre-feet (acre-ft)	1.233×10^3	cubic meters (m ³)
	1.233×10^{-3}	cubic hectometers (hm ³)
	1.233×10^{-6}	cubic kilometers (km ³)
<i>Flow</i>		
cubic feet per second (ft ³ /s)	2.832×10^1	liters per second (L/s)
	2.832×10^1	cubic decimeters per second (dm ³ /s)
	2.832×10^{-2}	cubic meters per second (m ³ /s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm ³ /s)
	6.309×10^{-5}	cubic meters per second (m ³ /s)
million gallons per day	4.381×10^1	cubic decimeters per second (dm ³ /s)
	4.381×10^{-2}	cubic meters per second (m ³ /s)
<i>Mass</i>		
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

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