UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SMALL-STREAM FLOOD INVESTIGATIONS IN MINNESOTA,

October 1958 to September 1980

With floods from selected larger drainage areas

By K. T. Gunard and C. J. Smith

Open-File Report 82-433

Prepared in cooperation with the

MINNESOTA DEPARTMENT OF TRANSPORTATION,

MINNESOTA DEPARTMENT OF NATURAL RESOURCES,

UNITED STATES ARMY CORPS OF ENGINEERS

St. Paul, Minnesota
May 1982

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ABSTRACT

An investigation of flood flows from small drainage basins in Minnesota is being made to aid in the design of bridges, culverts and other highway drainage structures. Results of the investigation provide peak-flow data on streams generally with drainage areas less than 200 square miles, placing particular emphasis on those with drainage areas less than 10 square miles. Basin parameters being investigated for their effect on floods are drainage area, length of main stream, slope of main channel, basin altitude, forest cover, and storage area. All of the 187 gaging stations included in the report are equipped with crest-stage gages. In addition, 4 stations are equipped to record stage continuously, and 8 stations are equipped to record stage and precipitation continuously. The relative magnitude of flood flows for different hydrologic regions is shown in graphs that relate maximum discharge to drainage area. Station records contain location, drainage area, records available, type of gage, on-site structure elevations, bankfull stage, and annual maximum stage and discharge data. These data, with annual peak data from continuous-record stations, form the basis for statewide flood-frequency studies.

CONVERSION FACTORS

Multiply inch-pound unit	By	To obtain SI (metric) unit
	Length	
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
feet per mile (ft/mi)	0.1894	meters per kilometer (m/km)
	Area	
square miles (mi^2)	2.590	square kilometers (km^2)
	Flow	
cubic feet per second (ft^3/s)	0.02832	cubic meters per second (m^3/s)

Definition of Terms

The terms referring to hydrologic data, as used in this report, are defined as follows:

Area of lakes and swamps - Area expressed as percentage of the drainage area covered by lakes, ponds, and swamps, as shown on topographic maps and determined by the grid method.

Bankfull stage - That gage height at which the stream begins to flow overbank or recedes from the flood plain. It pertains to bank elevations in the immediate vicinity of the gage.

Contributing drainage area - The net drainage area enclosed by a topographic divide which contributes directly to surface runoff above a specified point.

Drainage area - That area measured in a horizontal plane, enclosed by a topographic divide, within which direct surface runoff from precipitation normally flows by gravity into a stream, above a specified point. This may include closed basins and other areas which do not contribute directly to surface runoff.

Forest area - Area expressed as percentage of the drainage area covered by forests, as shown on topographic maps and determined by the grid method.

Main-channel length - The length of the watercourse, in miles, from the gaging station to the basin divide, as measured on topographic maps. The main channel is defined as the watercourse that drains the greatest area.

Main-channel slope - The slope of the watercourse, in feet per mile, determined as the average between points 10 and 85 percent of the distance along the main channel from the gaging station to the divide.

Mean basin altitude - The altitude, in feet, referenced to National Geodetic Vertical Datum of 1929, computed as the mean of altitudes at the 10 and 85 percent points along the main stream channel.

National Geodetic Vertical Datum of 1929 - A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Mean Sea Level."

Permanent station number - Distinctive numbers assigned on a national basis to each gaging station to provide a convenient method of geographical location and identification. The numbers are assigned on the basis of downstream order for each major river basin. The identification number consists of two elements--(1) the part number and (2) the station number. The first two digits designate the part or major river basin in which the station is located. Part divisions

pertinent to Minnesota are as follows: Part 4, St. Lawrence River basin; Part 5, Hudson Bay and Upper Mississippi River basins; and Part 6, Missouri River basin. The last six digits designate the station's downstream position within the basin.

Site number - These numbers assigned to each station included in the crest-stage network are used as a means of local identification for those stations operated in the cooperative program with the Minnesota Department of Transportation.

Water year - This is the 12-month period, October 1 through September 30, used in U.S. Geological Survey reports dealing with surface-water supply. The water year is designated by the calendar year in which it ends. Thus, the year ending September 30, 1980, is called the 1980 water year.

INTRODUCTION

Purpose and Scope

The first consideration in the hydraulic design of drainage structures is the magnitude and frequency of the design flood or maximum peak flow the structure is intended to discharge safely and economically. Studies of flood frequency in Minnesota, based on analyses of available streamflow records, have provided information generally applicable to streams with drainage areas greater than 50 square miles. The results of these studies are contained in U.S. Geological Survey Water-Supply Papers 1677, 1678, 1679, and 1680, titled "Magnitude and frequency of floods in the United States." These reports are applicable to areas divided according to major drainage basins as follows: St. Lawrence River Basin (Part 4) in Water-Supply Paper 1677; Hudson Bay and Upper Mississippi River Basins (Part 5) in Water-Supply Paper 1678; Missouri River Basin above Sioux City, Iowa, (Part 6-A) in Water-Supply Paper 1679; and Missouri River Basin below Sioux City, Iowa, (Part 6-B) in Water-Supply Paper 1680. However, few flood records have been available for small watersheds, and the determination of reliable flood-frequency characteristics for these small basins, particularly for use in the design of highway drainage structures, has not been possible.

To fill this need, a small-stream flood-investigation program for Minnesota was begun in August 1958. This program was designed to provide flood data on streams generally with drainage areas less than 200 square miles, placing particular emphasis on those with drainage areas less than 10 square miles. Effort was oriented toward collecting hydrologic data that would form the basis for defining flood-frequency characteristics and provide information for detailed hydrologic studies.

In 1977, a comprehensive flood-frequency report was published utilizing all data collected in this program through the 1975 water year. These data were combined with annual peak data available from the entire stream-gaging program since its beginning in the early 1900's. The resulting report, titled "Techniques for estimating magnitude and frequency of floods in Minnesota", was published as U.S. Geological Survey Water-Resources Investigations 77-31.

Emphasis in the program has not changed, and collection of hydrologic data continues in the same manner as in the past. Additional years of record will improve flood-frequency estimates and may reduce standard errors of estimate.

This report, which is the eighth of a series previously published biennially (see References), has been prepared to document the status of the program and to make available the hydrologic data collected through the 1980 water year. The most recent previous report covered data collected through the 1977 water year. A general description of the program, methods of operation, and a presentation of the basic data are included in the report.

Also included in this report are peak data from selected stations funded by other programs in recent years. Flood data have been collected at several stations, some on much larger drainage basins for which this series of reports affords a means of communicating the complete record of annual floods. Occasionally, continuous-record stations that need additional peak-flow data to be hydrologically defined are terminated. Most of these stations have been converted to high-flow partial-record sites and are included in this series of reports. Data from each of these stations will be an important supplement to future flood-frequency reports.

Cooperation

The small-stream flood investigations in Minnesota are financed under a cooperative agreement between the Minnesota Department of Transportation and the U.S. Geological Survey. The original cooperative agreement began in August 1958 and has been renewed annually since that time.

Data from 33 additional high-flow partial-record sites, operated under other cooperative programs, have been included in this report. Twenty-one of these sites are financed under a cooperative agreement between the Minnesota Department of Natural Resources and the U.S. Geological Survey. The remaining 12 sites are financed under an agreement with the U.S. Army Corps of Engineers.

DESCRIPTION OF PROGRAM

The ideal basis for selecting design discharge is from frequency-discharge relationships defined for each site under consideration. However, installing gages on the vast number of sites in Minnesota is impractical, so it becomes necessary to confine the investigation to a sampling process. Flood data collected from a small number of sampling stations can be made applicable to a region by analyzing the flood data and relating them to measurable basin characteristics. In this way, regionalized flood-magnitude and frequency data can be developed for the entire State.

The program is planned so as to obtain hydrologic data for small watersheds to supplement data obtained in other stream-gaging programs in larger drainage areas. In general, streams with drainage areas less than 200 square miles are of interest in this program. To provide hydrologic data for small basins, gaging-station sites have been selected on watersheds ranging in size from 0.05 to 200 square miles.

Initially for the Small Streams Program, gages were installed at selected sites over a period of 8 years. Site selection and gage installation began in August 1958 and was completed in October 1965. Progress in the installation of gages has been as follows:

Calendar year	Gage installations completed
1958	36
1959	46
1960	39
1961	14
1962	1
1963	14
1964	1
1965	8
Total	159

In 1978, 15 additional crest-stage gages were installed throughout the State located in areas of sparsest areal coverage. Special emphasis was placed on choosing sites with drainage areas between 15 and 200 square miles.

Data collection has been discontinued at 42 sites over the years because of unstable control conditions or highway relocation. Present plans are to reduce the network to 111 stations, and complete a network analysis of the entire Survey stream-gaging program in Minnesota. Results of this analysis may indicate that some stations should be discontinued and others established. The locations of gaging stations, for which data are tabulated in this report, are shown in figure 1.

Hydrologic data obtained under this program, and other data reported herein, consist primarily of the annual peak gage height and discharge at each active gaging station during the water year. Each station is equipped with a crest-stage gage, which records the peak stage. Discharge measurements are made throughout the range in stage to establish a stage-discharge relation.

To supplement the record of instantaneous peak discharges, 11 stations have been equipped with continuous stage-recording gages from which discharge hydrographs can be derived to determine the total volume of runoff during floods. Most stations equipped with continuous recorders are also equipped with automatic tipping-bucket rain gages to obtain simultaneous records of water stage and precipitation. The recording equipment is not installed permanently, but will be operated at a site long enough to establish a basis for a study of rainfall-runoff relationships. The period of operation at any one site will vary in length, depending on the number of storms annually. In this way, discharge hydrographs and rainfall records will be obtained at a maximum number of locations with a minimum amount of equipment. The crest-stage gage will remain as the permanent gage at each location.

In the past, approximately 25 manually read rain gages were used to supplement the recording-gage network. These gages were located near the crest-stage sites and were read by local volunteer observers. In the summer of 1980, the rainfall-observer network was reorganized and expanded to provide improved areal coverage and early warning of flooding. There are presently 68 paid observers in this network.

The small-stream program also provides for the investigation of outstanding floods in ungaged areas. These investigations are confined to present or proposed highway crossings.

Many basin characteristics that may affect the magnitude of floods have been investigated in this program. The basin characteristics selected for evaluation are:

1. drainage area
2. main-channel length
3. main-channel slope
4. mean basin altitude
5. forest area
6. area of lakes and swamps

Occasionally swamp and forest area may be common, resulting in the sum of forest area and lake and swamp area being greater than 100 percent of the total drainage area.

PROGRAM OPERATION

Selection of Gaging-Station Sites

Many factors enter into the selection of a gaging-station site, which, in combination, greatly restrict the number of suitable sites. Because the program involves a sampling process, it is necessary to select sites that represent various types of topographic and soil conditions, provide adequate areal coverage, and include the desired range in drainage areas.

In addition to the physical properties listed above, consideration must be given to the hydraulic conditions at the site. The definition of a stage-discharge relationship requires reasonably stable control and channel conditions so that scour and deposition of bed material are at a minimum. The site must provide a suitable location for the crest-stage gage to protect it from destruction by high velocities, debris, or ice. Because of the flashy nature of runoff from many small watersheds, it is often necessary to rely on indirect methods of measuring discharge rather than the conventional current-meter measurement. Bridges or culverts, which form channel constrictions, are convenient control structures for indirect measurement of flood discharge. Where such structures are not available, the site must have an adequate reach of reasonably uniform channel where the discharge can be computed by the slope-area method. It is only after these and other technical factors have been considered that final selection of a gaging site is made.

Instrumentation

As previously noted, the permanent gage at most stations is a simple device called a "crest-stage gage." The gage used in Minnesota consists of a 2-inch pipe containing a graduated wooden rod and a small amount of granulated cork. The pipe is closed at both ends except for a group of intake holes at the bottom and a vent hole at the top. The gage pipe is mounted in a vertical position by pinning it to a support pipe driven into the stream bed or by attaching it to the wingwall of a bridge or culvert. The gage is set so that the intake holes are above the stage of sustained low flows. As the water in the stream rises during floods, it covers the intake holes and rises inside

the gage pipe. The granulated cork floats on the water rising inside the pipe; when the water recedes, a ring of cork is left on the wooden rod at the same elevation as the peak stage. After the peak has passed, the peak stage is determined by removing the graduated rod and reading the elevation of the cork line.

Equipment at recording stations consists of a stilling well connected to the stream by intake pipes, a shelter atop the stilling well, a continuous graphic recorder, and an automatic tipping-bucket rain gage. Water from the stream enters through intake pipes to the stilling well where a float activates a recorder pen, which graphically traces the fluctuating water surface.

The automatic rain gage consists of a receiver mounted on the roof of the shelter, a tipping-bucket device, and a battery-powered counter with pen attachment. Rain is collected in the receiver and transferred to the tipping-bucket device, where it is measured in 0.1-inch increments. When 0.1 inch of rain accumulates, the bucket tips, closing an electrical circuit, which activates the counter and moves a second pen on the recorder chart.

Recording both precipitation and stream stage simultaneously on the same chart is advantageous in that it eliminates errors in computing lag time between precipitation and runoff due to variations in time correction that could occur if separate recording instruments were used. It also provides ease of correlation by visual inspection.

Data Collection and Analysis

Systematic inspections are made at each gaging station through most of the year at approximately monthly intervals. Additional inspections are made during the spring snowmelt and during periods of intense thundershowers. Inspections are discontinued during winter when flood peaks normally do not occur, unless it is known that runoff has been significant in the basin. At each inspection, the elevation of the peak stage is determined and verified whenever possible by comparison with high-water marks. In the event of outstanding floods, which occasionally overtop the gage, gage heights are obtained by making a transit-stadia survey of high-water marks in the vicinity of the gage. A plot of the water-surface profile is made from the data.

As two or more peak flows may occur between inspections to a gaging station, a higher peak may wash off the cork lines left by previously recorded lower peaks. As a result, the peak stage for all floods at a particular site will not be available. However, the highest annual peaks, which are the data to be used in the magnitude and frequency analyses, will be recorded. In addition, many lesser peaks will also be recorded.

At stations equipped with recording gages, all peaks during the year will be available from the continuous strip charts. These recorders are serviced and the charts removed at regular periods, usually monthly to bimonthly.

Current-meter measurements are obtained whenever flows are in the range where definition of the stage-discharge relation is required. During floods, however, it is frequently impossible to measure high discharges. Structures

from which current-meter measurements were to have been made may be damaged or not suitably located; stream velocities may be too high; knowledge of the flood rise may not be available in sufficient time to permit reaching the site at the time of the peak; flow of debris or ice may prevent use of a current meter; or limitations on personnel may preclude direct measurements of discharge at all stations within the flood area. Consequently, considerable reliance must be placed on indirect measurements of peak discharge to establish the stage-discharge relation or rating curve, as it is frequently termed.

Indirect measurements are of four types, as listed below:

1. flow through culverts
2. flow through width contractions
3. slope-area
4. flow over dams and embankments.

Indirect measurements make use of the energy equation for computing discharge. The specific equations differ for different types of flow; however, all the methods involve these general factors:

1. Physical characteristics of the channel, such as channel dimensions, boundary conditions, and channel conformation

2. Water-surface elevations at time of peak stage to define the upper limit of the cross-sectional areas and the difference in elevation between two significant points

3. Hydraulic factors based on physical characteristics and water-surface elevations, such as roughness coefficients and discharge coefficients.

Most indirect measurements of peak discharge made under this program are of the "flow through culvert" type, although all the methods are utilized. In each case, a transit-stadia survey is made to determine the high-water profile, geometry of any structure involved, channel cross sections, and roadway features, where applicable. Hydrologists making the survey evaluate roughness coefficients and appraise possible backwater conditions at the site. From these data and the appropriate equations for the type of indirect measurement being made, the peak discharge can be computed. A digital-computer program developed by the Geological Survey facilitates the computation of peak discharges. This program includes the various types of culvert-flow computations necessary for determining the stage-discharge relation. Using this method, theoretical ratings have been computed for a considerable number of stations.

A complicating factor in determining peak discharge is backwater from ice during runoff in early spring. For this reason, gaging stations are inspected more frequently during spring snowmelt than at other times in order to measure flow rates and assess ice conditions from which backwater corrections can be estimated.

Permanent bench marks are established at each gaging station for maintaining a stable gage datum. Level loops are run annually to detect any movement of the gage and to determine the datum correction applicable.

At the end of each water year, the peak stages are corrected to the base datum and tabulated. Backwater conditions are evaluated and appropriate corrections applied, where necessary, to determine the backwater-free, or effective stage for each peak. A curve of relation between stage and discharge is established when sufficient discharge measurements become available. The highest effective stage for the water year is applied to this curve to determine the maximum discharge. The dates on which peak flows occur are determined from precipitation data collected in the drainage basins and by correlation with time-oriented precipitation and stage-hydrographs from recorder-equipped stations.

Flood Investigations at Miscellaneous Sites

To enhance the supply of peak-flow information, investigations are made of outstanding small-area floods, even though they occur in basins outside the crest-stage network. These investigations are made to provide peak stage and discharge. Also, precipitation data may be collected from local sources in the immediate area. Maximum discharges at miscellaneous sites are listed in table 1.

PRESENTATION OF DATA

Maximum Floods

Peak-discharge data for small drainage areas in Minnesota have now been collected at some locations for as long as 22 years, commencing in 1958. During this time, several outstanding floods have occurred for which data are available at gaging stations and at miscellaneous ungaged sites. These recorded peak flows provide a reasonable basis for estimating the maximum flood flows to be expected in various parts of the State.

The State has been divided into eight hydrologic regions, as illustrated in figure 1. These region boundaries are intended to enclose areas having similar hydrologic characteristics. The region boundaries are considered provisional and may require revision when additional flood data indicate another complete analysis needs to be made. Such revision would be consistent with the objectives of the program--to define flood-frequency characteristics on a regional basis.

The relative magnitude of flood flows from small drainage areas is indicated by a comparison of maximum discharge to drainage area. These data for each of the several hydrologic regions are shown in figures 2-9, wherein the maximum discharge observed at each gaging station or miscellaneous site is plotted against drainage area.

Each figure contains an enveloping curve of maximum discharges for drainage areas ranging in size from 0.05 to 18 square miles. This curve has been based on a composite plot of all maximum discharge data available for small drainage areas in Minnesota and provides a means of comparing maximum discharge values observed in a particular region with those observed throughout the State.

Table 1.—Maximum discharge at miscellaneous sites

Stream	Tributary to	Location	Drainage area (mi^2)	Date	Discharge (ft^3/s)
		Streams tributary to Lake Superior			
Schmidt Creek	Lake Superior	$NE\frac{1}{4}NE\frac{1}{4}$ sec.17, T.51 N., R.12 W., at U.S. Highway 61, 0.5 mile upstream from mouth, and 0.6 mile northeast of French River, Minn.	4.9	9- 7-64	2,670
		Mississippi River tributary basin			
Mississippi River tributary	Mississippi River	$NE\frac{1}{4}NE\frac{1}{4}$ sec.1, T.41 N., R.32 W., at culvert on U.S. Highway 371, 0.3 mile south of Camp Ripley Junction, Minn., and 0.7 mile upstream from mouth.	1.5	7-22-72	215
		Fletcher Creek basin			
Fletcher Creek	Mississippi River	At center of $W\frac{1}{2}$ sec.1, T.41 N., R.32 W., at box culvert on U.S. Highway 371, 0.2 mile upsteam from mouth, and 0.6 mile south of Camp Ripley Junction, Minn.	19	7-22-72	924

Table 1.—Maximum discharge at miscellaneous sites—Continued

Stream	Tributary to	Location	Drainage area (mi^2)	Date	Discharge (ft^3/s)
		Crow River basin			
South Fork Crow River	Crow River	SE¼SW¼ sec.31, T.117 N., R.29 W., at dam just upstream from State Highways 15 and 22 in Hutchinson, Minn., 6.2 miles upstream from McCuen Creek.	-	4-11-65	4,670
		Rice Creek basin			
Rice Creek	Mississippi River	NW¼ sec.14, T.30 N., R.24 W., at State Highway 47 in Fridley, Minn., about 0.5 mile above mouth.	-	6- 8-65	606
		Minnehaha Creek basin			
Minnehaha Creek	Mississippi River	E½ sec.15, T.117 N., R.22 W., at bridge on County Highway 16 at Minnetonka Mills, Minn., 2.2 miles below outlet of Minnetonka Lake.	130	6- 1-65	*245
Minnehaha Creek	Mississippi River	In sec.18, T.28 N., R.24 W., at 50th Street in Edina, Minn.	-	5-31-65	368

* Result of discharge measurement made near peak.

Table 1.—Maximum discharge at miscellaneous sites—Continued

Stream	Tributary to	Location	Drainage area (mi^2)	Date	Discharge (ft^3/s)
		Minnehaha Creek basin--Continued			
Minnehaha Creek	Mississippi River	SE¼NE¼ sec.18, T.28 N., R.23 W., at bridge on Minnehaha Avenue in Minneapolis, Minn., 0.1 mile above Minnehaha Falls, and 0.8 mile above mouth.	-	5-31-65	500
Minnehaha Creek	Mississippi River	SE¼NE¼ sec.18, T.28 N., R.24 W., at bridge on Cedar Avenue in Minneapolis, Minn., 0.1 mile above Minnehaha Falls, and 0.8 mile above mouth.	-	8-31-77	916
		Minnesota River basin			
Birch Coulee Creek tributary No. 1	Birch Coulee Creek	NE¼ sec.30, T.114 N., R.34 W., at culvert on county road, 1 mile upstream from Birch Coulee Creek, and 7 miles north of Morton, Minn.	0.62	6-11-71	155
Birch Coulee Creek	Minnesota River	SE¼ sec.29, T.114 N., R.34 W., at culvert on County Highway 50, 6 miles north of Morton, Minn., and 10 miles upstream from mouth.	14.8	6-11-71	1,890
Birch Coulee Creek tributary No. 2	Birch Coulee Creek	NE¼ sec.8, T.113 N., R.34 W., at culvert on county road, 1.5 miles upstream from Birch Coulee Creek, and 4 miles north of Morton, Minn.	1.59	6-11-71	513

Table 1.—Maximum discharge at miscellaneous sites—Continued

Stream	Tributary to	Location	Drainage area (mi^2)	Date	Discharge (ft^3/s)
		Minnesota River basin--Continued			
Porter Creek	Sand Creek	Near north edge of sec.6, T.113 N., R.22 W., at culvert on County Highway 8, 1.5 miles southwest of Lydia, and 6.5 miles northeast of New Prague, Minn.	58.6	5-21-60	725
Sand Creek	Minnesota River	$SE\frac{1}{4}SE\frac{1}{4}$ sec.18, T.114 N., R.23 W., at bridge on State Highway 169, at north edge of Jordan, Minn.	238	5-21-60	8,650
Ninemile Creek	Minnesota River	$NW\frac{1}{4}$ sec.25, T.117 N., R.22 W., at culvert on 7th Street South, in Hopkins, Minn.	1.46	8-30-77	501
Interstate 494 Storm Sewer	Minnesota River	$NE\frac{1}{4}SE\frac{1}{4}$ sec.31, T.28 N., R.23 W., at culvert under radar tower road of Headquarters Company, 3rd Missle Battalion at Fort Snelling, Minn.	0.49	8-29-64	482
		Cannon River basin			
Turtle Creek	Straight River	On west line of sec.34, T.107 N., R.20 W., at bridge on U.S. Highway 65, 2.5 miles above mouth, and 3 miles south of city limits of Owatonna, Minn.	-	5-31-61	2,930

Table 1.—Maximum discharge at miscellaneous sites—Continued

Stream	Tributary to	Location	Drainage area (mi^2)	Date	Discharge (ft^3/s)
		Cannon River basin--Continued			
Straight River	Cannon River	SW¼SE¼ sec.9, T.107 N., R.20 W., 0.9 mile above Maple Creek at Owatonna, Minn.	-	5-31-61	2,080
		Zumbro River basin			
Willow Creek	Beaver Creek	SE¼ sec.23, T.106 N., R.14 W., at bridge on U.S. Highway 63, 2.5 miles south of Rochester, Minn.	17.6	6- 4-58	6,240
Cold Creek	Zumbro River	NE¼SE¼ sec.36, T.110 N., R.14 W., at culvert on State Highway 60, 0.2 mile upstream from mouth, and 0.7 mile northwest of Zumbro Falls, Minn.	45.9	5-28-70	19,800
		Mississippi River basin			
Cedar Creek	Mississippi River	SW¼ sec.5, T.106 N., R.6 W., Winona County, Hydrologic Unit 07040003, at U.S. Highway 61 bridge and Chicago, Milwaukee, St. Paul, and Pacific Railroad bridge, 4.2 miles east of Homer, Minn., and 0.2 mile above mouth.	17.7	9-20-80	11,100

Table 1.—Maximum discharge at miscellaneous sites—Continued

Stream	Tributary to	Location	Drainage area (mi^2)	Date	Discharge (ft^3/s)
		Mississippi River basin--Continued			
Big Trout Creek	Mississippi River	On line between NE¼ sec.26 and SE¼ sec.23, T.106 N., R.6 W., Winona County, Hydrologic unit 07040003, on east-west gravel road about 4.1 miles above mouth, and 1.4 miles south of Pickwick, Minn.	9.87	9-20-80	18,000
		Iowa River basin			
Rose Creek	Cedar River	NE¼NE¼ sec.6, T.102 N., R.16 W., at bridge on County Highway 20, 4.25 miles west of Elkton, Minn.	-	3-25-61	2,470
		Big Sioux River basin			
Mound Creek	Rock River	NE¼ sec.24, T.103 N., R.45 W., at lower damsite in Mount Springs State Park, 4.5 miles north of Luverne, Minn.	16	5-28-59	1,480

Station Manuscripts

Hydrologic and physiographic data pertinent to each gaging station are presented in the section of this report titled "Gaging-station records". A manuscript is included for each active gaging station. Data for several discontinued stations having a significant amount of record are also included. The manuscript gives the permanent station number and name, site number, location, drainage area, period of records available, type of gage, pertinent elevations of on-site structures, bankfull stage where applicable, basin characteristics where they have been determined, and a tabulation of the annual maximum discharges and corresponding gage heights.

Some drainage-area outlines were originally determined from maps of poor quality or by photographic interpretation. As topographic maps became available for these areas, previously determined drainage areas have been revised. The word "revised" appears in parenthesis after the drainage area value only in the first report of the series following the revision.

When information is insufficient to determine the annual maximum discharge, a footnote "discharge not determined", is used. This does not mean that the discharge will never be known, but indicates that the determination of peak flow has been delayed pending the accumulation of additional data. Present inability to determine annual maximum discharge is usually due to a lack of discharge measurements with which to define the stage-discharge relation. When more data become available, the appropriate discharges will be computed and published.

Annual peak gage heights are determined from an arbitrary local datum at the on-site drainage structure. Information on recovery of this datum can be obtained from the Minnesota District Office of the U.S. Geological Survey, 702 Post Office Building, St. Paul, Minn. 55101. The elevation of the gage referenced to the National Geodetic Vertical Datum of 1929 is available at some sites and is given in the "Gage" paragraph of the manuscript.

The omission of annual peak gage heights in the tabular listing is usually the result of low-water years, when the peak stage did not reach the bottom of the gage. Under these circumstances, a footnote describing the condition is entered in place of the peak-gage height, and a maximum discharge of less than the value corresponding to the elevation of the gage zero is given. This would represent an upper limiting value for the maximum discharge. Occasionally, a malfunction of the gage occurred, resulting in the loss of the annual peak gage height. A dash is inserted in the gage-height tabulation to indicate such a loss and, if conditions permit, the annual maximum discharge is estimated on the basis of a correlation with adjacent stations or by evaluation of precipitation data and their relationship to other available peak data.

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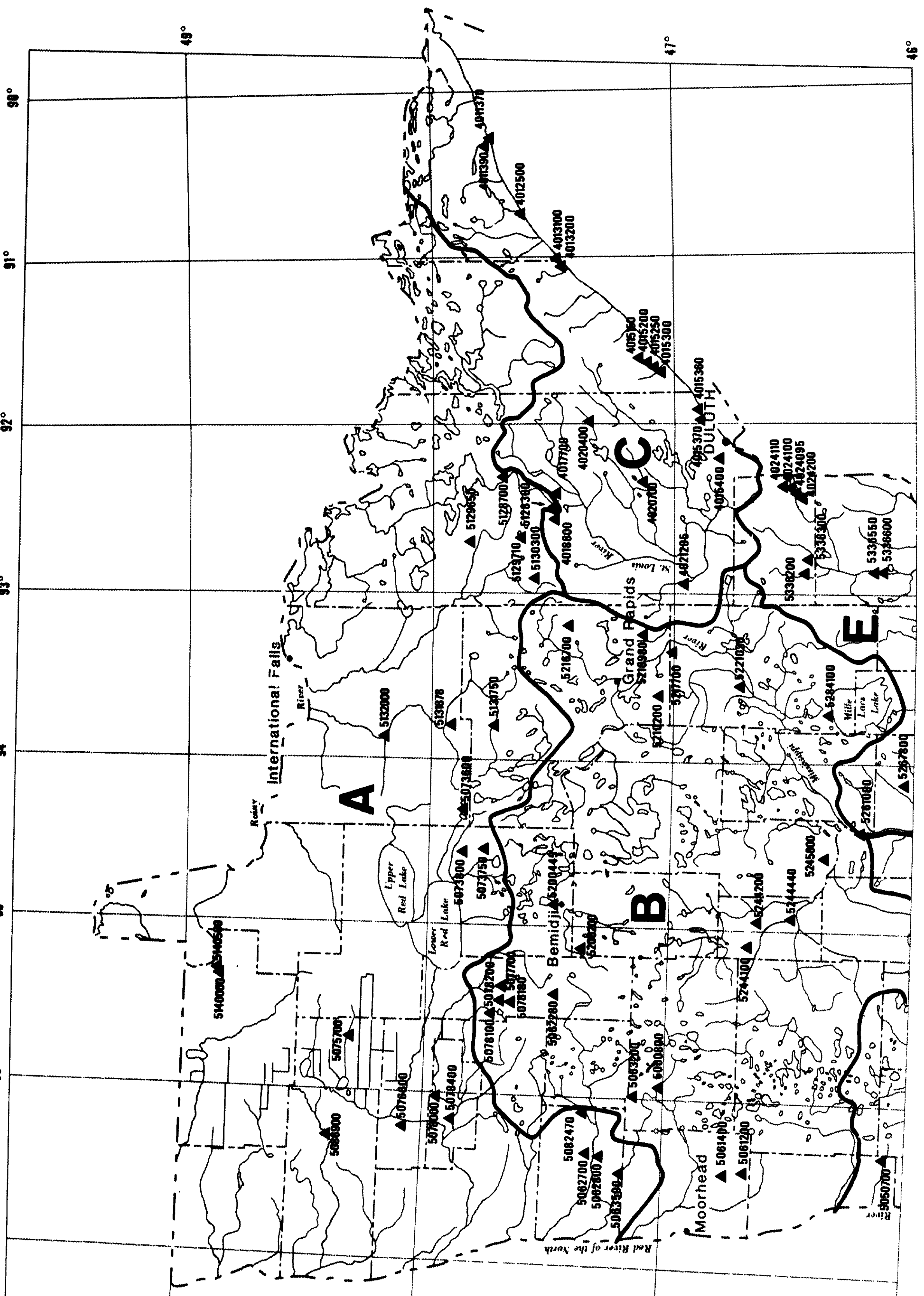
Gunard, K. T., and Guetzkow, L. C., 1971, Small-stream flood investigations in Minnesota, October 1958 to September 1969: U.S. Geological Survey open-file report, 174 p.



International Falls
Grand Rapids
DULUTH
Bemidji
Moorhead
A
B
C
E
Upper Red Lake
Lower Red Lake
Mille Lacs Lake
Red River of the North
Rainy River
St. Louis River
49°
48°
47°
46°
90°
91°
92°
93°
94°
95°
96°
97°

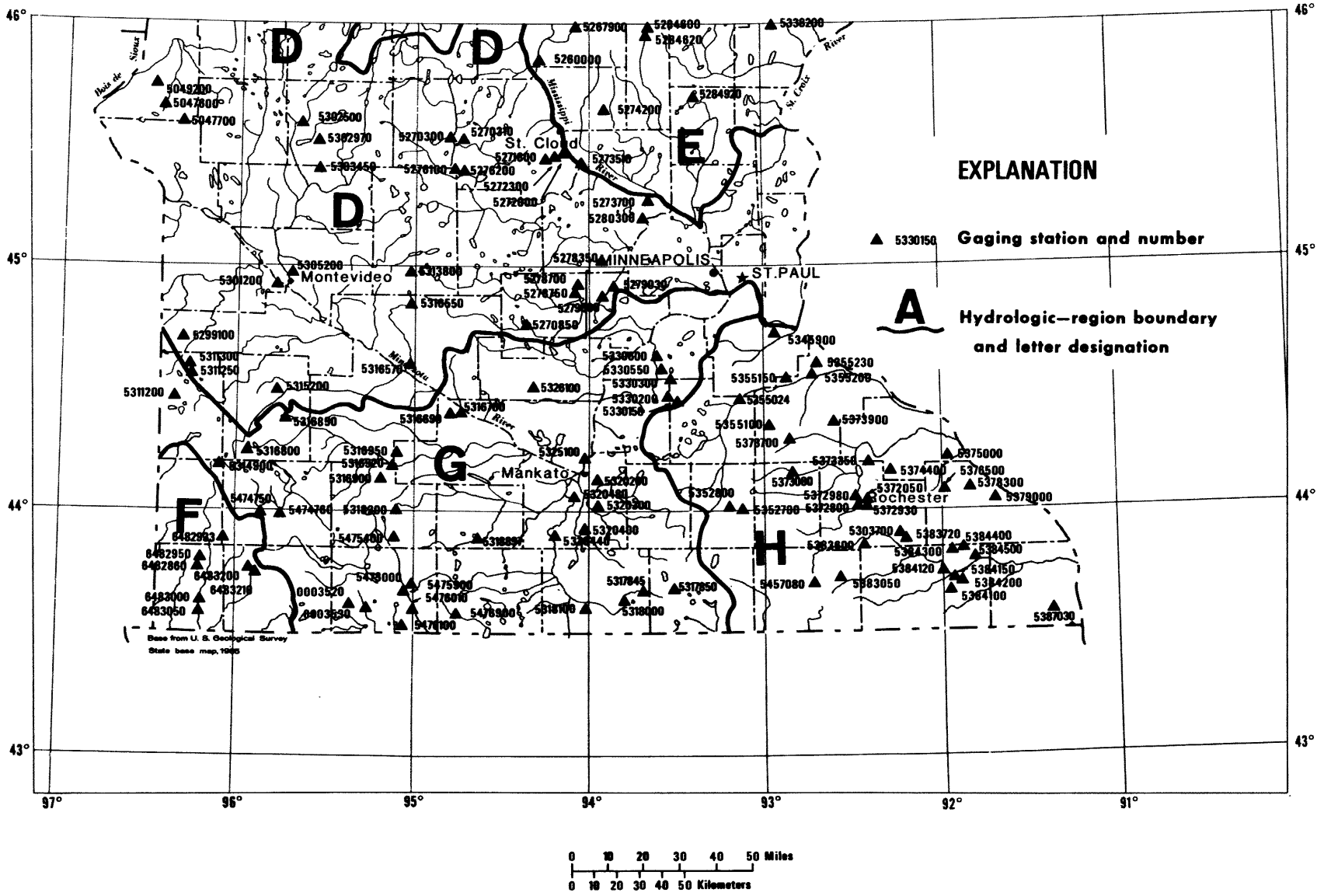


Figure 1.--Map of Minnesota showing location of gaging stations and hydrologic regions

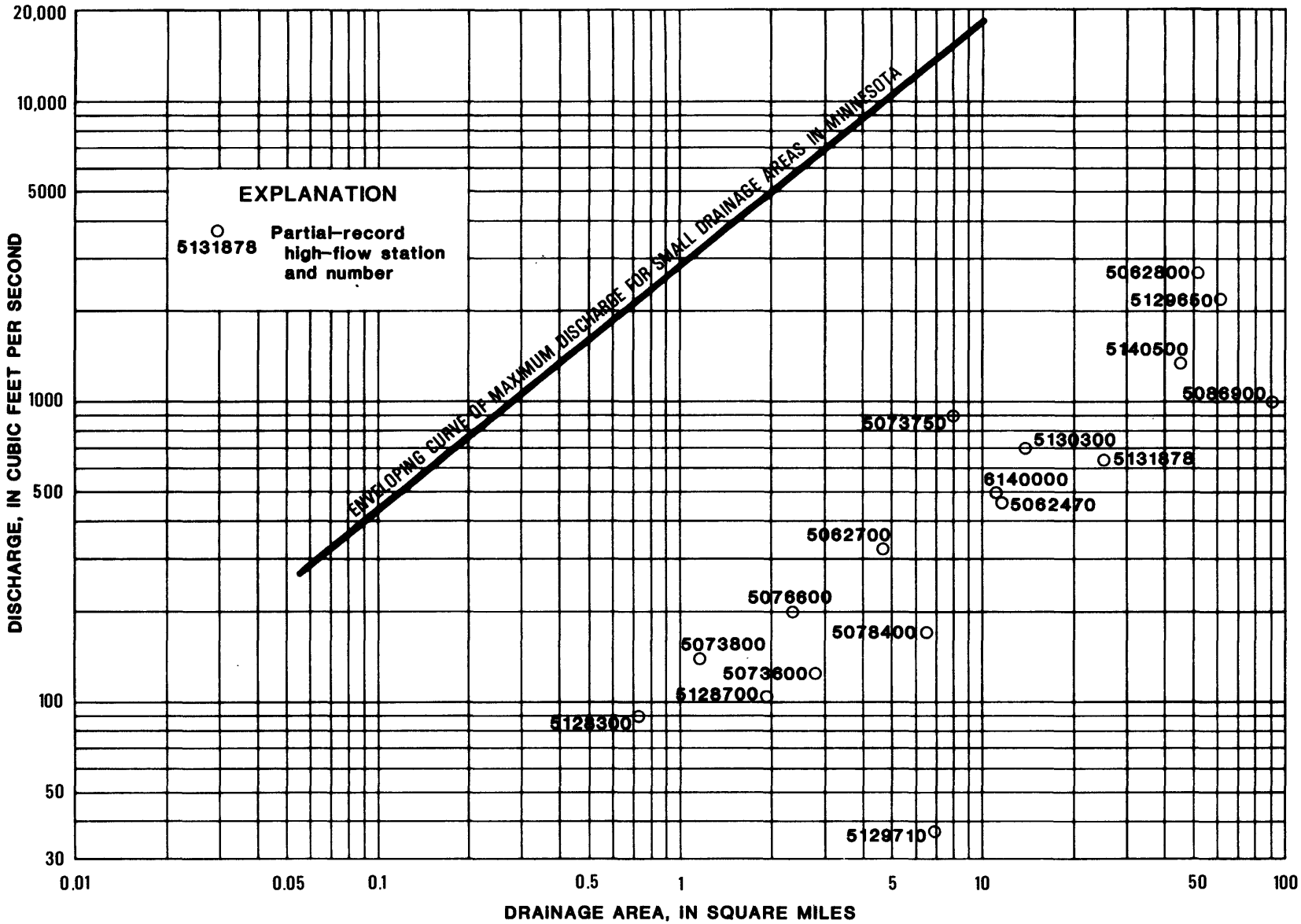


Figure 2.--Maximum discharge from small drainage areas in hydrologic region A

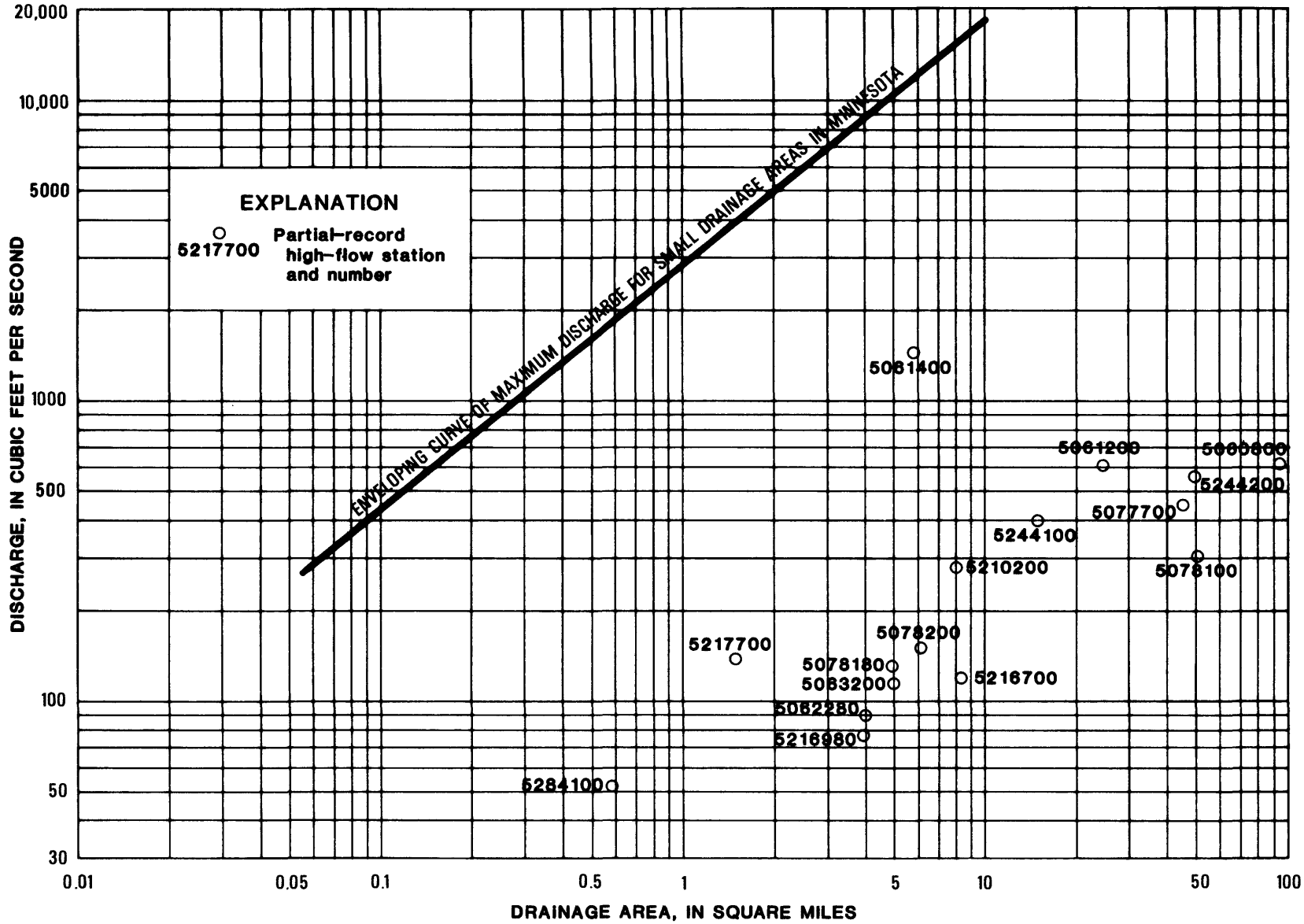


Figure 3.--Maximum discharge from small drainage areas in hydrologic region B

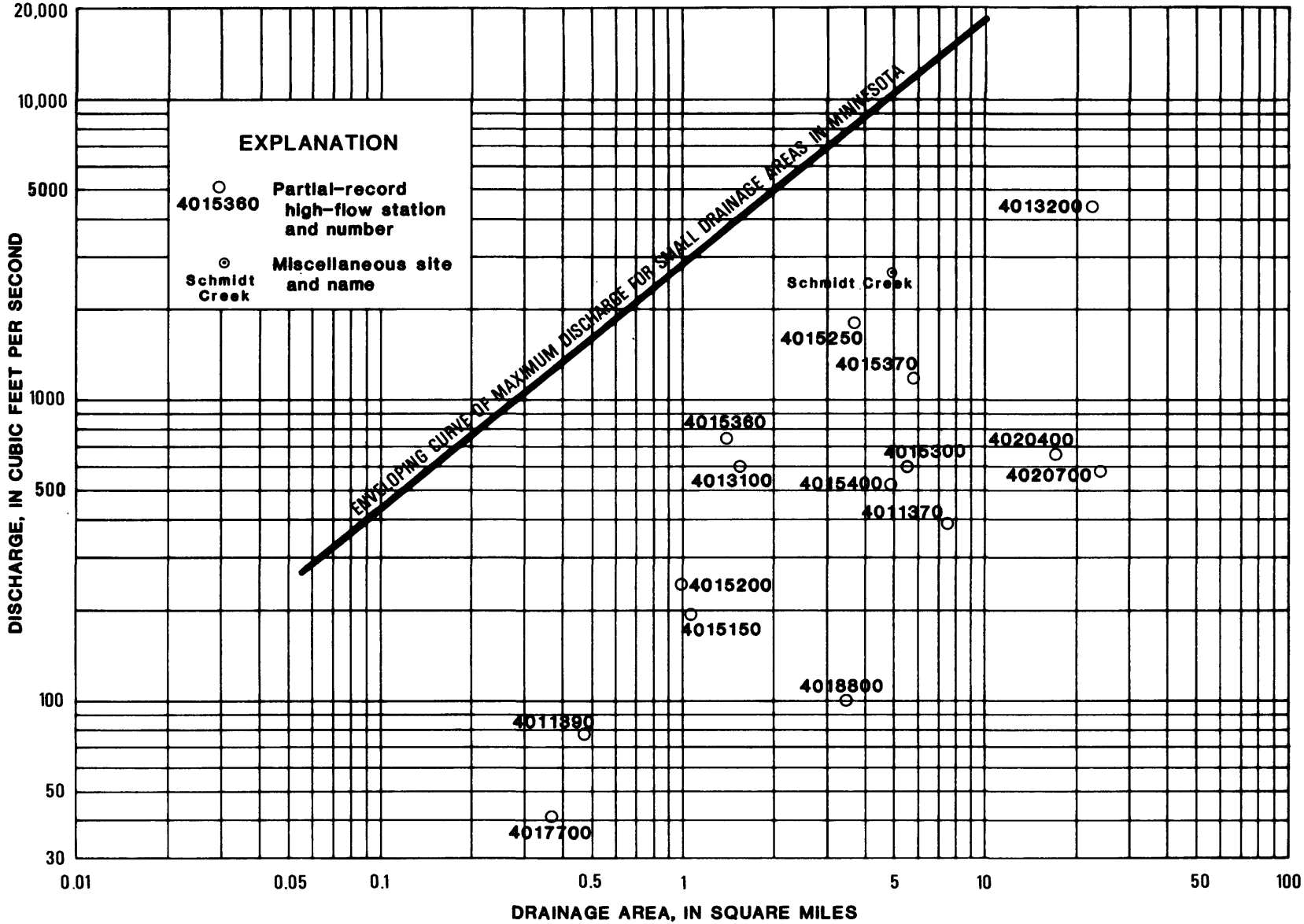


Figure 4.--Maximum discharge from small drainage areas in hydrologic region C

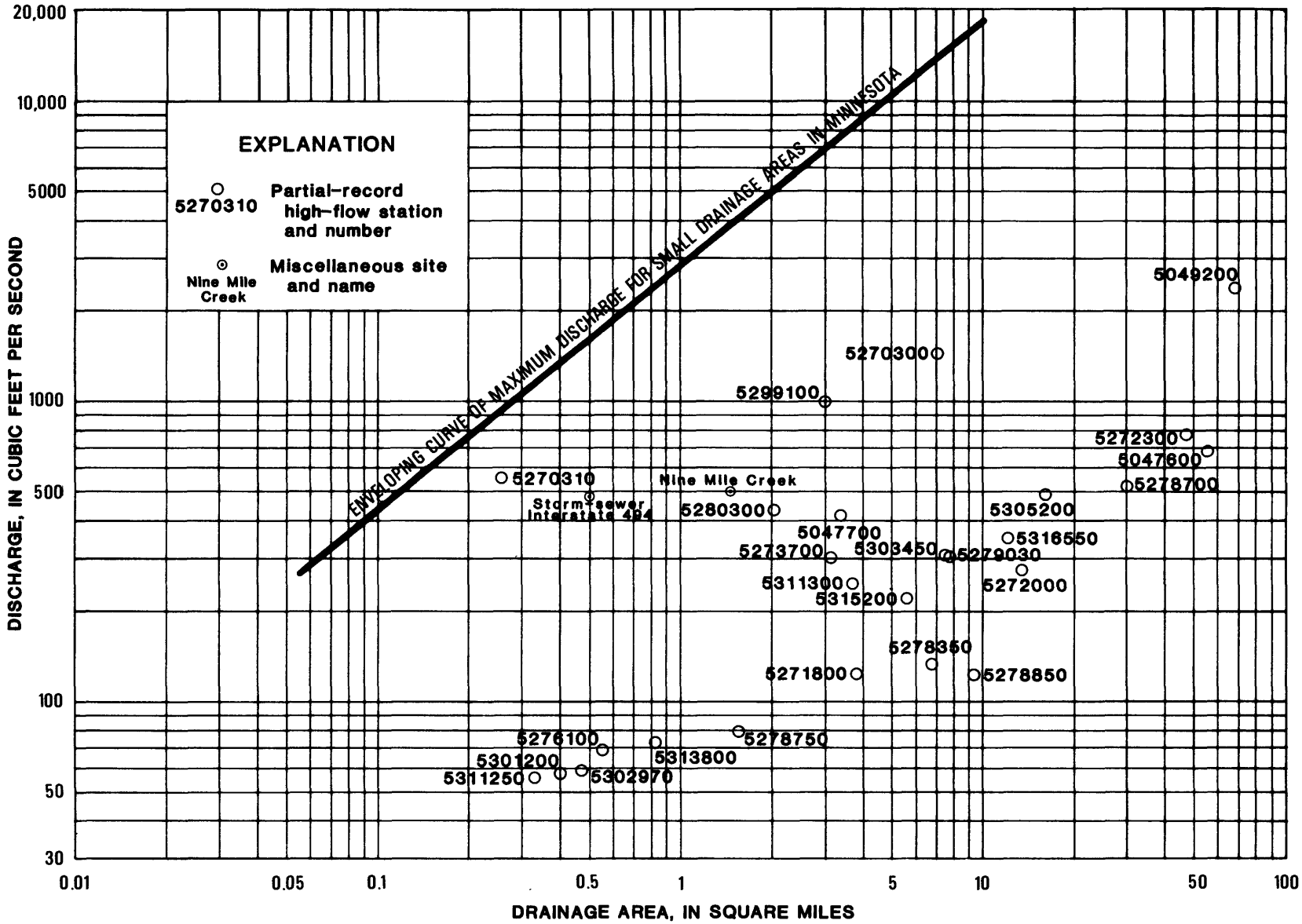


Figure 5.--Maximum discharge from small drainage areas in hydrologic region D

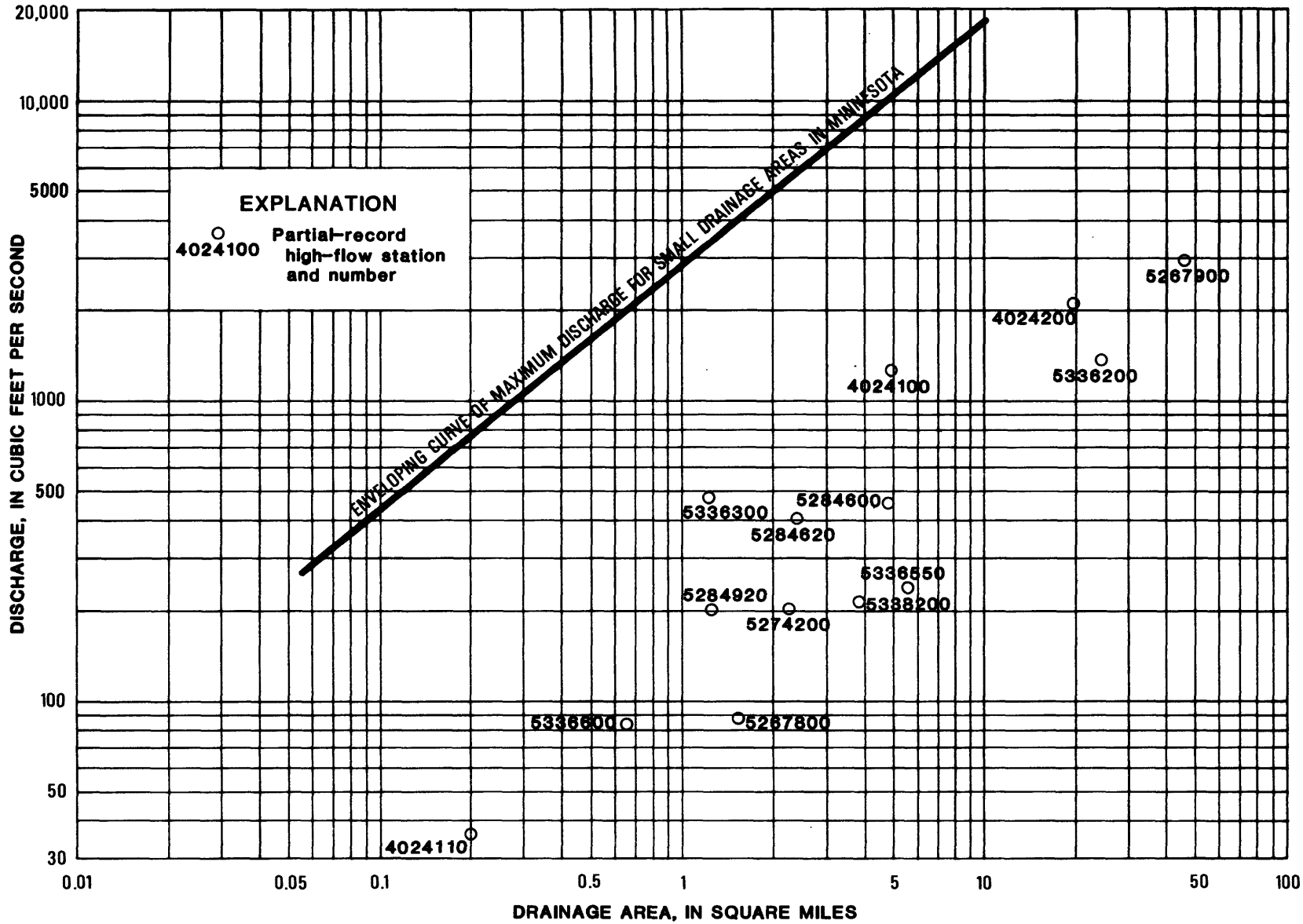


Figure 6.--Maximum discharge from small drainage areas in hydrologic region E

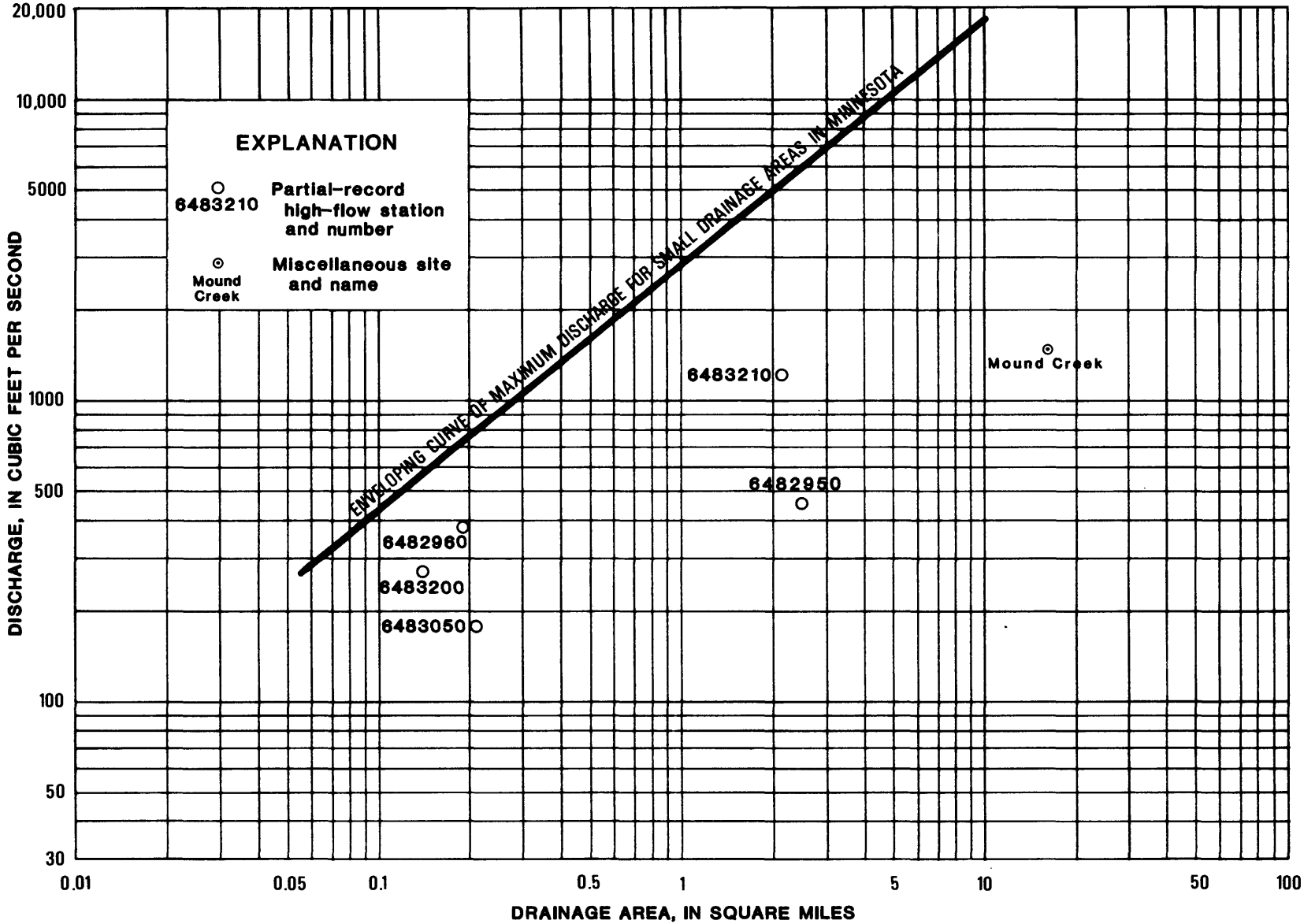


Figure 7.--Maximum discharge from small drainage areas in hydrologic region F

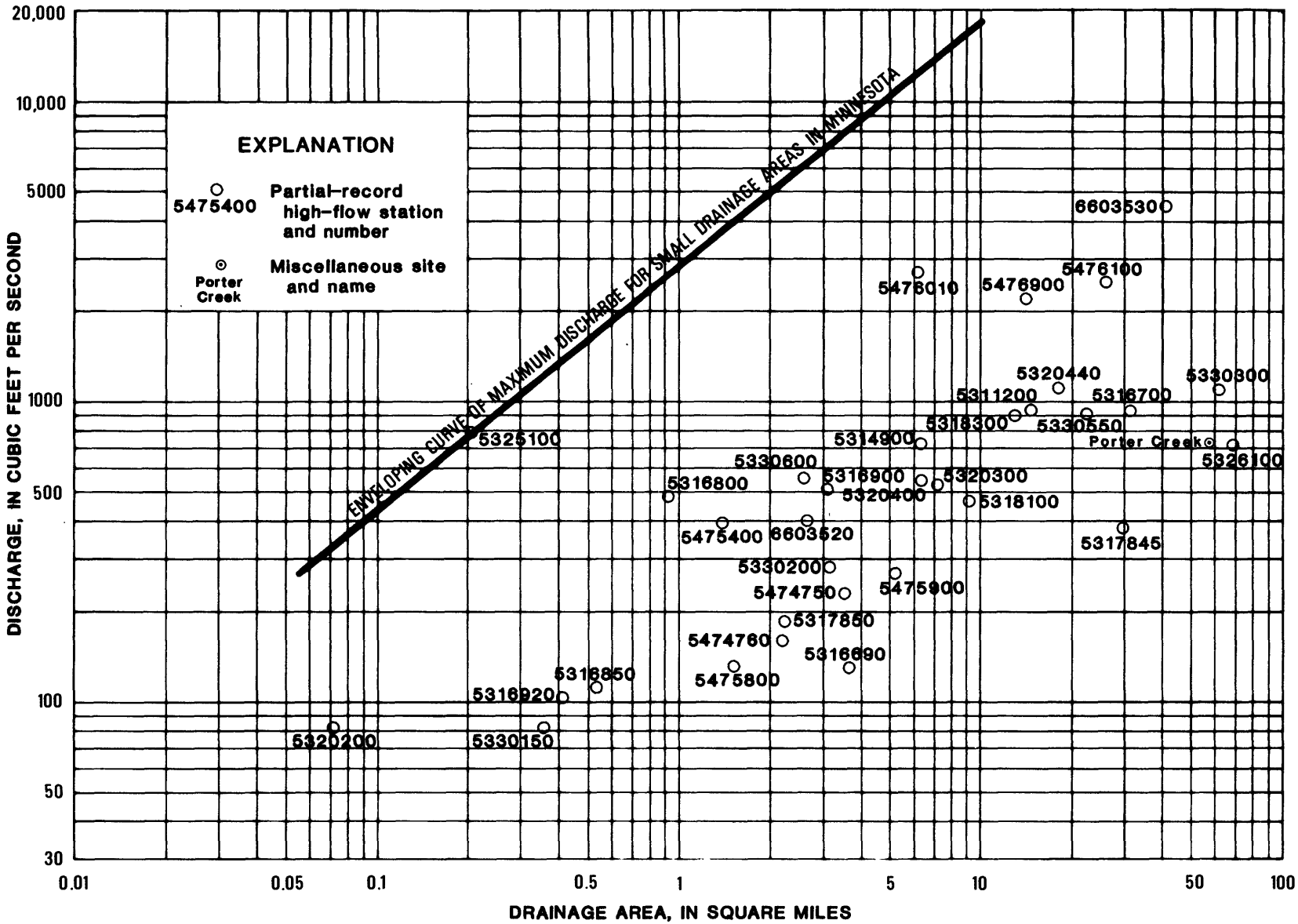


Figure 8.--Maximum discharge from small drainage areas in hydrologic region G

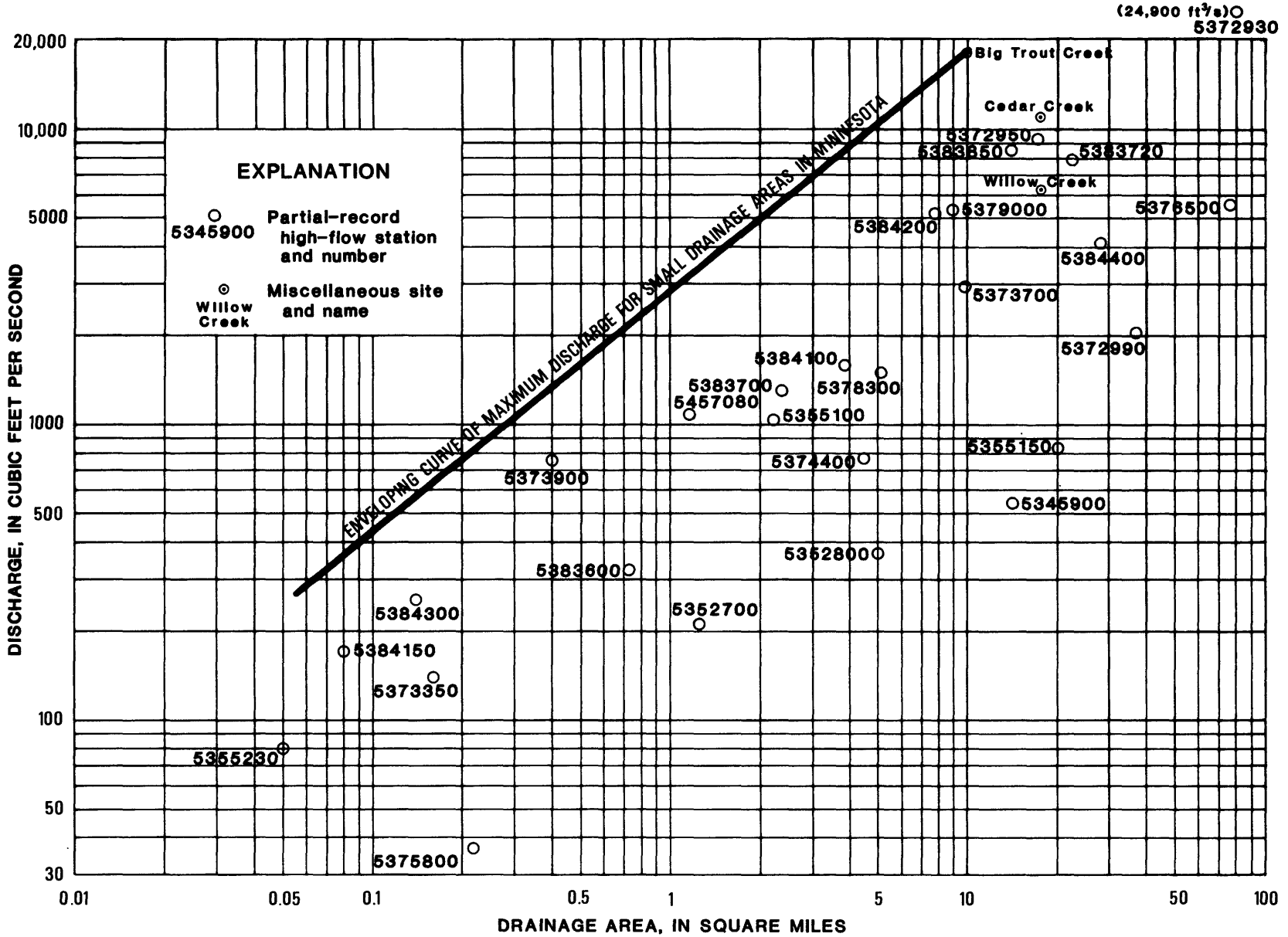


Figure 9.--Maximum discharge from small drainage areas in hydrologic region H

STREAMS TRIBUTARY TO LAKE SUPERIOR

04011370 Little Devil Track River near Grand Marais, MN

(Site No. 132)

Location.--Lat 47°47'09", long 90°19'44", in NE¼NW¼ sec.9, T.61 N., R.1 E., Cook County, Hydrologic Unit 04010101, at culvert on County Highway 12, 1.6 miles above mouth, and 2.5 miles north of Grand Marais.

Drainage area.--7.49 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--12.90 ft, upstream; 11.73 ft, downstream.

Bankfull stage.--15 ft.

Basin characteristics.--Main-channel length, 4.88 miles; main-channel slope, 51.4 ft per mile; mean basin altitude, 1,544 ft; forest area, 92 percent; area of lakes and swamps, 10 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 20, 1961	17.50	156
1962	May 23, 1962	16.25	74
1963	June 15, 1963	a15.54	19
1964	May 6, 1964	19.06	260
1965	May 21, 1965	17.35	137
1966	May 5, 1966	17.21	129
1967	Apr. 17, 1967	22.43	390
1968	Apr. 26, 1968	16.56	92
1969	Oct. 9, 1969	20.62	341
1970	Apr. 29, 1970	18.10	188
1971	Oct. 27, 1970	19.24	273
1972	May 2, 1972	17.39	138
1973	May 1, 1973	15.63	51
1974	May 11, 1974	18.96	250
1975	July 2, 1975	15.75	56
1976	Apr. 16, 1976	18.48	213
1977	Sept.24, 1977	22.33	388
1978	May 9, 1978	---	g120
1979	May 10, 1979	17.05	162
1980	Sept. 4, 1980	16.87	115

a Backwater from debris.
g Estimated; gage height unknown.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04011390 Little Devil Track River tributary near Grand Marais, MN

(Site No. 170)

Location.--Lat 47°47'17", long 90°19'20", in SE¼SE¼ sec.4, T.61 N., R.1 E., Cook County, Hydrologic Unit 04010101, at culvert on County Highway 55, 0.2 mile above mouth, and 2.8 miles north of Grand Marais.

Drainage area.—0.47 mi^2.

Records available.—October 1965 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—8.49 ft, upstream; 6.69 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 1.15 miles; main-channel slope, 192 ft per mile; mean basin altitude, 1,543 ft; forest area, 83 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1966	May. 5, 1966	b10.88	5.3
1967	Apr. 17, 1967	16.41	40
1968	June 14, 1968	10.09	6.4
1969	Oct. 9, 1968	16.02	19
1970	Sept.21, 1970	16.02	19
1971	Oct. 27, 1970	16.31	28
1972	Oct. 27, 1971	14.42	15
1973	Sept. 1, 1973	10.02	6.1
1974	Apr. 22 1974	b11.64	8.9
1975	Apr. 23, 1975	b 9.91	3.8
1976	Apr. 16, 1976	10.31	7.7
1977	Sept.24, 1977	16.75	77
1978	May 9, 1978	11.28	11
1979	May 10, 1979	16.37	37
1980	Sept. 4, 1980	c15.81	14

b Backwater from ice.
c Affected by shifting control.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04012500 Poplar River at Lutsen, MN

Location.—Lat 47°38'23", long 90°42'31", in SW¼NE¼ sec.33, T.60 N., R.3 W., Cook County, Hydrologic Unit 04010101, 350 ft upstream from bridge on U.S. Highway 61 at Lutsen, and 0.3 mile upstream from mouth.

Drainage area.—112 mi^2.

Records available.—May to November 1911, August 1912 to September 1917, July 1928 to September 1947, August 1952 to September 1961, October 1971 to present. Continuous records available October 1912 to September 1917, July 1928 to September 1947, and August 1952 to September 1961.

Gage.—Water-stage recorder and concrete control. Datum of gage is 697.89 ft, National Geodetic Vertical Datum of 1929. May 6 to November 1911, nonrecording gage at site 1,250 ft downstream, August 22, 1912 to September 30, 1917 at site 900 ft downstream at different datum, July 17, 1928 to March 30, 1937, at site 150 ft downstream at datum 6.90 ft lower.

Remarks.—Prior to 1915, some regulation by dams about 2.5 miles upstream.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1913	Apr. 25, 1913	3.08	462
1914	Aug. 11, 1914	3.75	773
1915	June 13, 1915	2.95	412
1916	Apr. 25, 1916	4.70	1,390
1917	June 19, 1917	3.72	756
1930	May 9, 1930	8.0	850
1931	Nov. 21, 1930	7.55	760
1932	May 10, 1932	6.35	521
1934	May 7, 1934	8.32	914
1935	Apr. 30, 1935	8.02	854
1936	May 7, 1936	7.96	842
1937	May 1, 1937	10.02	1,250
1938	Apr. 29, 1938	5.25	908
1939	May 1, 1939	5.36	1,090
1940	Apr. 30, 1940	4.10	481
1941	Apr. 14, 1941	b4.94	850
1942	May 15, 1942	4.84	835
1943	June 3, 1943	5.44	1,150
1944	June 5, 1944	5.31	1,060
1945	Mar. 28, 1945	4.97	1,220
1946	---	3.79	505
1947	May 3, 1947	---	e1,200
1953	May 31, 1953	4.35	548
1954	May 1, 1954	6.23	1,880
1955	Apr. 21, 1955	4.49	564
1956	May 14, 1956	5.55	1,290

04012500 Poplar River at Lutsen, MN--Continued

Annual maximum data.--Continued

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1957	Apr. 25, 1957	5.48	1,170
1958	June 5, 1958	3.84	238
1959	Aug. 26, 1959	4.70	742
1960	Apr. 25, 1960	5.24	1,050
1961	Apr. 21, 1961	5.56	1,300
1972	May 2, 1972	5.51	1,260
1973	May 26, 1973	5.17	1,000
1974	May 12, 1974	4.98	1,050
1975	May 3, 1975	4.69	640
1976	Apr. 19, 1976	6.21	1,860
1977	Sept.25, 1977	8.09	4,780
1978	May 9, 1978	5.40	1,220
1979	May 10, 1979	5.95	1,160
1980	Aug. 30, 1980	c4.82	648

b Backwater from ice.
c Affected by shifting control.
e Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04013100 Lake Superior tributary near Taconite Harbor, MN

(Site No. 161)

Location.--Lat 47°29'14, long 90°59'19", in SW¼SE¼ sec.20, T.58 N., R.5 W., Cook County, Hydrologic Unit 04010101, at culvert on U.S. Highway 61, 0.2 mile above mouth, and 3.7 miles southwest of Taconite Harbor.

Drainage area.—1.56 mi^2.

Records available.--October 1963 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.92 ft, upstream; (corrugated pipe); 4.08 ft, downstream.

Bankfull stage.—10 ft.

Basin characteristics.—Main-channel length, 2.80 miles; main-channel slope, 226 ft per mile; mean basin altitude, 1,028 ft; forest area, 99 percent; area of lakes and swamps, 8 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	May 23, 1964	11.63	167
1965	Apr. 21, 1965	8.12	59
1966	Apr. 15, 1966	b7.69	33
1967	Apr. 17, 1967	10.37	125
1968	Apr. 25, 1968	7.20	33
1969	Oct. 9, 1968	9.62	102
1970	Apr. 26, 1970	7.71	48
1971	Oct. 27, 1970	12.28	188
1972	Aug. 21, 1972	14.05	600
1973	June 4, 1973	7.12	32
1974	Oct. 6, 1973	10.47	129
1975	Apr. 28, 1975	7.94	54
1976	Apr. 7, 1976	7.48	42
1977	Sept.24, 1977	14.60	416
1978	July 7, 1978	7.49	41
1979	Apr. 21, 1979	8.65	74
1980	Sept. 4, 1980	10.07	110

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04013200 Caribou River near Little Marais, MN

(Site No. 130)

Location.--Lat 47°27'51", 91°01'50", in NW¼SE¼ sec.36, T.58 N., R.6 W., Lake County, Hydrologic Unit 04010101, at culvert on U.S. Highway 61, 0.2 mile above mouth, and 5.2 miles northeast of Little Marais.

Drainage area.--22.7 mi 2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--8.89 ft, upstream; 8.42 ft, downstream.

Bankfull stage.--15 ft.

Basin characteristics.--Main-channel length, 14.6 miles; main-channel slope, 52.6 ft per mile; mean basin altitude, 1,286 ft; forest area, 99 percent; area of lakes and swamps, 7 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 20, 1961	15.97	1,130
1962	Apr. 27, 1962	11.28	190
	May 23, 1962		
1963	Apr. 7, 1963	b13.23	307
1964	Apr. 28, 1964	16.74	1,340
1965	May 15, 1965	12.66	443
1966	Apr. 19, 1966	13.34	548
1967	Apr. 17, 1967	15.70	1,080
1968	June 9, 1968	12.14	378
1969	Oct. 9, 1968	13.64	608
1970	Apr. 27, 1970	13.12	500
1971	Oct. 27, 1970	16.63	1,320
1972	Aug. 16, 1972	16.38	1,230
1973	June 4, 1973	12.92	463
1974	May 11, 1974	13.88	655
1975	Apr. 23, 1975	12.69	422
1976	Apr. 16, 1976	12.67	417
1977	Sept.24, 1977	27.00	4,430
1978	May 29, 1978	12.52	320
1979	May 10, 1979	13.70	610
1980	Sept. 4, 1980	12.61	410

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015150 Crow Creek near Silver Creek, MN

(Site No. 58)

Location.--Lat 47°08'30", long 91°34'38", in SW¼SW¼ sec.23, T.54 N., R.10 W., Lake County, Hydrologic Unit 04010102, at culvert on County Highway 3, 2.3 miles northeast of Silver Creek, and 4.0 miles above mouth.

Drainage area.--1.07 mi 2.

Records available.--October 1959 to September 1975.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--6.97 ft, upstream; 6.37 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 2.60 miles; main-channel slope, 108 ft per mile; mean basin altitude, 1,195 ft; forest area, 93 percent: area of lakes and swamps, 19 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	9.56	49
1961	Apr. 20, 1961	11.08	121
1962	May 23, 1962	8.47	21
1963	Apr. 2, 1963	b9.20	19
1964	May 23, 1964	9.30	41
1965	Apr. 19, 1965	b9.29	23
1966	Aug. 8, 1966	9.13	37
1967	June 12, 1967	8.81	29
1968	Apr. 24, 1968	9.65	51
1969	Apr. 13, 1969	8.83	32
1970	Apr. 27, 1970	8.72	30
1971	Apr. 12, 1971	11.34	196
1972	Sept.20, 1972	11.34	196
1973	June 17, 1973	9.29	43
1974	Oct. 9, 1973	11.19	154
1975	Apr. 23, 1975	c9.00	34

b Backwater from ice.
c Affected by shifting control.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015200 Encampment River tributary at Silver Creek, MN

(Site No. 59)

Location.--Lat 47°07'01", long 91°36'04", in NE¼SE¼ sec.33, T.54 N., R.10 W., Lake County, Hydrologic Unit 04010102, at culvert on County Highway 3, 0.3 mile north of Silver Creek, and 1.4 miles above mouth.

Drainage area.--0.96 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.02 ft, upstream; 4.07 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 1.70 miles; main-channel slope, 183 ft per mile; mean basin altitude, 1,142 ft; forest area, 97 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	8.65	72
1961	Apr. 20, 1961	9.17	85
1962	May 23, 1962	6.81	26
1963	Apr. 7, 1963	6.55	20
1964	Sept. 7, 1964	7.50	41
1965	May 21, 1965	7.01	29
1966	Aug. 8, 1966	7.77	47
1967	Apr. 9, 1967	c7.78	45
1968	July 12, 1968	11.49	245
1969	Aug. 6, 1969	7.73	46
1970	May 9, 1970	7.21	31
1971	Apr. 11, 1971	b8.81	45
1972	Sept.20, 1972	11.49	225
1973	June 17, 1973	7.90	48
1974	Oct. 9, 1973	11.03	149
1975	Apr. 23, 1975	b7.79	41
1976	Apr. 9, 1976	c6.90	22
1977	Sept.24, 1977	8.42	60
1978	July 18, 1978	8.42	60
1979	May 10, 1979	10.14	112
1980	Sept. 4, 1980	8.42	60

b Backwater from ice.
c Affected by shifting control.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015250 Silver Creek tributary near Two Harbors, MN

(Site No. 169)

Location.--Lat 47°04'40", long 91°36'49", in SW¼NE¼ sec.16, T.53 N., R.10 W., Lake County, Hydrologic Unit 04010102, at culvert on County Highway 3, 1.0 mile above mouth, and 4.5 miles northeast of Two Harbors.

Drainage area.—3.72 mi^2.

Records available.--October 1964 to present.

Gage.—Water-stage recorder upstream from culvert.

Culvert invert elevations.—0.20 ft, upstream; -0.59 ft, downstream.

Bankfull stage.—3 ft.

Basin characteristics.—Main-channel length, 3.00 miles; main-channel slope, 110 ft per mile; mean basin altitude, 962 ft; forest area, 91 percent; area of lakes and swamps, 0 percent.

Remarks.--Recording rain gage installed Mar. 16, 1966.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1965	Sept.30, 1965	4.06	130
1966	Oct. 18, 1965	4.47	155
1967	June 12, 1967	4.66	168
1968	July 12, 1968	14.41	1,020
1969	Aug. 6, 1969	5.22	208
1970	May 9, 1970	5.16	203
1971	Oct. 27, 1970	5.21	206
1972	Sept.20, 1972	17.08	1,880
1973	June 17, 1973	7.06	455
1974	Oct. 9, 1973	11.00	950
1975	Apr. 24, 1975	b4.74	200
1976	June 15, 1976	2.77	97
1977	Sept.24, 1977	5.95	318
1978	July 18, 1978	6.85	430
1979	May 10, 1979	10.30	838
1980	Sept. 4, 1980	7.86	540

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015300 Little Stewart River near Two Harbors, MN

(Site No. 57)

Location.--Lat 47°03'52", long 91°40'03", in SE¼NE¼ sec.24, T.53 N., R.11 W., Lake County, Hydrologic Unit 04010102, at culvert on county highway, 2.0 miles above mouth, and 2.7 miles north of Two Harbors.

Drainage area.—5.54 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—7.87 ft, upstream; 7.73 ft, downstream.

Bankfull stage.—10 ft.

Basin characteristics.—Main-channel length, 7.47 miles; main-channel slope, 53.8 ft per mile; mean basin altitude, 1,152 ft; forest area, 75 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	10.80	140
1961	Apr. 20, 1961	11.76	200
1962	May 23, 1962	10.43	118
1963	Apr. 7, 1963	b10.05	65
1964	Sept. 7, 1964	12.03	260
1965	Apr. 19, 1965	10.62	161
1966	Oct. 18, 1965	10.34	139
1967	June 12, 1967	10.78	171
1968	Apr. 24, 1968	11.80	243
1969	Apr. 13, 1969	10.85	176
1970	Apr. 8, 1970	10.98	185
1971	Apr. 11, 1971	b12.72	207
1972	Sept.20, 1972	15.18	598
1973	Aug. 16, 1973	11.31	206
1974	Oct. 9, 1973	13.05	362
1975	Apr. 23, 1975	b13.33	245
1976	Mar. 31, 1976	b11.38	143
1977	Sept.24, 1977	13.24	377
1978	July 18, 1978	11.41	212
1979	May 10, 1979	14.34	500
1980	Sept. 4, 1980	10.10	(+)

+ Discharge not determined.
b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015360 Lake Superior tributary No. 2 at French River, MN

(Site No. 160)

Location.--Lat 46°53'43", long 91°54'31", in SW¼SE¼ sec.18, T.51 N., R.12 W., St. Louis County, Hydrologic Unit 04010102, at culvert on U.S. Highway 61, 0.35 mile above mouth, and 0.7 mile west of French River.

Drainage area.--1.41 mi^2.

Records available.--October 1963 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--14.52 ft, upstream; 0.71 ft, downstream.

Bankfull stage.--20 ft.

Basin characteristics.--Main-channel length, 2.81 miles; main-channel slope, 144 ft per mile; mean basin altitude, 902 ft; forest area, 95 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	Sept. 7, 1964	28.25	337
1965	June 6, 1965	18.03	64
1966	Oct. 18, 1965	18.27	69
1967	June 13, 1967	23.00	276
1968	Apr. 24, 1968	19.72	109
1969	Apr. 13, 1969	18.48	75
1970	Apr. 8, 1970	18.24	69
1971	Apr. 11, 1971	b18.89	80
1972	Sept.20, 1972	31.58	748
1973	Aug. 15, 1973	18.22	68
1974	June 10, 1974	23.5	282
1975	Apr. 27, 1975	19.17	94
1976	Apr. 6, 1976	17.62	51
1977	Sept.24, 1977	23.63	283
1978	July 7, 1978	25.37	300
1979	May 9, 1979	30.23	550
1980	Sept. 4, 1980	29.91	500

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015370 Talmadge River at Duluth, MN

(Site No. 159)

Location.--Lat 46°53'20", long 91°55'21", in SE¼NE¼ sec.24, T.51 N., R.13 W., St. Louis County, Hydrologic Unit 04010102, at culvert on U.S. Highway 61, 0.6 mile above mouth, and 0.5 mile northeast of Duluth city limits.

Drainage area.--5.79 mi^2.

Records available.--October 1963 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--10.51 ft, upstream; 5.12 ft, downstream.

Bankfull stage.--13 ft.

Basin characteristics.--Main-channel length, 5.85 miles; main-channel slope, 92.7 ft per mile; mean basin altitude, 972 ft; forest area, 65 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	Sept. 7, 1964	17.54	609
1965	Apr. 19, 1965	13.17	187
1966	Oct. 18, 1965	12.61	150
1967	June 13, 1967	15.55	371
1968	Apr. 24, 1968	15.23	335
1969	Apr. 14, 1969	13.85	224
1970	Apr. 8, 1970	13.68	139
1971	Apr. 11, 1971	15.33	358
1972	Sept.20, 1972	20.54	1,020
1973	Apr. 15, 1973	b14.11	h152
1974	Oct. 9, 1973	16.42	h470
1975	Apr. 27, 1975	14.69	252
1976	Apr. 1, 1976	13.70	140
1977	Sept.24, 1977	15.94	415
1978	Aug. 23, 1978	17.00	544
1979	May 9, 1979	21.76	1,180
1980	Sept. 4, 1980	15.95	415

b Backwater from ice.
h Revised.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015400 Miller Creek at Duluth, MN

(Site No. 56)

Location.--Lat 46°49'01", long 92°10'42", in SE¼NE¼ sec.13, T.50 N., R.15 W., St. Louis County, Hydrologic Unit 04010201, at culvert on U.S. Highway 53, 0.2 mile northwest of Duluth city limits.

Drainage area.—4.92 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—12.03 ft, upstream; 11.60 ft, downstream.

Bankfull stage.—14 ft.

Basin characteristics.—Main-channel length, 3.95 miles; main-channel slope, 28.0 ft per mile; mean basin altitude, 1,384 ft; forest area, 72 percent; area of lakes and swamps, 8 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 20, 1960	15.55	154
1961	Apr. 20, 1961	18.85	424
1962	May 23, 1962	c16.22	193
1963	Apr. 2, 1963	c13.94	43
1964	Sept. 7, 1964	17.95	343
1965	Apr. 19, 1965	b16.18	190
1966	Oct. 18, 1965	c15.92	150
1967	June 13, 1967	16.76	242
1968	June 9, 1968	15.74	167
1969	Apr. 11, 1969	15.67	164
1970	Apr. 8, 1970	15.28	134
1971	Apr. 11, 1971	16.83	254
1972	Sept.20, 1972	19.24	481
1973	Aug. 15, 1973	17.47	302
1974	Oct. 9, 1973	17.19	282
1975	Apr. 29, 1975	15.96	185
1976	Apr. 2, 1976	15.23	120
1977	Sept.24, 1977	18.16	360
1978	Aug. 23, 1978	18.97	430
1979	May 9, 1979	19.95	525
1980	Sept. 4, 1980	18.19	360

b Backwater from ice.
c Affected by shifting control.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04018800 East Two River tributary at Virginia, MN

(Site No. 40)

Location.--Lat 47°31'54", long 92°33'51", in NE¼NE¼ sec.12, T.58 N., R.18 W., St. Louis County, Hydrologic Unit 04010201, at culvert on U.S. Highway 169, 0.2 mile west of Virginia city limits, and 1.1 miles above mouth.

Drainage area (revised).—3.46 mi^2. (Contributing area)
4.26 mi^2. (Total area)

Records available.--October 1958 to September 1972.

Gage.—Crest-stage gage upstream from culvert. Datum of gage is 1,421.72 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.—4.08 ft, upstream; 4.00 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 2.80 miles; main-channel slope, 21.9 ft per mile; mean basin altitude, 1,452 ft; forest area, 77 percent; area of lakes and swamps, 14 percent.

Remarks.--Drainage pattern has been affected by mining operations in the past and will probably continue to be in the future. Several open pit mines and mining dumps are located in basin.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 11, 1959	6.11	44
1960	July 16, 1960	a6.59	46
1961	Apr. 20, 1961	8.16	54
1962	June 29, 1962	6.18	44
1963	June 10, 1963	*6.37	40
1964	May 7, 1964	7.87	81
1965	Apr. 19, 1965	6.74	54
1966	Apr. 20, 1966	5.57	41
1967	Mar. 30, 1967	6.38	48
1968	Aug. 21, 1968	8.37	85
1969	Aug. 29, 1969	*8.93	e100
1970	June 11, 1970	6.30	26
1971	Apr. 16, 1971	b7.07	74
1972	Apr. 16, 1972	6.65	64

* Gage height at downstream end of culvert.
a Backwater from debris.
b Backwater from ice.
e Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04017700 McKinley Lake tributary at McKinley, MN

(Site No. 54)

Location.--Lat 47°30'41", long 92°25'11", in SW¼NE¼ sec.18, T.58 N., R.16 W., St. Louis County, Hydrologic Unit 04010201, at culvert on State Highway 135, at west edge of McKinley.

Drainage area.—0.37 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—6.48 ft, upstream; 5.60 ft, downstream.

Bankfull stage.—10 ft.

Basin characteristics.—Main-channel length, 0.95 miles; main-channel slope, 259 ft per mile; mean basin altitude, 1,585 ft; forest area, 97 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	8.20	13
1961	Apr. 17, 1961	b9.84	27
1962	Apr. 27, 1962	8.07	11
1963	Apr. 2, 1963	8.51	18
1964	June 23, 1964	8.03	11
1965	Sept.28, 1965	8.34	15
1966	Apr. 20, 1966	8.18	13
1967	Mar. 31, 1967	7.80	8.1
1968	Aug. 21, 1968	9.73	27
1969	Sept. 6, 1969	9.35	25
1970	Apr. 8, 1970	b7.33	2.7
1971	June 20, 1971	8.47	17
1972	Apr. 18, 1972	7.64	6.5
1973	May 6, 1973	9.37	25
1974	Oct. 11, 1973	8.57	19
1975	Apr. 29, 1975	7.49	5.2
1976	Apr. 9, 1976	b7.19	2.0
1977	Aug. 27, 1977	11.65	39
1978	July 18, 1978	11.90	41
1979	Apr. 24, 1979	9.64	10
1980	Apr. 8, 1980	b8.24	3.4

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04020400 North Branch Whiteface River near Fairbanks, MN

(Site No. 177)

Location.--Lat 47°22'20", long 91°56'28", at common corner of secs.35, 36, 1, and 2, along line between T.57 N., and T.56 N., R.13 W., St. Louis County, Hydrologic Unit 04010201, on right downstream wingwall of double box culvert on County Highway 16, 2 miles upstream from the mouth of Jenkins Creek, and 0.7 mile west of Fairbanks.

Drainage area.—17.1 mi^2.

Records available.--October 1978 to present.

Gage.—Crest-stage gage at downstream side of culvert.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 23, 1979	13.67	660
1980	Apr. 21, 1980	11.26	52

STREAMS TRIBUTARY TO LAKE SUPERIOR

04020700 Bug Creek at Shaw, MN

(Site No. 178)

Location.—Lat 47°06'40", long 92°21'03", in SW¼SE¼ sec.34, T.54 N., R.16 W., St. Louis County, Hydrologic Unit 04010201, at left bank on downstream side of culverts on County Road 15 at Shaw, and 7.5 miles upstream from mouth.

Drainage area.—24.0 mi^2.

Records available.—October 1978 to present.

Gage.—Crest-stage gage at downstream side of culverts.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 23, 1979	15.12	590
1980	Apr. 20, 1980	11.79	78

STREAMS TRIBUTARY TO LAKE SUPERIOR

04021205 Floodwood River above Floodwood, MN

Location.—Lat 46°17'15", long 92°53'40", in NE¼NW¼ sec.32, T.52 N., R.20 W., St. Louis County, Hydrologic Unit 04010201, at bridge on County Highway 835, 500 ft west of State Highway 73, and 2 miles north of Floodwood.

Drainage area.—198 mi^2.

Records available.—October 1971 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	Apr. 19, 1972	19.78	1,590
1973	May 11, 1973	14.95	857
1974	Oct. 13, 1973	17.96	1,300
1975	May 1, 1975	19.91	2,030
1976	Apr. 6, 1976	15.23	1,020
1977	Sept.27, 1977	12.78	491
1978	Aug. 28, 1978	16.82	1,420
1979	Apr. 23, 1979	22.87	2,300
1980	Apr. 8, 1980	b14.34	386

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04024095 Nemadji River near Holyoke, MN

Location.—Lat 46°31'04", long 92°23'22", in NE¼NE¼ sec.32, T.47 N., R.16 W., Carlton County, Hydrologic Unit 04010301, at bridge on State Highway 23, 3.5 miles north of Holyoke.

Drainage area.—118 mi^2.

Records available.—October 1971 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	Sept.29, 1972	15.31	3,250
1973	Mar. 11, 1973	b11.25	1,270
1974	June 9, 1974	12.55	2,000
1975	Apr. 23, 1975	12.20	1,850
1976	Apr. 1, 1976	b14.69	1,650
1977	Sept.24, 1977	d	e900
1978	Apr. 7, 1978	11.60	1,610
1979	May 10, 1979	13.31	2,340
1980	Sept. 3, 1980	11.37	1,500

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04024100 Rock Creek near Blackhoof, MN

(Site No. 128)

Location.--Lat 46°32'10", long 92°22'12", in SW¼SE¼ sec.21, T.47 N., R.16 W., Carlton County, Hydrologic Unit 04010301, at culvert on State Highway 23, 4.0 miles above mouth, and 4.4 miles east of Blackhoof.

Drainage area.—4.94 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—10.03 ft, upstream; 8.76 ft, downstream.

Bankfull stage.—18 ft.

Basin characteristics.—Main-channel length, 5.35 miles; main-channel slope, 41.7 ft per mile; mean basin altitude, 960 ft; forest area, 40 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 20, 1961	15.13	282
1962	May 23, 1962	16.53	404
1963	Apr. 2, 1963	b12.68	85
1964	Sept. 7, 1964	19.44	698
1965	Sept.30, 1965	14.97	269
1966	---	---	---
1967	June 14, 1967	19.29	678
1968	June 9, 1968	24.7	1,110
1969	July 31, 1969	16.03	360
1970	May 21, 1970	28.92	1,270
1971	Apr. 11, 1971	b17.26	233
1972	Sept.20, 1972	27.20	1,210
1973	Aug. 8, 1973	15.55	318
1974	June 6, 1974	16.07	362
1975	Apr. 16, 1975	b14.32	130
1976	June 18, 1976	15.12	282
1977	Sept.24, 1977	16.20	375
1978	Aug. 23, 1978	17.90	535
1979	May 9, 1979	16.72	420
1980	Sept. 3, 1980	c17.96	490

b Backwater from ice.
c Affected by shifting control.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04024110 Rock Creek tributary near Blackhoof, MN

(Site No. 129)

Location.--Lat 46°32'14", long 92°22'05", in NE¼SE¼ sec.21, T.47 N., R.16 W., Carlton County, Hydrologic Unit 04010301, at culvert on State Highway 23, 0.1 mile above mouth, and 4.5 miles east of Blackhoof.

Drainage area.--0.20 mi^2.

Records available.--October 1960 to present.

Gage.--Water-stage recorder upstream from culvert. Prior to Oct. 12, 1979, crest-stage gage at same site and elevation.

Culvert invert elevations.--7.46 ft, upstream; 3.04 ft, downstream.

Bankfull stage.--9 ft.

Basin characteristics.--Main-channel length, 0.59 mile; main-channel slope, 90.9 ft per mile; mean basin altitude, 902 ft; forest area, 65 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 20, 1961	9.44	12
1962	May 23, 1962	9.82	15
1963	Apr. 2, 1963	b9.42	5.8
1964	Sept. 7, 1964	13.23	27
1965	Sept.30, 1965	8.73	5.9
1966	June 25, 1966	13.50	28
1967	June 14, 1967	13.14	27
1968	June 9, 1968	12.73	27
1969	July 31, 1969	15.21	31
1970	May 21, 1970	18.42	36
1971	Apr. 11, 1971	b10.11	8.7
1972	Sept.20, 1972	14.36	30
1973	May 1, 1973	8.73	5.5
1974	Oct. 11, 1973	9.14	8.7
1975	Apr. 16, 1975	b10.10	9.4
1976	Apr. 1, 1976	b9.71	5.3
1977	Sept.24, 1977	9.71	14
1978	July 7, 1978	10.89	22
1979	May 10, 1979	9.81	14
1980	Sept. 3, 1980	11.41	24

b Backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04024200 South Fork Nemadji River near Holyoke, MN

(Site No. 127)

Location.--Lat 46°29'38", long 92°24'36", in SE¼SE¼ sec.6, T.46 N., R.16 W., Carlton County, Hydrologic Unit 04010301, at culvert on State Highway 23, 1.7 miles below Clear Creek, and 2.0 miles northwest of Holyoke.

Drainage area.—19.4 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—7.70 ft, upstream; 6.86 ft, downstream.

Bankfull stage.—11 ft.

Basin characteristics.—Main-channel length, 7.90 miles; main-channel slope, 36.8 ft per mile; mean basin altitude, 946 ft; forest area, 90 percent; area of lakes and swamps, 8 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 14, 1961	11.44	458
1962	May 23, 1962	13.46	900
1963	June 10, 1963	9.84	190
1964	Sept. 7, 1964	14.40	1,120
1965	Sept.30, 1965	10.87	352
1966	June 25, 1966	14.8	1,220
1967	June 14, 1967	14.78	1,210
1968	June 9, 1968	12.71	730
1969	July 31, 1969	16.29	1,590
1970	May 21, 1970	17.99	2,100
1971	Apr. 11, 1971	b12.59	590
1972	Sept.20, 1972	17.79	2,030
1973	May 25, 1973	10.97	370
1974	June 6, 1974	12.85	760
1975	June 29, 1975	13.40	890
1976	Apr. 1, 1976	b11.20	244
1977	Sept.24, 1977	12.51	688
1978	Aug. 23, 1978	11.30	430
1979	May 10, 1979	13.85	990
1980	Sept. 3, 1980	12.15	610

b Backwater from ice.

RED RIVER OF THE NORTH BASIN

05047600 West Branch Mustinka River near Graceville, MN

(Site No. 157)

Location.--Lat 45°37'43", long 96°26'35", in NW¼NW¼ sec.22, T.125 N., R.46 W., Traverse County, Hydrologic Unit 09020102, at culverts on county highway, 4.1 miles north of Graceville.

Drainage area.--56.7 mi^2. (Contributing area)
81.2 mi^2. (Total area)

Records available.--October 1963 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.70 ft, upstream; 5.80 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 12.4 miles; main-channel slope, 7.75 ft per mile; mean basin altitude, 1,106 ft; forest area, 0 percent; area of lakes and swamps, 8 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	Apr. 13, 1964	8.25	41
1965	July 6, 1965	8.80	59
1966	Mar. 18, 1966	9.41	83
1967	June 14, 1967	8.46	47
1968	---	d	<5
1969	Apr. 9, 1969	12.50	686
1970	Apr. 7, 1970	b8.58	(+)
1971	Apr. 7, 1971	8.51	(+)
1972	May 21, 1972	8.63	(+)

+ Discharge not determined.
< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

RED RIVER OF THE NORTH BASIN

05047700 West Branch Mustinka River tributary near Graceville, MN

(Site No. 156)

Location.--Lat 45°36'53", long 96°19'47", in NE¼NW¼ sec.28, T.125 N., R.45 W., Traverse County, Hydrologic Unit 09020102, at culvert on county highway, 6.0 miles northeast of Graceville.

Drainage area.—3.37 mi^2.

Records available.--October 1963 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.80 ft, upstream; 5.61 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 6.10 miles; main-channel slope, 13.3 ft per mile; mean basin altitude, 1,122 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	Apr. 13, 1964	8.76	80
1965	Sept.30, 1965	6.99	10
1966	Apr. 17, 1966	7.53	27
1967	June 14, 1967	8.06	49
1968	——	d	<3
1969	Apr. 9, 1969	10.56	418
1970	Apr. 7, 1970	b8.04	27
1971	Mar. 14, 1971	b8.26	34
1972	July 12, 1972	8.59	74
1973	Mar. 14, 1973	b7.18	10
1974	——	d	<6
1975	June 14, 1975	7.55	36
1976	Mar. 24, 1976	b8.13	24
1977	Mar. 12, 1977	b9.73	26
1978	Mar. 26, 1978	b10.28	103
1979	June 20, 1979	7.65	40
1980	June 5, 1980	c7.81	29

< Less than.
b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.

RED RIVER OF THE NORTH BASIN

05049200 Eighteenmile Creek near Wheaton, MN

(Site No. 158)

Location.--Lat 45°47'18", long 96°31'52", on west quarter of line between secs.24 and 25, T.127 N., R.47 W., Traverse County, Hydrologic Unit 09020102, at culvert on County Highway 67, 1.4 miles above mouth, and 2.0 miles southwest of Wheaton.

Drainage area.--68.5 mi^2.

Records available.--October 1964 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--1.04 ft, upstream; 1.64 ft, downstream (center culvert).

Bankfull stage.--7 ft.

Basin characteristics.--Main-channel length, 26.6 miles; main-channel slope, 5.03 ft per mile; mean basin altitude, 1,048 ft; forest area, 1 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1965	June 1, 1965	9.30	701
1966	Mar. 3, 1966	b9.85	246
1967	June 14, 1967	8.48	730
1968	Apr. 22, 1968	4.90	70
1969	Apr. 9, 1969	---	e2,400
1970	Apr. 8, 1970	4.83	37
1971	Mar. 14, 1971	b9.24	58
1972	May 21, 1972	6.74	188
1973	May 24, 1973	6.74	188
1974	Mar. 14, 1974	b4.07	8.1
1975	Apr. 16, 1975	b8.82	320
1976	Mar. 24, 1976	b8.48	157
1977	Apr. 19, 1977	5.38	47
1978	Apr. 9, 1978	9.36	750
1979	Apr. 12, 1979	b12.10	1,460
1980	June 5, 1980	7.03	207

b Backwater from ice.
e Estimated.

RED RIVER OF THE NORTH BASIN

05050700 Rabbit River near Nashua, MN

(Site No. 179)

Location.--Lat 46°04'30", long 96°18'24", in SE¼NE¼ sec.15, T.130 N., R.45 W., Wilkin County, Hydrologic Unit 09020101, at right downstream piling of bridge on County Road 19, 2.6 miles north of Nashua, 4.8 miles upstream from mouth of South Fork Rabbit River.

Drainage area.--56.1 mi^2.

Records available.--October 1978 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 12, 1979	13.43	838
1980	June 5, 1980	10.47	214

RED RIVER OF THE NORTH BASIN

05060800 Buffalo River near Callaway, MN

(Site No. 46)

Location.--Lat 47°01'17", long 95°54'43", in SW¼SW¼ sec.17, T.141 N., R.41 W., Becker County, Hydrologic Unit 09020106, at culvert on U.S. Highway 59, 2.7 miles north of Callaway.

Drainage area.—94.5 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--8.14 ft, upstream; 6.70 ft, downstream.

Bankfull stage.—13 ft.

Basin characteristics.—Main-channel length, 20.8 miles; main-channel slope, 6.03 ft per mile; mean basin altitude, 1,400 ft; forest area, 47 percent; area of lakes and swamps, 27 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	b12.92	246
1961	Apr. 4, 1961	b13.57	127
1962	June 8, 1962	13.35	370
1963	Apr. 3, 1963	b12.04	43
1964	Apr. 13, 1964	b13.73	237
1965	Apr. 10, 1965	b16.12	245
1966	May 23, 1966	11.87	238
1967	May 1, 1967	12.85	324
1968	June 30, 1968	10.06	81
1969	Apr. 10, 1969	b15.11	446
1970	Apr. 8, 1970	---	e250
1971	Apr. 18, 1971	b13.65	323
1972	Apr. 15, 1972	12.02	251
1973	Sept. 2, 1973	12.02	251
1974	Apr. 27, 1974	13.65	400
1975	June 29, 1975	15.68	620
1976	Mar. 29, 1976	b11.90	160
1977	---	d	e40
1978	Apr. 6, 1978	b13.45	310
1979	Apr. 18, 1979	b15.57	340
1980	Apr. 3, 1980	b14.23	(+)

+ Discharge not determined.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

RED RIVER OF THE NORTH BASIN

05061200 Whisky Creek at Barnesville, MN

(Site No. 123)

Location.--Lat 46°39'35", long 96°23'54", in SE¼SW¼ sec.20, T.137 N., R.45 W., Clay County, Hydrologic Unit 09020106, at culvert on State Highway 34, 0.7 mile above Blue Eagle Lake, and 1.0 mile northeast of Barnesville.

Drainage area.--25.3 mi^2. (Contributing area)
62.5 mi^2. (Total area)

Records available.--October 1960 to present. Continuous records available October 1964 to September 1966.

Gage.--Crest-stage gage downstream from culvert. Altitude of gage is 1,030 ft (from topographic map). Prior to October 6, 1964, crest-stage gage upstream from culvert at same datum. October 6, 1964, to May 9, 1967, water-stage recorder upstream from culvert at same datum.

Culvert invert elevations.--1.77 ft, upstream; 1.79 ft, downstream.

Bankfull stage.--6 ft.

Basin characteristics.--Main-channel length, 15.6 miles; main-channel slope, 18.6 ft per mile; mean basin altitude, 1,176 ft; forest area, 4 percent; area of lakes and swamps, 9 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 13, 1961	b5.75	40
1962	June 8, 1962	6.52	292
1963	June 1, 1963	6.07	236
1964	Apr. 15, 1964	4.83	117
1965	Apr. 9, 1965	5.45	175
1966	Mar. 14, 1966	b8.25	260
1967	June 14, 1967	4.90	159
1968	Apr. 8, 1968	4.94	164
1969	Apr. 9, 1969	6.85	570
1970	June 17, 1970	3.78	73
1971	June 29, 1971	4.44	119
1972	Mar. 17, 1972	b6.41	170
1973	Mar. 14, 1973	3.14	33
1974	Apr. 12, 1974	4.26	105
1975	June 29, 1975	6.97	610
1976	Mar. 23, 1976	5.94	82
1977	May 30, 1977	4.43	117
1978	Mar. 31, 1978	c7.38	348
1979	Apr. 20, 1979	c5.11	161
1980	Apr. 4, 1980	c4.97	118

b Backwater from ice.
c Affected by shifting control.

RED RIVER OF THE NORTH BASIN

05061400 Spring Creek above Downer, MN

(Site No. 124)

Location.--Lat 46°44'37", long 96°25'12", in NW¼NW¼ sec.30, T.138 N., R.45 W., Clay County, Hydrologic Unit 09020106, at culvert on county road, 3.1 miles east of Downer.

Drainage area.--5.81 mi^2.

Records available.--October 1960 to present. Prior to 1981 water year station was called Hay Creek above Downer, MN.

Gage.--Crest-stage gage upstream from culverts.

Culvert invert elevations.--4.95 ft, upstream; 5.01 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 3.83 miles; main-channel slope, 16.0 ft per mile; mean basin altitude, 1,070 ft; forest area, 1 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 3, 1961	6.96	21
1962	June 8, 1962	13.46	h860
1963	May 26, 1963	7.78	69
1964	Apr. 15, 1964	c6.90	41
1965	Apr. 10, 1965	7.47	103
1966	June 5, 1966	6.64	53
1967	June 14, 1967	c6.26	12
1968	June 10, 1968	6.30	35
1969	Apr. 9, 1969	8.08	117
1970	Apr. 8, 1970	5.96	15
1971	June 29, 1971	7.38	84
1972	Mar. 17, 1972	7.38	84
1973	Apr. 14, 1973	7.39	84
1974	July 13, 1974	5.85	11
1975	June 29, 1975	13.52	1,460
1976	Mar. 23, 1976	6.75	(+)
1977	July 5, 1977	7.02	(+)
1978	Mar. 31, 1978	b9.18	(+)
1979	June 30, 1979	c7.39	(+)
1980	Mar. 28, 1980	b7.42	(+)

+ Discharge not determined.
b Backwater from ice.
c Affected by shifting control.
h Revised.

RED RIVER OF THE NORTH BASIN

05062280 Mosquito Creek near Bagley, MN

(Site No. 120)

Location.--Lat 47°27'02", long 95°22'55", in SW¼NW¼ sec.21, T.146 N., R.37 W., Clearwater County, Hydrologic Unit 09020108, at culvert on State Highway 92, 5.0 miles south of Bagley.

Drainage area.—3.98 mi^2.

Records available.--October 1960 to present.

Gage.—Water-stage recorder upstream from culvert. Prior to June 21, 1968, crest-stage gage at same site and datum.

Culvert invert elevations.—6.06 ft, upstream; 4.81 ft, downstream.

Bankfull stage.—10 ft.

Basin characteristics.—Main-channel length, 4.22 miles; main-channel slope, 11.4 ft per mile; mean basin altitude, 1,536 ft; forest area, 34 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 18, 1961	b7.12	5
1962	May 23, 1962	7.94	29
1963	May 27, 1963	c8.34	37
1964	May 5, 1964	c8.32	36
1965	Apr. 11, 1965	b10.30	67
1966	Apr. 1, 1966	b11.37	60
1967	Apr. 17, 1967	9.72	68
1968	Apr. 20, 1968	c8.06	11
1969	Apr. 10, 1969	9.24	57
1970	Apr. 26, 1970	c8.09	12
1971	Apr. 8, 1971	8.47	21
1972	Apr. 15, 1972	c8.50	32
1973	Sept. 2, 1973	9.35	57
1974	Apr. 12, 1974	b10.08	34
1975	Apr. 17, 1975	b10.53	71
1976	Mar. 30, 1976	b9.05	33
1977	Mar. 12, 1977	b8.50	8
1978	Apr. 8, 1978	9.57	62
1979	Apr. 20, 1979	10.53	90
1980	Apr. 6, 1980	9.03	c23

b Backwater from ice.
c Affected by shifting control.

05062470 Marsh Creek tributary near Mahnomen, MN

(Site No. 121)

Location.--Lat 47°19'31", long 96°04'41", in SE¼SW¼ sec.36, T.145 N., R.43 W., Norman County, Hydrologic Unit 09020108, at culvert on State Highway 31, 0.1 mile above mouth, and 5.2 miles west of Mahnomen.

Drainage area.--11.9 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--7.95 ft, upstream; 5.82 ft, downstream.

Bankfull stage.--10 ft.

Basin characteristics.--Main-channel length, 8.98 miles; main-channel slope, 4.01 ft per mile; mean basin altitude, 1,196 ft; forest area, 2 percent; area of lakes and swamps, 5 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 17, 1961	b10.55	6
1962	June 8, 1962	10.27	116
1963	May 28, 1963	d	e15
1964	Apr. 17, 1964	b12.52	140
1965	Apr. 10, 1965	b12.90	241
1966	Apr. 2, 1966	b13.43	205
1967	Mar. 29, 1967	10.37	110
1968	Mar. 25, 1968	9.18	25
1969	Apr. 11, 1969	13.76	436
1970	Apr. 7, 1970	b12.81	107
1971	Apr. 7, 1971	b11.42	98
1972	Apr. 13, 1972	10.35	110
1973	Mar. 14, 1973	b10.03	46
1974	Apr. 12 1974	b14.56	370
1975	July 2, 1975	10.47	119
1976	Mar. 30, 1976	b11.76	102
1977	July 16, 1977	c9.61	61
1978	Apr. 3, 1978	b16.07	375
1979	Apr. 19, 1979	14.00	460
1980	Apr. 2, 1980	b10.63	137

b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

RED RIVER OF THE NORTH BASIN

05062700 Wild Rice River tributary near Twin Valley, MN

(Site No. 122)

Location.--Lat 47°17'47", long 96°19'42", in SW¼SE¼ sec.12, T.144 N., R.45 W., Norman County, Hydrologic Unit 09020107, at culvert on State Highway 31, 1.2 miles above mouth, and 4.1 miles northwest of Twin Valley.

Drainage area.--4.72 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--9.90 ft, upstream; 9.42 ft, downstream.

Bankfull stage.--13 ft.

Basin characteristics.--Main-channel length, 5.05 miles; main-channel slope, 17.9 ft per mile; mean basin altitude, 1,034 ft; forest area, 7 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 14, 1961	10.63	6.4
1962	June 8, 1962	12.39	107
1963	May 28, 1963	10.83	12
1964	Apr. 21, 1964	c11.25	23
1965	June 19, 1965	12.66	135
1966	Mar. 16, 1966	b15.70	91
1967	Mar. 29, 1967	12.07	79
1968	Mar. 24, 1968	b13.32	61
1969	Apr. 9, 1969	13.83	236
1970	June 16, 1970	14.76	324
1971	Sept. 4, 1971	12.26	102
1972	Apr. 12, 1972	12.85	154
1973	Sept. 2, 1973	12.45	117
1974	Apr. 12, 1974	12.18	94
1975	July 2, 1975	c12.39	90
1976	Mar. 30, 1976	b12.25	61
1977	Sept.24, 1977	11.10	20
1978	Mar. 30, 1978	---	g270
1979	Apr. 16, 1979	14.37	290
1980	Apr. 2, 1980	b12.45	75

b Backwater from ice.
c Affected by shifting control.
g Estimated; gage height unknown.

RED RIVER OF THE NORTH BASIN

05062800 Coon Creek near Twin Valley, MN

(Site No. 141)

Location.--Lat 47°15'51", long 96°20'34", in NE¼NE¼ sec.26, T.144 N., R.45 W., Norman County, Hydrologic Unit 09020108, at bridge on County Highway 28, 1.3 miles above mouth, and 4.0 miles west of Twin Valley.

Drainage area.--50.8 mi^2.

Records available.--October 1961 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Basin characteristics.--Main-channel length, 15.1 miles; main-channel slope, 15.2 ft per mile; mean basin altitude, 1,067 ft; forest area, 5 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	June 8, 1962	12.68	896
1963	May 28, 1963	11.35	415
1964	June 19, 1964	11.83	565
1965	Apr. 10, 1965	b13.21	745
1966	Mar. 17, 1966	b13.52	630
1967	Apr. 17, 1967	10.77	267
1968	Mar. 24, 1968	b9.59	44
1969	Apr. 9, 1969	b13.42	1,520
1970	June 16, 1970	12.11	1,090
1971	Sept. 4, 1971	9.28	42
1972	Oct. 2, 1971	11.55	722
1973	Mar. 14, 1973	10.55	290
1974	Apr. 27, 1974	12.09	1,060
1975	June 29, 1975	14.59	2,700
1976	Mar. 30, 1976	b10.93	460
1977	Sept.24, 1977	d	e40
1978	Apr. 6, 1978	11.65	850
1979	Apr. 16, 1979	12.70	1,650
1980	Apr. 2, 1980	b10.94	500

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

RED RIVER OF THE NORTH BASIN

05063200 Spring Creek tributary near Ogema, MN

(Site No. 154)

Location.--Lat 47°07'22", long 95°57'35", in SE¼SE¼ sec.11, T.142 N., R.42 W., Becker County, Hydrologic Unit 09020108, at culvert on county highway, 2.0 miles northwest of Ogema.

Drainage area.—4.99 mi^2.

Records available.--October 1962 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—4.87 ft, upstream; 4.31 ft, downstream.

Basin characteristics.—Main-channel length, 3.62 miles; main-channel slope, 20.2 ft per mile; mean basin altitude, 1,260 ft; forest area, 1 percent; area of lakes and swamps, 21 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1963	June 2, 1963	8.21	70
1964	Apr. 17, 1964	8.87	83
1965	Apr. 10, 1965	b9.87	83
1966	Mar. 16, 1966	b9.49	57
1967	Mar. 29, 1967	8.48	72
1968	June 30, 1968	7.30	34
1969	Apr. 9, 1969	8.68	115
1970	Apr. 7, 1970	6.79	76
1971	Apr. 9, 1971	6.00	37
1972	Apr. 13, 1972	5.85	33
1973	Sept. 2, 1973	6.29	36
1974	Apr. 27, 1974	6.71	59
1975	June 29, 1975	8.44	101
1976	Mar. 30, 1976	b6.79	37
1977	——	d	e8
1978	Apr. 6, 1978	8.08	97
1979	Apr. 18, 1979	7.70	85
1980	Apr. 2, 1980	b6.03	24

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

05063500 South Branch Wild Rice River near Borup, MN

Location.—Lat 47°11'40", long 96°34'40", in NW¼NW¼ sec.24, T.143 N., R.47 W., Norman County, Hydrologic Unit 09020108, at bridge on County Highway 193, 3.5 miles upstream from Wild Rice River and 4 miles northwest of Borup.

Drainage area.—254 mi^2.

Records available.—March 1944 to September 1949, October 1971 to present. Continuous records available March 1944 to September 1949. Miscellaneous discharge measurements 1966, 1967.

Gage.—Crest-stage gage at downstream side of bridge. Prior to Sept. 1949, nonrecording gage at different datum.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1944	July 12, 1944	11.17	852
1945	Mar. 19, 1945	10.86	792
1946	Mar. 19, 1946	—	984
1947	Apr. 13, 1947	12.86	1,150
1948	Apr. 5, 1948	—	522
1949	July 6, 1949	7.10	319
1972	Apr. 13, 1972	16.74	950
1973	Sept. 5, 1973	11.09	250
1974	Apr. 12, 1974	b19.02	1,100
1975	July 1, 1975	20.59	3,700
1976	Mar. 28, 1976	17.85	760
1977	Mar. 30, 1977	—	e60
1978	Apr. 8, 1978	19.48	2,980
1979	Apr. 17, 1979	19.52	3,040
1980	Apr. 2, 1980	b16.22	527

b Backwater from ice.
e Estimated.

RED RIVER OF THE NORTH BASIN

05073600 South Branch Battle River at Northome, MN

(Site No. 52)

Location.--Lat 47°52'17", long 94°17'45", in NW¼NE¼ sec.25, T.151 N., R.29 W., Koochiching County, Hydrologic Unit 09020302, at culvert on U.S. Highway 71, 0.7 mile west of Northome, and 3.1 miles above Battle Lake.

Drainage area.--2.80 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--12.08 ft, upstream; 12.01 ft, downstream.

Bankfull stage.--17 ft.

Basin characteristics.--Main-channel length, 2.88 miles; main-channel slope, 9.72 ft per mile; mean basin altitude, 1,417 ft; forest area, 75 percent; area of lakes and swamps, 14 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 29, 1960	12.88	5.7
1961	May 14, 1961	14.83	99
1962	May 23, 1962	14.45	68
1963	May 27, 1963	14.25	56
1964	Apr. 13, 1964	b13.92	24
1965	Apr. 15, 1965	b15.13	37
1966	Apr. 16, 1966	c14.21	40
1967	Apr. 1, 1967	14.71	89
1968	Apr. 7, 1968	13.90	36
1969	Apr. 13, 1969	b16.43	109
1970	Apr. 26, 1970	b14.94	84
1971	Apr. 13, 1971	b14.84	43
1972	July 22, 1972	c13.97	46
1973	Sept. 3, 1973	c14.45	46
1974	May 11, 1974	14.52	75
1975	July 2, 1975	15.09	126
1976	Apr. 5, 1976	b15.25	34
1977	Aug. 27, 1977	13.48	20
1978	Apr. 18, 1978	14.15	50
1979	Apr. 21, 1979	b16.50	60
1980	Apr. 8, 1980	b15.05	28

b Backwater from ice.
c Affected by shifting control.

RED RIVER OF THE NORTH BASIN

05073750 Spring Creek near Blackduck, MN

(Site No. 51)

Location.--Lat 47°46'23", long 94°31'22", in NW¼NW¼ sec.32, T.150 N., R.30 W., Beltrami County, Hydrologic Unit 09020302, at culvert on County Highway 304, 3.1 miles north of Blackduck, and 3.2 miles above mouth.

Drainage area.--7.96 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--10.00 ft, upstream; 9.92 ft, downstream.

Bankfull stage.--11 ft.

Basin Characteristics.--Main-channel length, 4.78 miles; main-channel slope, 13.1 ft per mile; mean basin altitude, 1,366 ft; forest area, 75 percent; area of lakes and swamps, 15 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	12.75	*27
1961	May 14, 1961	13.24	51
1962	May 23, 1962	16.54	346
1963	May 27, 1963	15.87	182
1964	Apr. 13, 1964	b12.59	20
1965	May 15, 1965	12.91	37
1966	Apr. 16, 1966	13.53	78
1967	Apr. 1, 1967	14.00	61
1968	Apr. 7, 1968	12.53	39
1969	Apr. 13, 1969	16.16	235
1970	Apr. 26, 1970	14.60	111
1971	Apr. 11, 1971	b14.20	81
1972	Apr. 16, 1972	14.30	99
1973	Sept. 3, 1973	15.86	180
1974	June 6, 1974	15.20	143
1975	July 2, 1975	16.85	896
1976	Apr. 4, 1976	13.22	50
1977	Aug. 27, 1977	12.71	31
1978	Apr. 7, 1978	14.09	95
1979	Apr. 20, 1979	14.02	92
1980	Apr. 8, 1980	12.83	(+)

+ Discharge not determined.
* Higher discharge resulted from blasting of beaver dams, but did not represent natural yield.
b Backwater from ice.

RED RIVER OF THE NORTH BASIN

05073800 Perry Creek tributary near Shooks, MN

(Site No. 50)

Location.--Lat 47°52'00", long 94°32'52", in NW¼SW¼ sec.30, T.151 N., R.30 W., Beltrami County, Hydrologic Unit 09020302, at culvert on State Highway 72, 5.2 miles west of Shooks.

Drainage area.--1.14 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.45 ft, upstream; 3.94 ft, downstream.

Bankfull stage.--7 ft.

Basin characteristics.--Main-channel length, 2.80 miles; main-channel slope, 10.5 ft per mile; mean basin altitude, 1,330 ft; forest area, 90 percent; area of lakes and swamps, 51 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	July 16, 1960	5.84	8.6
1961	May 14, 1961	6.54	30
1962	May 23, 1962	7.38	61
1963	May 27, 1963	7.10	50
1964	June 23, 1964	5.93	13
1965	May 15, 1965	6.23	21
1966	Apr. 16, 1966	7.45	64
1967	Mar. 29, 1967	b7.58	31
1968	June 10, 1968	6.03	15
1969	Apr. 13, 1969	a8.05	76
1970	Apr. 26, 1970	6.86	41
1971	Apr. 11, 1971	c6.96	36
1972	Apr. 16, 1972	c7.35	49
1973	Sept. 3, 1973	c7.79	58
1974	June 6, 1974	c6.81	23
1975	July 2, 1975	9.91	140
1976	Apr. 4, 1976	b7.06	20
1977	Aug. 27, 1977	6.34	13
1978	Apr. 17, 1978	7.19	46
1979	Apr. 20, 1979	b8.32	60
1980	Apr. 8, 1980	b6.83	17

a Backwater from debris.
b Backwater from ice.
c Affected by shifting control.

RED RIVER OF THE NORTH BASIN

05075700 Mud River near Grygla, MN

(Site No. 180)

Location.--Lat 48°19'31", long 95°44'35", at common corner of secs.13, 14, 23, and 24, T.156 N., R.40 W., Marshall County, Hydrologic Unit 09020304, at bridge on State Highway 89, 6 miles west of Grygla.

Drainage area.--170 mi^2.

Records available.--October 1978 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 26, 1979	18.49	1,480
1980	Apr. 6, 1980	16.38	670

RED RIVER OF THE NORTH BASIN

05076600 Red Lake River tributary near Thief River Falls, MN

(Site No. 140)

Location.--Lat 48°04'44", long 96°12'15", in SW¼SE¼ sec.8, T.153 N., R.43 W., Pennington County, Hydroloigc Unit 09020303, at culvert on County Highway 7, 0.5 mile above mouth, and 3.1 miles south of Thief River Falls.

Drainage area.—2.33 mi^2.

Records available.--October 1961 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—4.26 ft, upstream; 3.79 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 2.80 miles; main-channel slope, 5.71 ft per mile; mean basin altitude, 1,112 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	June 8, 1962	6.20	36
1963	Apr. 4, 1963	7.29	81
1964	Sept.26, 1964	f7.39	77
1965	Apr. 11, 1965	-	g150
1966	Mar. 20, 1966	b10.60	39
1967	Mar. 30, 1967	b9.67	115
1968	June 7, 1968	5.85	30
1969	Apr. 9, 1969	7.22	200
1970	Apr. 20, 1970	7.99	111
1971	Apr. 8, 1971	6.89	64
1972	Mar. 20, 1972	*b9.94	45
1973	May 10, 1973	6.28	43
1974	Apr. 21, 1974	8.10	117
1975	Apr. 18, 1975	6.55	52
1976	Mar. 23, 1976	b9.54	52
1977	May 18, 1977	7.48	89
1978	Apr. 6, 1978	---	g130
1979	Apr. 24, 1979	9.77	195
1980	Mar. 31, 1980	b7.40	67

* Gage height at downstream end of culvert.
b Backwater from ice.
f Backwater from aquatic growth.
g Estimated; gage height unknown.

05077700 Ruffy Brook near Gonvick, MN

Location.—Lat 47°44'50", long 95°24'45", in SE¼SE¼ sec.5, T.149 N., R.37 W., Clearwater County, Hydrologic Unit 09020305, on downstream side of bridge on County Highway 17, 4.0 miles upstream from mouth, and 4.8 miles east of Gonvick.

Drainage area.—45.2 mi^2.

Records available.—October 1978 to present. Continuous records available July 1960 to September 1978.

Gage.—Crest-stage gage at downstream side of bridge.

Bankfull stage.—5.2 ft.

Basin characteristics.—Main-channel length, 17.6 miles; main-channel slope, 13.0 ft per mile; forest area, 40 percent; area of lakes and swamps, 24 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 20, 1961	b3.74	66
1962	July 7, 1962	6.70	364
1963	May 28, 1963	5.48	225
1964	Apr. 16, 1964	4.45	134
1965	Apr. 13, 1965	6.38	412
1966	Apr. 2, 1966	b5.53	265
1967	Mar. 30, 1967	6.35	453
1968	June 10, 1968	2.70	76
1969	Apr. 9, 1969	b6.62	232
1970	Apr. 29, 1970	5.28	279
1971	Apr. 8, 1971	b5.40	176
1972	Apr. 17, 1972	4.87	237
1973	Sept. 2, 1973	3.94	156
1974	Apr. 12, 1974	b5.80	268
1975	Apr. 17, 1975	5.74	364
1976	Mar. 29, 1976	b5.25	147
1977	Sept.24, 1977	2.05	47
1978	Apr. 7, 1978	5.67	357
1979	Apr. 20, 1979	4.94	284
1980	Apr. 5, 1980	3.36	137

b Backwater from ice.

RED RIVER OF THE NORTH BASIN

05078000 Clearwater River at Plummer, MN

Location.—Lat 47°55'24", long 96°02'46", in SE¼SW¼ sec.4, T.151 N., R.42 W., Red Lake County, Hydrologic Unit 09020305, on right bank 200 ft downstream from Soo Line Railroad bridge on U.S. Highway 59, 0.9 mile northwest of railroad depot in Plummer, and 8.0 miles upstream from Hill River.

Drainage area.—512 mi^2.

Records available.—October 1978 to present. Continuous records available April 1939 to September 1978.

Gage.—Water-stage recorder downstream from bridge.

Basin characteristics.—Main-channel length, 88.0 miles; main-channel slope, 4.4 ft per mile; mean basin elevation, 1,220 ft; forest area, 42.2 percent; area of lakes and swamps, 12.3 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1939	Apr. 27, 1939	—	380
1940	Apr. 16, 1940	6.98	840
1941	June 8, 1941	6.57	756
1942	Apr. 3, 1942	6.12	722
1943	Apr. 21, 1943	6.43	800
1944	Aug. 10, 1944	8.12	1,160
1945	Mar. 28, 1945	6.76	952
1946	Mar. 23, 1946	b8.09	1,030
1947	June 11, 1947	8.34	1,420
1948	Apr. 25, 1948	6.80	929
1949	June 1, 1949	9.08	1,870
1950	May 6, 1950	11.33	3,630
1951	May 3, 1951	7.22	1,110
1952	Apr. 15, 1952	8.10	1,440
1953	July 5, 1953	6.23	834
1954	Apr. 13, 1954	8.52	1,640
1955	Apr. 6, 1955	b9.64	1,800
1956	Apr. 21, 1956	9.58	2,240
1957	June 27, 1957	11.84	3,570
1958	July 6, 1958	6.08	822
1959	Apr. 6, 1959	b6.37	702
1960	Apr. 7, 1960	b8.18	710
1961	Apr. 25, 1961	4.88	461
1962	June 9, 1962	11.90	3,640
1963	Apr. 4, 1963	b7.54	966
1964	Apr. 17, 1964	8.57	1,640
1965	Apr. 12, 1965	11.88	3,620
1966	Apr. 3, 1966	b10.73	2,000
1967	Apr. 3, 1967	10.19	2,470

05078000 Clearwater River at Plummer, MN--Continued

Annual maximum data.--Continued

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1968	June 18, 1968	11.00	3,000
1969	Apr. 11, 1969	11.89	3,630
1970	Apr. 26, 1970	9.48	2,080
1971	Apr. 10, 1971	8.32	1,520
1972	Apr. 16, 1972	10.33	2,550
1973	Sept. 6, 1973	7.98	1,270
1974	Apr. 22, 1974	10.31	2,540
1975	July 4, 1975	11.19	2,960
1976	Apr. 1, 1976	b8.86	1,250
1977	Sept.27, 1977	4.85	429
1978	Apr. 13, 1978	11.40	3,270
1979	Apr. 25, 1979	12.31	3,940
1980	Apr. 8, 1980	6.57	898

b Backwater from ice.

RED RIVER OF THE NORTH BASIN

05078100 Lost River at Gonvick, MN

(Site No. 47)

Location.--Lat 47°44'14", long 95°31'05", in NE¼SE¼ sec.9, T.149 N., R.38 W., Clearwater County, Hydrologic Unit 09020305, at culvert on State Highway 92, at west edge of Gonvick, and 3.8 miles below Pine Lake.

Drainage area.—53.6 mi^2.

Records available.—October 1959 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—3.95 ft, upstream; 4.07 ft, downstream.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 19.9 miles; main-channel slope, 12.2 ft per mile; mean basin altitude, 1,354 ft; forest area, 28 percent; area of lakes and swamps, 18 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 26, 1960	6.48	50
1961	May 15, 1961	a7.42	25
1962	June 8, 1962	9.06	255
1963	June 9, 1963	7.67	121
1964	Apr. 21, 1964	b7.54	110
1965	Apr. 19, 1965	8.34	178
1966	May 15, 1966	8.24	167
1967	Mar. 30, 1967	b9.58	202
1968	Mar. 28, 1968	a7.14	60
1969	Apr. 8, 1969	b13.33	308
1970	Apr. 26, 1970	9.50	230
1971	Apr. 8, 1971	b11.38	142
1972	Apr. 13, 1972	b10.84	260

a Backwater from debris.
b Backwater from ice.

RED RIVER OF THE NORTH BASIN

05078180 Silver Creek near Clearbrook, MN

(Site No. 49)

Location.--Lat 47°38'43", long 95°26'33", in NW¼NW¼ sec.13, T.148 N., R.38 W., Clearwater County, Hydrologic Unit 09020305, at at culvert on county highway, 3.4 miles south of Clearbrook.

Drainage area.—4.96 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.96 ft, upstream; 5.67 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 4.23 miles; main-channel slope, 39.6 ft per mile; mean basin altitude, 1,487 ft; forest area, 47 percent; area of lakes and swamps, 15 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 6, 1960	8.56	33
1961	Mar. 26, 1961	b7.79	5.4
1962	May 23, 1962	14.35	132
1963	May 27, 1963	11.04	81
1964	Apr. 21, 1964	8.04	21
1965	Apr. 11, 1965	12.19	98
1966	May 15, 1966	8.54	33
1967	Mar. 31, 1967	12.85	109
1968	Apr. 20, 1968	10.01	63
1969	Apr. 10, 1969	9.54	56
1970	Apr. 26, 1970	8.80	40
1971	Apr. 9, 1971	9.07	46
1972	Apr. 15, 1972	10.06	67
1973	Sept. 2, 1973	11.51	94
1974	Apr. 17, 1974	9.57	57
1975	Apr. 17, 1975	b11.89	(+)
1976	Mar. 29, 1976	8.46	(+)
1977	Mar. 12, 1977	b6.25	(+)
1978	Apr. 6, 1978	b11.00	(+)
1979	Apr. 20, 1979	8.68	77
1980	Apr. 5, 1980	---	g35

+ Discharge not determined.
b Backwater from ice.
g Estimated, gage height unknown.

RED RIVER OF THE NORTH BASIN

05078200 Silver Creek tributary at Clearbrook, MN

(Site No. 48)

Location.--Lat 47°41'49", long 95°25'50", in SW¼NW¼ sec.29, T.149 N., R.37 W., Clearwater County, Hydrologic Unit 09020305, at culvert on county highway at north edge of Clearbrook, 0.9 mile above mouth.

Drainage area.--6.02 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.47 ft, upstream; 5.35 ft, downstream.

Bankfull stage.--11 ft.

Basin characteristics.--Main-channel length, 3.22 miles; main-channel slope, 36.4 ft per mile; mean basin altitude, 1,370 ft; forest area, 29 percent; area of lakes and swamps, 9 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 6, 1960	b8.60	18
1961	Apr. 26, 1961	8.40	20
1962	May 23, 1962	15.83	147
1963	May 27, 1963	10.57	56
1964	Apr. 13, 1964	9.89	45
1965	Apr. 11, 1965	b12.99	89
1966	Aug. 13, 1966	9.84	44
1967	Mar. 30, 1967	14.47	123
1968	Mar. 28, 1968	b9.99	30
1969	Apr. 9, 1969	12.74	93
1970	Apr. 26, 1970	c11.06	62
1971	Apr. 8, 1971	c10.19	43
1972	Apr. 15, 1972	c10.92	59
1973	Sept. 2, 1973	16.11	152
1974	Apr. 17, 1974	c11.86	67
1975	Apr. 17, 1975	c11.90	69
1976	Mar. 30, 1976	c10.59	48
1977	Aug. 27, 1977	c10.10	23
1978	Apr. 6, 1978	b13.32	90
1979	Apr. 19, 1979	12.57	91
1980	Apr. 1, 1980	9.91	c25

b Backwater from ice.
c Affected by shifting control.

RED RIVER OF THE NORTH BASIN

05078400 Clearwater River tributary near Plummer, MN

(Site No. 119)

Location.--Lat 47°52'34", long 96°08'35", in SE¼SE¼ sec.22, T.151 N., R.43 W., Red Lake County, Hydrologic Unit 09020305, at culvert on county highway, 1.2 miles above mouth, and 5.3 miles southwest of Plummer.

Drainage area.--6.51 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.62 ft, upstream; 3.64 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 5.78 miles; main-channel slope, 8.31 ft per mile; mean basin altitude, 1,094 ft; forest area, 24 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 24, 1961	6.10	10
1962	May 23, 1962	8.48	106
1963	July 12, 1963	6.59	20
1964	July 10, 1964	8.33	96
1965	Apr. 11, 1965	b11.23	177
1966	Apr. 27, 1966	8.27	85
1967	Mar. 30, 1967	7.93	71
1968	July 16, 1968	f7.36	41
1969	Apr. 10, 1969	9.97	153
1970	May 15, 1970	8.80	106
1971	Apr. 7, 1971	b7.48	38
1972	Mar. 20, 1972	b8.38	45
1973	Sept.24, 1973	10.64	(+)
1974	Apr. 12, 1974	b13.24	(+)
1975	Apr. 28, 1975	11.54	(+)
1976	Mar. 30, 1976	11.42	(+)
1977	---	d	(+)
1978	Apr. 8, 1978	11.96	(+)
1979	Apr. 18, 1979	b14.01	(+)
1980	Apr. 2, 1980	12.56	(+)

+ Discharge not determined.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
f Backwater from aquatic growth.

RED RIVER OF THE NORTH BASIN

05086900 Middle River near Newfolden, MN

(Site No. 181)

Location.--Lat 48°22'04", long 96°16'47", in NE¼NE¼ sec.3, T.156 N., R.44 W., Marshall County, Hydrologic Unit 09020309, at bridge on township road, 2.0 miles northeast of Newfolden.

Drainage area.—91.1 mi^2.

Records available.--October 1978 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 25, 1979	17.10	1,000
1980	Apr. 6, 1980	14.32	270

LAKE OF THE WOODS BASIN

05128300 Pike River near Gilbert, MN

(Site No. 171)

Location.--Lat 47°29'34", long 92°29'15", in NE¼SW¼ sec.22, T.58 N., R.17 W., St. Louis County, Hydrologic Unit 09030002, at culvert on State Highway 135, 1.1 miles west of Gilbert.

Drainage area.--0.73 mi^2.

Records available.--October 1965 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.66 ft, upstream; 2.37 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 1.32 miles; main-channel slope, 114 ft per mile; mean basin altitude, 1,650 ft; forest area, 100 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1966	Apr. 15, 1966	7.13	13
1967	Mar. 31, 1967	7.17	14
1968	Aug. 21, 1968	8.11	34
1969	Oct. 17, 1968	7.67	24
1970	Apr. 27, 1970	7.25	16
1971	Apr. 16, 1971	c7.91	33
1972	Apr. 27, 1972	8.24	37
1973	May 7, 1973	7.54	21
1974	Apr. 21, 1974	8.69	50
1975	July 2, 1975	7.29	16
1976	Apr. 9, 1976	6.97	11
1977	Aug. 27, 1977	7.48	20
1978	July 18, 1978	9.85	89
1979	Apr. 23, 1979	8.03	36
1980	Apr. 19, 1980	6.85	9.6

c Affected by shifting control.

LAKE OF THE WOODS BASIN

05128700 Pike River tributary near Wahlsten, MN

(Site No. 133)

Location.--Lat 47°43'04", long 92°17'12", in SW¼SW¼ sec.32, T.61 N., R.15 W., St. Louis County, Hydrologic Unit 09030002, at culvert on State Highway 135, 1.2 miles south of Wahlsten, and 2.7 miles above mouth.

Drainage area.—1.93 mi^2. (Contributing area)
2.64 mi^2. (Total area)

Records available.—October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—4.55 ft, upstream; 4.10 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 2.58 miles; main-channel slope, 18.1 ft per mile; mean basin altitude, 1,450 ft; forest area, 87 percent; area of lakes and swamps, 36 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 15, 1961	b8.06	60
1962	July 8, 1962	6.37	23
1963	June 10, 1963	5.73	8.2
1964	June 23, 1964	6.71	39
1965	Apr. 26, 1965	c6.35	26
1966	Apr. 15, 1966	b8.91	25
1967	Apr. 17, 1967	6.57	31
1968	June 8, 1968	7.08	62
1969	Apr. 13, 1969	7.29	80
1970	May 21, 1970	7.28	71
1971	June 17, 1971	7.31	70
1972	Aug. 16, 1972	c6.79	30
1973	July 26, 1973	*6.65	34
1974	Oct. 10, 1973	8.22	105
1975	Apr. 27, 1975	b8.34	92
1976	Apr. 9, 1976	b8.56	43
1977	Aug. 27, 1977	7.47	68
1978	July 18, 1978	---	g47
1979	Apr. 20, 1979	b8.28	95
1980	June 1, 1980	6.90	27

* Unusual.
b Backwater from ice.
c Affected by shifting control.
g Estimated, gage height unknown

LAKE OF THE WOODS BASIN

05129650 Little Fork River at Cook, MN

Location.—Lat 47°51'15", long 92°41'55", in SE¼NE¼ sec.13, T.62 N., R.19 W., St. Louis County, Hydrologic Unit 09030005, at bridge on U.S. Highway 53, 0.6 mile west of Cook.

Drainage area.—61.5 mi^2.

Records available.—October 1967 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1968	June 10, 1968	15.45	431
1969	Apr. 15, 1969	17.90	900
1970	June 11, 1970	21.40	2,200
1971	Apr. 18, 1971	17.04	745
1972	Aug. 22, 1972	16.08	523
1973	July 27, 1973	—	250
1974	June 7, 1974	15.95	502
1975	Aug. 29, 1975	17.26	747
1976	Apr. 8, 1976	—	350
1977	Aug. 30, 1977	18.82	1,030
1978	June 1, 1978	—	360
1979	Apr. 21, 1979	18.24	992
1980	Sept.21, 1980	14.63	305

LAKE OF THE WOODS BASIN

05129710 Johnson Creek near Britt, MN

(Site No. 134)

Location.--Lat 47°39'40", long 92°38'03", in NW¼NE¼ sec.28, T.60 N., R.18 W., St. Louis County, Hydrologic Unit 09030005, at culvert adjacent to U.S. Highway 53, 0.6 mile below Sand Lake, and 5.9 miles west of Britt.

Drainage area.--6.92 mi^2.

Records available.--October 1960 to September 1964, October 1965 to September 1975.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.19 ft, upstream; 4.98 ft, downstream.

Bankfull stage.--6 ft.

Basin characteristics.--Main-channel length, 3.32 miles; main-channel slope, 4.42 ft per mile; mean basin altitude, 1,464 ft; forest area, 70 percent; area of lakes and swamps, 42 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 21, 1961	7.60	28
1962	May 23, 1962	7.22	22
1963	June 10, 1963	c6.75	13
1964	May 6, 1964	7.63	29
1965	---	---	---
1966	Apr. 15, 1966	a9.19	35
1967	Mar. 28, 1967	8.03	17
1968	June 14, 1968	7.46	22
1969	Apr. 13, 1969	7.86	31
1970	June 11, 1970	7.69	26
1971	Apr. 16, 1971	8.19	37
1972	Apr. 21, 1972	7.79	23
1973	July 25, 1973	7.66	20
1974	Oct. 11, 1973	8.11	29
1975	Apr. 30, 1975	8.19	32

a Backwater from debris.
c Affected by shifting control.

LAKE OF THE WOODS BASIN

05130300 Boriin Creek near Chisholm, MN

(Site No. 39)

Location.--Lat 47°36'14", long 92°51'58", in SE¼SE¼ sec.9, T.59 N., R.20 W., St. Louis County, Hydrologic Unit 09030005, at culvert on State Highway 73, 1.2 miles above mouth, and 7.8 miles north of Chisholm.

Drainage area.—13.7 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage at downstream end of culvert.

Culvert invert elevations.—7.92 ft, upstream; 6.84 ft, downstream.

Bankfull stage.—11 ft.

Basin characteristics.—Main-channel length, 9.55 miles; main-channel slope, 13.8 ft per mile; mean basin altitude, 1,472 ft; forest area, 83 percent; area of lakes and swamps, 20 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Sept. 6, 1959	12.58	305
1960	Apr. 13, 1960	12.23	206
1961	Apr. 23, 1961	13.01	485
1962	June 11, 1962	11.79	124
1963	Apr. 3, 1963	b12.00	83
1964	May 6, 1964	12.21	202
1965	Sept.30, 1965	12.18	191
1966	Apr. 16, 1966	12.26	211
1967	Mar. 31, 1967	b12.63	182
1968	Sept.18, 1968	12.02	159
1969	Apr. 13, 1969	13.40	700
1970	Apr. 27, 1970	12.62	318
1971	Apr. 17, 1971	c13.11	410
1972	Apr. 17, 1972	b12.66	165
1973	Mar. 14, 1973	b10.92	48
1974	Oct. 12, 1973	c13.06	335
1975	Apr. 29, 1975	12.49	284
1976	Apr. 7, 1976	b12.00	125
1977	Aug. 27, 1977	12.27	216
1978	May 30, 1978	11.75	120
1979	Apr. 20, 1979	13.37	560
1980	Apr. 7, 1980	11.28	86

b Backwater from ice.
c Affected by shifting control.

LAKE OF THE WOODS BASIN

05131750 Big Fork River near Bigfork, MN

Location.—Lat 47°44'56", long 93°46'31", in SW¼NE¼ sec.27, T.61 N., R.27 W., Itasca County, Hydrologic Unit 09030006, at bridge on State Highway 6, 5.5 miles west of Big Fork.

Drainage area.—602 mi^2.

Records available.—October 1972 to present.

Gage.—Crest-stage gage upstream from culvert.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1973	Apr. 21, 1973	10.92	900
1974	June 7, 1974	13.37	1,800
1975	Apr. 29, 1975	13.97	2,030
1976	Apr. 6, 1976	12.13	1,340
1977	Sept.26, 1977	d	e550
1978	Apr. 18, 1978	12.34	1,420
1979	Apr. 22, 1979	15.48	2,830
1980	Apr. 18, 1980	11.58	1,140

d Peak stage did not reach bottom of gage.
e Estimated.

LAKE OF THE WOODS BASIN

05131878 Bowerman Brook near Craigville, MN

(Site No. 182)

Location.--Lat 47°55'29, long 93°45'34", in NE¼NW¼ sec.26, T.63 N., R.27 W., Koochiching County, Hydrologic Unit 09030006, on left downstream wingwall of bridge on State Highway 6, 2.4 miles upstream from mouth, and 7.0 miles west of Craigville.

Drainage area.--25 mi^2.

Records available.--October 1978 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 21, 1979	14.73	650
1980	Apr. 18, 1980	12.13	152

LAKE OF THE WOODS BASIN

05132000 Big Fork River at Big Falls, MN

Location.—Lat 48°11'45", long 93°48'25", in SW¼SE¼ sec.35, T.155 N., R.25 W., Koochiching County, Hydrologic Unit 09030006, on left bank at village of Big Falls, 700 ft downstream from falls, 0.3 miles downstream from bridge on U.S. Highway 71, and 4.8 miles upstream from Sturgeon River.

Drainage area.—1,460 mi^2.

Records available.—October 1979 to present. Continuous records available June 1928 to September 1979.

Gage.—Water-stage recorder downstream of falls.

Basin characteristics.—Main-channel length, 114 miles; main-channel slope, 1.9 ft per mile; mean basin altitude, 1,300 ft; forest area, 89 percent; area of lakes and swamps, 19 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1910	Apr. 19, 1910	8.70	4,820
1911	June 12, 1911	7.40	1,910
1912	May 19, 1912	7.35	2,090
1929	Oct. 7, 1928	6.00	2,240
1930	May 13, 1930	8.00	4,470
1931	June 15, 1931	4.14	750
1932	Apr. 11, 1932	5.98	2,220
1933	Apr. 20, 1933	8.71	5,440
1934	May 5, 1934	6.08	2,340
1935	May 1, 1935	7.50	3,700
1936	Apr. 16, 1936	7.34	3,480
1937	Apr. 26, 1937	15.12	13,000
1938	May 7, 1938	14.05	11,200
1939	Apr. 26, 1939	6.58	2,830
1940	May 1, 1940	9.70	6,320
1941	June 9, 1941	11.65	8,550
1942	May 4, 1942	7.23	3,260
1943	Apr. 9, 1943	10.68	7,440
1944	June 29, 1944	10.89	7,680
1945	Mar. 26, 1945	11.60	8,520
1946	Mar. 26, 1946	9.54	6,000
1947	May 4, 1947	9.31	5,760
1948	Apr. 18, 1948	12.49	9,600
1949	June 2, 1949	9.48	6,000
1950	May 8, 1950	17.08	14,800
1951	Apr. 29, 1951	13.87	11,000
1952	Apr. 18, 1952	8.62	4,950
1953	June 17, 1953	10.84	7,500
1954	Apr. 17, 1954	12.78	9,730
1955	Apr. 12, 1955	7.48	3,700

05132000 Big Fork River at Big Falls, MN--Continued

Annual maximum data.--Continued

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1956	Apr. 21, 1956	9.74	6,240
1957	Apr. 23, 1957	12.96	9,940
1958	July 15, 1958	5.03	1,300
1959	May 23, 1959	5.63	1,860
1960	Apr. 16, 1960	8.00	4,270
1961	May 17, 1961	8.02	4,290
1962	May 25, 1962	12.63	9,560
1963	June 3, 1963	7.61	3,840
1964	May 8, 1964	8.52	4,840
1965	Apr. 21, 1965	10.85	7,510
1966	Apr. 19, 1966	12.60	9,520
1967	Apr. 8, 1967	8.88	5,250
1968	Apr. 11, 1968	6.33	2,620
1969	Apr. 16, 1969	15.79	13,300
1970	Apr. 29, 1970	13.13	10,100
1971	Apr. 17, 1971	11.09	7,110
1972	Apr. 21, 1972	10.58	6,510
1973	May 12, 1973	5.63	1,860
1974	June 8, 1974	12.15	9,010
1975	May 2, 1975	12.45	9,350
1976	Apr. 8, 1976	7.53	3,750
1977	Sept.27, 1977	6.98	3,090
1978	Apr. 18, 1978	---	6,400
1979	Apr. 22, 1979	15.90	14,000
1980	Apr. 19, 1980	7.57	3,800

LAKE OF THE WOODS BASIN

05140000 Bulldog Run near Warroad, MN

Location.—Lat 48°51'30", long 95°20'18", in SW¼SE¼ sec.7, T.162 N., R.36 W., Roseau County, Hydrologic Unit 09030009, 5 feet downstream from culvert on county highway, 0.8 mile upstream from mouth, and 2.5 miles south of Warroad.

Drainage area.—11.1 mi^2.

Records available.—October 1977 to present. Continuous records available March 1946 to November 1951, June 1966 to September 1977.

Gage.—Crest-stage gage at downstream side of bridge.

Basin characteristics.—Main-channel length, 9.5 miles; main-channel slope, 8.0 ft per mile; forest area, 23 percent; area of lakes and swamps, 9 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1946	Mar. 22, 1946	5.49	32
1947	June 10, 1947	6.91	420
1948	Apr. 17, 1948	5.98	204
1949	Apr. 9, 1949	5.64	41
1950	Apr. 23, 1950	6.69	292
1951	Apr. 10, 1951	6.10	228
1967	Apr. 21, 1967	6.82	401
1968	June 8, 1968	6.06	171
1969	Apr. 11, 1969	5.55	86
1970	Apr. 28, 1970	6.20	198
1971	Apr. 8, 1971	6.00	160
1972	Apr. 19, 1972	5.86	110
1973	Mar. 14, 1973	3.92	4.5
1974	Apr. 14, 1974	7.07	343
1975	Apr. 17, 1975	6.33	151
1976	Mar. 31, 1976	b6.53	156
1977	Mar. 29, 1977	3.80	6.0
1978	Apr. 10, 1978	6.52	248
1979	Apr. 18, 1979	7.54	498
1980	Apr. 6, 1980	6.42	173

b Backwater from ice.

05140500 East Branch Warroad River near Warroad, MN

Location.—Lat 48°51'29", long 95°18'40", in NE¼NE¼ sec.17, T.162 N., R.36 W., Roseau County, Hydrologic Unit 09030009, at upstream side of highway bridge, 2.5 miles south of Warroad, and 3.3 miles upstream from mouth.

Drainage area.—45.8 mi^2.

Records available.—October 1977 to present. Continuous records available October 1946 to September 1954, June 1966 to September 1977.

Gage.—Crest-stage gage at downstream side of bridge.

Basin characteristics.—Main-channel length, 24.9 miles; main-channel slope, 6.2 ft per mile; forest area, 70 percent; area of lakes and swamps, 47 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1946	Mar. 24, 1946	7.70	215
1947	June 11, 1947	9.36	1,340
1948	Apr. 22, 1948	8.12	480
1949	Apr. 14, 1949	b6.72	142
1950	June 27, 1950	8.29	554
1951	Apr. 28, 1951	8.20	476
1952	July 4, 1952	8.37	614
1953	May 31, 1953	4.27	52
1954	Apr. 16, 1954	7.50	238
1967	Apr. 21, 1967	8.72	574
1968	June 11, 1968	8.40	430
1969	Apr. 13, 1969	8.53	520
1970	Apr. 28, 1970	8.75	592
1971	Apr. 12, 1971	7.50	227
1972	Apr. 19, 1972	7.85	288
1973	Sept.28, 1973	5.90	99
1974	Apr. 22, 1974	8.40	478
1975	Apr. 23, 1975	8.87	790
1976	Apr. 7, 1976	7.11	180
1977	Sept.27, 1977	4.10	49
1978	Apr. 18, 1978	8.71	672
1979	Apr. 25, 1979	9.38	1,120
1980	Apr. 6, 1980	6.22	112

b Backwater from ice.

MISSISSIPPI RIVER MAIN STEM

05200200 Hennepin Creek near Becida, MN

(Site No. 183)

Location.--Lat 47°23'52", long 95°05'12", in NW¼NE¼ sec.11, T.145 N., R.35 W., Hubbard County, Hydrologic Unit 07010101, gages upstream and downstream from culvert on Stumphges Rapids Trail, approximately 0.5 mile west of Hubbard County Road 3, 3 miles north of Becida, and 1.5 miles upstream from mouth.

Drainage area.—41.4 mi^2.

Records available.--October 1978 to present.

Gage.—Crest-stage gage upstream from culvert.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 20, 1979	15.18	(+)
1980	Nov. 1, 1979	11.83	(+)

+ Discharge not determined.

MISSISSIPPI RIVER MAIN STEM

05200445 Mississippi River at Bemidji, MN

Location.—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.

Drainage area.—400 mi^2.

Records available.—October 1972 to present. Miscellaneous discharge measurements 1950, 1964-65.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1973	Sept. 9, 1973	11.71	495
1974	Apr. 20, 1974	12.33	979
1975	Apr. 22, 1975	12.46	1,170
1976	Apr. 5, 1976	11.61	553
1977	Sept.25, 1977	d	e190
1978	Apr. 12, 1978	12.11	953
1979	Apr. 23, 1979	13.04	1,690
1980	Apr. 20, 1980	11.82	620

d Peak stage did not reach bottom of gage.
e Estimated.

SMITH CREEK BASIN

05210200 Smith Creek near Hill City, MN

(Site No. 118)

Location.--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.

Drainage area.—8.00 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—1.87 ft, upstream; 1.69 ft, downstream.

Bankfull stage.--6 ft.

Basin characteristics.—Main-channel length, 4.96 miles; main-channel slope, 41.9 ft per mile; mean basin altitude, 1,414 ft; forest area, 86 percent; area of lakes and swamps, 20 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 14, 1961	5.15	60
1962	May 23, 1962	6.02	238
1963	May 28, 1963	4.45	30
1964	May 6, 1964	6.28	282
1965	June 2, 1965	5.70	150
1966	Aug. 7, 1966	5.67	140
1967	Apr. 10, 1967	5.48	105
1968	Apr. 23, 1968	3.71	16
1969	Apr. 13, 1969	6.04	248
1970	Apr. 19, 1970	5.48	104
1971	Apr. 16, 1971	c5.67	120
1972	Aug. 22, 1972	5.96	220
1973	Mar. 14, 1973	3.75	17
1974	Oct. 10, 1973	c6.59	235
1975	Apr. 27, 1975	c5.90	108
1976	Apr. 3, 1976	4.39	28
1977	Sept.24, 1977	4.03	21
1978	Aug. 23, 1978	6.63	280
1979	Apr. 21, 1979	6.20	215
1980	Aug. 20, 1980	3.98	20

c Affected by shifting control.

SWAN RIVER BASIN

05216700 O'Brien Creek near Nashwauk, MN

(Site No. 42)

Location.--Lat 47°22'59", long 93°08'08", in NE¼NE¼ sec.33, T.57 N., R.22 W., Itasca County, Hydrologic Unit 07010103, at culvert on U.S. Highway 169, 1.5 miles east of Nashwauk, and 3.0 miles above Welcome Creek.

Drainage area.—8.26 mi^2.

Records available.—October 1958 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.98 ft, upstream; 5.36 ft, downstream.

Bankfull stage.—13 ft.

Basin characteristics.—Main-channel length, 5.34 miles; main-channel slope, 42.4 ft per mile; mean basin altitude, 1,465 ft; forest area, 80 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Apr. 18, 1959	8.39	88
1960	May 4, 1960	8.08	70
1961	May 14, 1961	8.35	85
1962	Apr. 8, 1962	b8.66	74
1963	Apr. 2, 1963	c8.21	48
1964	June 24, 1964	8.80	98
1965	Apr. 17, 1965	b9.28	87
1966	Apr. 19, 1966	a8.00	103
1967	Mar. 31, 1967	b9.57	120
1968	June 6, 1968	a9.76	94
1969	Apr. 12, 1969	b8.31	25
1970	Apr. 19, 1970	b8.59	50
1971	Apr. 16, 1971	b8.80	68
1972	Apr. 18, 1972	b8.76	66

a Backwater from debris.
b Backwater from ice.
c Affected by shifting control.

SWAN RIVER BASIN

05216980 Swan River tributary at Warba, MN

(Site No. 116)

Location.--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 above mouth, and 1.1 miles southeast of Warba.

Drainage area.—3.95 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.19 ft, upstream; 2.55 ft, downstream.

Bankfull stage.—5 ft.

Basin characteristics.—Main-channel length, 2.76 miles; main-channel slope, 15.9 ft per mile; mean basin altitude, 1,294 ft; forest area, 89 percent; area of lakes and swamps, 24 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 21, 1961	c5.63	27
1962	May 23, 1962	6.80	77
1963	Apr. 2, 1963	b6.87	39
1964	Apr. 21, 1964	6.21	52
1965	June 2, 1965	5.59	29
1966	Apr. 19, 1966	5.69	33
1967	Mar. 31, 1967	b5.68	29
1968	June 6, 1968	5.09	13
1969	Apr. 13, 1969	5.98	44
1970	Apr. 19, 1970	5.60	30
1971	Apr. 10, 1971	b6.74	42
1972	Aug. 22, 1972	5.81	37
1973	May 25, 1973	5.15	15
1974	Oct. 10, 1973	6.12	49
1975	Apr. 27, 1975	6.18	51
1976	Apr. 3, 1976	5.08	13
1977	Sept. 9, 1977	5.34	21
1978	Aug. 23, 1978	6.64	70
1979	Apr. 21, 1979	7.08	50
1980	Apr. 12, 1980	b5.64	28

b Backwater from ice.
c Affected by shifting control.

BLUFF CREEK BASIN

05217700 Bluff Creek near Jacobson, MN

(Site No. 117)

Location.--Lat 47°00'19", long 93°17'30", in SW¼NW¼ sec.8, T.52 N., R.23 W. Aitkin County, Hydrologic Unit 07010103, at culvert on State Highway 200, 1.2 miles west of Jacobson.

Drainage area.—1.50 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.08 ft, upstream; 4.01 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.--Main-channel length, 1.58 miles; main-channel slope, 12.7 ft per mile; mean basin altitude, 1,244 ft; forest area, 83 percent; area of lakes and swamps, 27 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 14, 1961	6.94	18
1962	Sept.11, 1962	8.35	60
1963	Apr. 2, 1963	b7.12	10
1964	June 23, 1964	7.72	41
1965	June 2, 1965	7.73	41
1966	Oct. 1, 1965	8.33	59
1967	Mar. 31, 1067	b8.15	31
1968	---	d	<15
1969	Apr. 13, 1969	8.33	59
1970	Apr. 19, 1970	7.15	26
1971	Apr. 10, 1971	b8.42	49
1972	Aug. 22, 1972	c7.43	38
1973	Mar. 14, 1973	b7.33	18
1974	June 6, 1974	7.85	44
1975	Apr. 27, 1975	8.69	73
1976	Mar. 31, 1976	b7.19	9
1977	Sept.24, 1977	d	e20
1978	Aug. 23, 1978	9.99	139
1979	Apr. 21, 1979	9.42	112
1980	Apr. 7, 1980	6.38	12

< Less than.
b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

WILLOW RIVER BASIN

05221020 Willow River below Palisade, MN

Location.—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.

Drainage area.—445 mi^2.

Records available.—October 1971 to present. Miscellaneous measurements 1964-65.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	Apr. 24, 1972	14.69	2,340
1973	Mar. 1973	11.42	1,180
1974	Oct. 17, 1973	16.00	2,870
1975	May 1, 1975	17.21	3,700
1976	Apr. 6, 1976	13.21	1,790
1977	Sept.10, 1977	d	e500
1978	Aug. 29, 1978	13.80	1,820
1979	Apr. 25, 1979	17.25	3,730
1980	Apr. 12, 1980	b13.08	1,060

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

CROW WING RIVER BASIN

05244100 Kitten Creek near Sebeka, MN

(Site No. 136)

Location.--Lat 46°40'33", long 95°04'46", in SE¼SE¼ sec.15, T.137 N., R.35 W., Wadena County, Hydrologic Unit 07010106, at culvert on county highway, 3.3 miles above mouth, and 3.2 miles north of Sebeka.

Drainage area.—14.7 mi^2.

Records available.--October 1960 to September 1978.

Gage.--Crest-stage gage upstream from culvert

Culvert invert elevations.—5.93 ft, upstream; 5.57 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 8.39 miles; main-channel slope, 15.4 ft per mile; mean basin altitude, 1,422 ft; forest area, 27 percent; area of lakes and swamps, 4 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 14, 1961	9.81	41
1962	May 23, 1962	10.50	60
1963	June 1, 1963	9.37	36
1964	May 6, 1964	10.52	174
1965	Apr. 13, 1965	11.14	320
1966	Apr. 3, 1966	10.36	143
1967	Mar. 30, 1967	10.63	200
1968	June 10, 1968	10.45	160
1969	Apr. 12, 1969	10.77	227
1970	Apr. 9, 1970	10.23	125
1971	Apr. 10, 1971	9.98	76
1972	Mar. 23, 1972	10.06	91
1973	Mar. 14, 1973	9.06	41
1974	Oct. 10, 1973	10.95	400
1975	Apr. 20, 1975	10.25	160
1976	Mar. 31, 1976	8.70	49
1977	Apr. 17, 1977	c10.03	21
1978	Apr. 1, 1978	10.29	120

c Affected by shifting control.

CROW WING RIVER BASIN

05244200 Cat River near Nimrod, MN

(Site No. 135)

Location.--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 above mouth.

Drainage area.--49.2 mi^2.

Records available.--October 1960 to present.

Gage.--Water-stage recorder upstream from bridge. Prior to Sept. 8, 1967, crest-stage gage at same site and datum.

Low-steel elevation.--8.11 ft.

Bankfull stage.--7 ft.

Remarks.--Recording rain gage installed Sept. 20, 1967.

Basin characteristics.--Main-channel length, 13.9 miles; main-channel slope; 6.90 ft per mile; mean basin altitude, 1,375 ft; forest area, 33 percent; area of lakes and swamps, 15 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 24, 1961	6.56	217
1962	May 23, 1962	7.52	316
1963	June 1, 1963	5.47	125
1964	May 6, 1964	6.38	200
1965	Apr. 14, 1965	8.93	488
1966	Apr. 3, 1966	7.44	336
1967	Apr. 1, 1967	6.84	244
1968	June 10, 1968	8.33	410
1969	Apr. 12, 1969	8.33	410
1970	Apr. 30, 1970	6.85	240
1971	Apr. 11, 1971	5.67	140
1972	Apr. 17, 1972	6.98	255
1973	July 27, 1973	4.69	79
1974	Oct. 12, 1973	9.43	560
1975	Apr. 20, 1975	7.43	305
1976	Apr. 2, 1976	4.94	64
1977	Aug. 31, 1977	c4.77	59
1978	Apr. 7, 1978	6.60	206
1979	Apr. 21, 1979	8.30	390
1980	Apr. 9, 1980	5.59	c125

c Affected by shifting control.

CROW WING RIVER BASIN

05244440 Leaf River near Aldrich, MN

Location.—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 miles northeast of Aldrich.

Drainage area.—860 mi^2.

Records available.—October 1971 to present. Miscellaneous discharge measurements 1965, 1968.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	Apr. 25, 1972	14.96	3,250
1973	Mar. 27, 1973	13.09	1,430
1974	Oct. 13, 1973	15.83	4,440
1975	Apr. 21, 1975	15.44	3,950
1976	Mar. 30, 1976	12.08	950
1977	Sept.25, 1977	—	e450
1978	Apr. 9, 1978	14.18	2,410
1979	Apr. 22, 1979	16.15	5,170
1980	Apr. 9, 1980	13.85	2,060

e Estimated.

MISSISSIPPI RIVER MAIN STEM

05245800 Sevenmile Creek near Pillager, MN

(Site No. 184)

Location.--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, and 3.2 miles upstream from mouth.

Drainage area.—18.3 mi^2.

Records available.--October 1978 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	May 10, 1979	12.43	(+)
1980	Mar. 29, 1980	b12.02	(+)

+ Discharge not determined.
b Backwater from ice.

MISSISSIPPI RIVER MAIN STEM

05261000 Mississippi River near Fort Ripley, MN

Location.—Lat 46°10'50", long 94°21'56", in SE¼NW¼ sec.27, T.43 N., R.32 W., Crow Wing County, Hydrologic Unit 07010104, at left bank 600 ft upstream from Nokasippi River, and 1.0 mile north of Fort Ripley.

Drainage area.—11,010 mi^2.

Records available.—June 1909 to September 1910 (gage heights and discharge measurements only), June to October 1929 (continuous record), October 1971 to present. Gage-heights records collected at same site since 1906 are contained in reports of U.S. Weather Bureau.

Gage.—Crest-stage gage at downstream side of old bridge abutment. Datum of crest-stage gage is 1,134.14 ft, National Geodetic Vertical Datum of 1929. June 1909 to September 1910, at datum 0.7 ft lower.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	July 25, 1972	1,145.70	22,200
1973	Mar. 17, 1973	1,144.47	12,200
1974	Apr. 17, 1974	1,147.13	27,000
1975	Apr. 28, 1975	1,146.53	24,800
1976	Apr. 3, 1976	1,142.70	12,800
1977	Sept.29, 1977	d	e5,500
1978	Apr. 9, 1978	1,143.36	14,700
1979	Apr. 19, 1979	1,147.42	28,000
1980	Apr. 7, 1980	1,143.33	14,700

d Peak stage did not reach bottom of gage.
e Estimated.

PLATTE RIVER BASIN

05267800 Big Mink Creek tributary near Lastrup, MN

(Site No. 138)

Location.--Lat 46°01'58", long 94°06'13", in NW¼SW¼ sec.14, T.41 N., R.30 W., Morrison County, Hydrologic Unit 07010201, at culvert on State Highway 25, 1.4 miles above mouth, and 2.1 miles west of Lastrup.

Drainage area.--1.53 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--7.45 ft, upstream; 6.93 ft, downstream.

Bankfull stage.--9 ft.

Basin characteristics.--Main-channel length, 2.62 miles; main-channel slope, 24.9 ft per mile; mean basin altitude, 1,228 ft; forest area, 0 percent; area of lakes and swamps, 10 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	---	d	<0.2
1962	May 23, 1962	9.27	14
1963	Mar. 15, 1963	b8.80	3.3
1964	Apr. 13, 1964	8.57	5.8
1965	Apr. 12, 1965	10.42	27
1966	Mar. 15, 1966	b10.47	21
1967	Mar. 30, 1967	10.08	23
1968	June 29, 1968	8.29	2.8
1969	Apr. 8, 1969	11.76	35
1970	Apr. 19, 1970	9.92	21
1971	Apr. 7, 1971	10.58	28
1972	July 22, 1972	12.56	86
1973	Mar. 12, 1973	b9.62	11
1974	Apr. 2, 1974	b8.64	4
1975	Apr. 20, 1975	9.33	14
1976	Mar. 29, 1976	b9.33	11
1977	Mar. 12, 1977	b8.82	3.0
1978	Mar. 28, 1978	b9.27	(+)
1979	May 11, 1979	8.96	(+)
1980	Apr. 4, 1980	9.20	(+)

< Less than.
+ Discharge not determined.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

PLATTE RIVER BASIN

05267900 Hillman Creek near Pierz, MN

(Site No. 162)

Location.--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 above mouth, and 1.5 miles east of Pierz.

Drainage area.—46.7 mi^2.

Records available.--October 1963 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Basin characteristics.--Main-channel length, 15.5 miles; main-channel slope, 9.53 ft per mile; mean basin altitude, 1,258 ft; forest area, 36 percent; area of lakes and swamps, 20 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	May 7, 1964	14.55	1,380
1965	Apr. 13, 1965	14.68	1,550
1966	Mar. 17, 1966	14.06	795
1967	Mar. 31, 1967	13.93	620
1968	June 21, 1968	13.21	190
1969	Apr. 9, 1969	15.48	2,960
1970	Apr. 21, 1970	13.51	290
1971	Apr. 8, 1971	13.97	670
1972	July 22, 1972	15.25	2,490
1973	Mar. 12, 1973	13.98	680
1974	June 6, 1974	12.61	77
1975	Apr. 27, 1975	14.11	840
1976	Mar. 29, 1976	b14.58	450
1977	Sept.24, 1977	12.24	48
1978	Apr. 6, 1978	13.26	300
1979	May 10, 1979	13.82	(+)
1980	Mar. 20, 1980	13.36	(+)

+ Discharge not determined.
b Backwater from ice.

PLATTE RIVER BASIN

05268000 Platte River above Royalton, MN

Location.—Lat 45°50'43", long 94°17'40", in SE¼NW¼ sec.26, T.39 N., R.32 W., Morrison County, Hydrologic Unit 07010201, at bridge on County Highway 27, 0.6 mile north of Royalton, and 6.6 miles upstream from mouth.

Drainage area.—335 mi^2.

Records available.—May 1929 to September 1936, October 1971 to present. Continuous records available May 1929 to September 1936.

Gage.—Crest-stage gage at downstream side of bridge. Non-recording gage May 1929 to September 1936 at site 0.6 mile downstream at different datum.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1929	May 18, 1929	2.37	132
1930	May 14, 1930	5.75	1,280
1931	May 30, 1931	5.90	1,330
1932	Apr. 10, 1932	4.00	543
1933	Apr. 1, 1933	b2.60	167
1934	Apr. 7, 1934	3.70	272
1935	Mar. 25, 1935	---	228
1936	May 3, 1936	6.36	1,450
1972	July 26, 1972	7.84	6,850
1973	Mar. 16, 1973	3.75	2,280
1974	---	d	<1,800
1975	Apr. 28, 1975	4.26	2,710
1976	Mar. 29, 1976	3.55	2,100
1977	Sept.29, 1977	d	e850
1978	Apr. 7, 1978	d	e620
1979	May 10, 1979	3.52	2,080
1980	Mar. 29, 1980	b3.03	800

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

SAUK RIVER BASIN

05270300 Sauk River tributary at Spring Hill, MN

(Site No. 97)

Location.--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 above mouth.

Drainage area.—7.06 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—7.87 ft, upstream; 7.45 ft, downstream.

Bankfull stage.—11 ft.

Basin characteristics.—Main-channel length, 5.08 miles; main-channel slope, 16.8 ft per mile; mean basin altitude, 1,236 ft; forest rea, 1 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Aug. 27, 1960	10.27	116
1961	Apr. 14, 1961	b12.33	157
1962	July 19, 1962	10.87	160
1963	Mar. 23, 1963	b11.26	8.5
1964	Apr. 6, 1964	b10.08	75
1965	Apr. 11, 1965	b12.60	268
1966	June 21, 1966	11.64	225
1967	Mar. 30, 1967	12.20	277
1968	June 10, 1968	9.78	82
1969	Apr. 7, 1969	13.09	364
1970	Apr. 19, 1970	11.21	190
1971	Mar. 31, 1971	b13.54	134
1972	July 8, 1972	12.22	280
1973	Mar. 14, 1973	b10.36	74
1974	June 6, 1974	10.81	260
1975	Apr. 27, 1975	10.77	153
1976	Mar. 25, 1976	10.42	127
1977	Mar. 12, 1977	b13.27	81
1978	July 6, 1978	22.76	1,440
1979	Apr. 12, 1979	10.77	153
1980	June 5, 1980	9.95	93

b Backwater from ice.

SAUK RIVER BASIN

05270310 Sauk River tributary No. 2 near St. Martin, MN

(Site No. 142)

Location.--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.

Drainage area.—0.26 mi^2 (revised).

Records available.—October 1961 to present. Annual peak for 1960 available from miscellaneous flood data collected prior to activation of station.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.97 ft, upstream; 2.89 ft, downstream.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 0.68 mile; main-channel slope, 78.4 ft per mile; mean basin altitude, 1,199 ft; forest area, 1 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Aug. 27, 1960	10.63	83
1962	July 19, 1962	10.47	79
1963	May 26, 1963	7.59	15
1964	May 6, 1964	7.10	7.4
1965	Apr. 11, 1965	b8.49	17
1966	June 21, 1966	7.80	19
1967	Mar. 30, 1967	b10.24	12
1968	Sept.22, 1968	7.48	13
1969	Apr. 8, 1969	7.34	11
1970	Apr. 19, 1970	8.52	33
1971	July 7, 1971	7.07	7.1
1972	Mar. 21, 1972	b8.44	21
1973	Mar. 14, 1973	b9.04	16
1974	Apr. 1, 1974	b8.06	14
1975	June 21, 1975	7.37	11
1976	July 30, 1976	7.06	7
1977	Aug. 31, 1977	7.50	13
1978	July 6, 1978	12.12	559
1979	June 21, 1979	9.14	48
1980	June 5, 1980	8.09	24

b Backwater from ice.

JOHNSON CREEK BASIN

05271800 Johnson Creek tributary at Luxemburg, MN

(Site No. 167)

Location.--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 miles south of Luxemburg.

Drainage area.—3.82 mi^2.

Records available.--October 1963 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.64 ft, upstream; 5.22 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 3.61 miles; main-channel slope, 7.38 ft per mile; mean basin altitude, 1,113 ft; forest area, 11 percent; area of lakes and swamps, 14 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	Aug. 29, 1964	7.24	29
1965	Apr. 12, 1965	9.43	125
1966	Mar. 11, 1966	b8.55	23
1967	Mar. 30, 1967	7.54	39
1968	---	d	<14
1969	Apr. 8, 1969	b8.25	52
1970	Apr. 19, 1970	7.93	54
1971	Apr. 6, 1971	7.78	49
1972	Mar. 21, 1972	b7.67	26
1973	Mar. 11, 1973	b7.14	13
1974	May 10, 1974	6.57	11
1975	Apr. 27, 1975	7.43	35
1976	Mar. 28, 1976	b7.89	30
1977	July 23, 1977	7.71	46
1978	Apr. 2, 1978	6.93	19
1979	May 10, 1979	8.33	72
1980	June 6, 1980	7.55	40

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

JOHNSON CREEK BASIN

05272000 Johnson Creek tributary No. 2 near St. Augusta, MN

(Site No. 165)

Location.--Lat 45°26'52", long 94°12'00", in NE¼SE¼ sec.21, T.123 N., R.28 W., Stearns County, Hydrologic Unit 07010203, at culvert on county highway, 0.7 mile above mouth, an 3.1 miles southwest of Augusta.

Drainage area.--13.4 mi^2.

Records available.--October 1963 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.46 ft, upstream; 4.50 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 6.75 miles; main-channel slope, 16.6 ft per mile; mean basin altitude, 1,081 ft; forest area, 4 percent; area of lakes and swamps, 4 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	May 6, 1964	6.45	39
1965	Apr. 12, 1965	10.10	274
1966	Mar. 11, 1966	b8.45	108
1967	June 14, 1967	7.45	88
1968	Sept.22, 1968	6.41	38
1969	Apr. 8, 1969	9.09	196
1970	Apr. 19, 1970	6.04	25
1971	June 29, 1971	6.88	57
1972	Mar. 21, 1972	6.84	56
1973	Mar. 11, 1973	b7.00	41
1974	Sept. 9, 1974	6.45	39
1975	Apr. 27, 1975	9.12	188
1976	Mar. 28, 1976	b7.00	52
1977	Aug. 28, 1977	7.84	103
1978	July 6, 1978	8.42	139
1979	June 16, 1979	8.29	131
1980	Sept.12, 1980	8.61	(+)

+ Discharge not determined.
b Backwater from ice.

JOHNSON CREEK BASIN

05272300 Johnson Creek near St. Augusta, MN

(Site No. 166)

Location.--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 above mouth.

Drainage area.--46.7 mi^2.

Records available.--October 1963 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Basin characteristics.--Main-channel length, 11.2 miles; main-channel slope, 15.4 ft per mile; mean basin altitude, 1,049 ft; forest area, 8 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)	
1964	Apr. 13, 1964	12.85	227	
1965	Apr. 12, 1965	14.77	682	
1966	Mar. 11, 1966	b14.84	430	
1967	Mar. 31, 1967	13.51	358	
1968	Sept.22, 1968	11.96	105	
1969	Apr. 8, 1969	14.23	532	
1970	---	d	<90	
1971	Apr. 6, 1971	12.58	185	
1972	July 22, 1972	c12.46	230	(Revised)
1973	Mar. 11, 1973	b13.82	154	
1974	Mar. 31, 1974	b12.16	85	
1975	Apr. 27, 1975	14.10	660	
1976	Mar. 28, 1976	b13.23	262	
1977	Aug. 28, 1977	13.05	360	
1978	Mar. 25, 1978	b14.45	342	
1979	June 16, 1979	14.46	780	
1980	Sept.12, 1980	13.48	470	

< Less than.
b Backwater from ice.
c Affected by shifing control.
d Peak stage did not reach bottom of gage.

MISSISSIPPI RIVER MAIN STEM

05273510 Mississippi River at Clearwater, MN

Location.—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.

Records available.—October 1971 to present.

Gage.—Crest-stage gage upstream from bridge. Zero of crest-stage gage is at 937.81 ft, National Geodetic Vertical Datum of 1929.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	July 26, 1972	18.66	33,500
1973	Mar. 18, 1973	b15.29	17,600
1974	Oct. 16, 1973	15.48	23,800
1975	Apr. 30, 1975	19.28	35,600
1976	Apr. 4, 1976	d	e17,000
1977	Sept.30, 1977	d	e6,500
1978	Apr. 13, 1978	14.10	19,900
1979	Apr. 24, 1979	18.25	33,900
1980	Apr. 10, 1980	d	e15,800

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

OTSEGO CREEK BASIN

05273700 Otsego Creek near Otsego, MN

(Site No. 164)

Location.--Lat 45°17'19", long 93°38'59", in SW¼NE¼ sec.13, T.121 N., R.24 W., Wright County, Hydrologic Unit 07010203, at culvert on County Highway 39, 1.3 miles above mouth, and 1.9 miles west of Otsego.

Drainage area.—3.11 mi^2.

Records available.--October 1963 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—2.99 ft, upstream; 2.67 ft, downstream.

Bankfull stage.—4 ft.

Basin characteristics.—Main-channel length, 3.60 miles; main-channel slope, 24.1 ft per mile; mean basin altitude, 924 ft; forest area, 5 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	Apr. 6, 1964	b4.39	23
1965	Apr. 11, 1965	7.48	202
1966	Mar. 11, 1966	8.86	303
1967	Mar. 30, 1967	8.36	263
1968	---	d	<22
1969	Apr. 7, 1969	7.00	171
1970	May 22, 1970	4.34	33
1971	Mar. 30, 1971	3.31	37
1972	Mar. 21, 1972	b5.32	63
1973	Mar. 12, 1973	b5.25	60
1974	Oct. 10, 1973	4.31	88
1975	June 27, 1975	5.59	154
1976	Mar. 23 1976	b4.94	70
1977	July 3, 1977	4.96	123
1978	Mar. 25, 1978	b5.93	121
1979	June 16, 1979	5.62	158
1980	Mar. 20, 1980	b7.40	145

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

ELK RIVER BASIN

05274200 Stony Brook tributary near Foley, MN

(Site No. 96)

Location.--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 above mouth, and 1.5 miles south of Foley.

Drainage area.--2.26 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.62 ft, upstream; 5.02 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 3.50 miles; main-channel slope, 10.7 ft per mile; mean basin altitude, 1,138 ft; forest area, 5 percent; area of lakes and swamps, 9 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	June 28, 1960	6.90	9.8
1961	Apr. 14, 1961	7.89	29
1962	May 23, 1962	11.35	132
1963	Aug. 11, 1963	7.74	25
1964	May 6, 1964	8.96	59
1965	Apr. 12, 1965	b11.26	83
1966	Mar. 11, 1966	b9.07	51
1967	Mar. 30, 1967	8.80	55
1968	June 30, 1968	6.88	9.5
1969	Apr. 7, 1969	b10.20	78
1970	Apr. 19, 1970	8.12	35
1971	Mar. 31, 1971	b9.84	41
1972	July 22, 1972	14.29	204
1973	Mar. 11, 1973	b8.03	21
1974	June 6, 1974	7.09	13
1975	Apr. 27, 1975	8.72	52
1976	Mar. 28, 1976	b9.54	33
1977	Apr. 15, 1977	7.95	30
1978	June 30, 1978	10.23	98
1979	July 26, 1979	10.81	115
1980	Apr. 4, 1980	b8.01	22

b Backwater from ice.

CROW RIVER BASIN

05276100 North Fork Crow River tributary near Paynesville, MN

(Site No. 98)

Location.--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 above mouth, and 3.0 miles west of Paynesville.

Drainage area.--0.55 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--15.51 ft, upstream; 13.31 ft, downstream.

Bankfull stage.--19 ft.

Basin characteristics.--Main-channel length, 1.05 miles; main-channel slope, 48.1 ft per mile; mean basin altitude, 1,248 ft; forest area, 0 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Aug. 27, 1960	18.59	48
1961	Apr. 14, 1961	b17.94	13
1962	May 23, 1962	16.74	10
1963	Sept.15, 1963	16.42	5.3
1964	Apr. 6, 1964	b16.82	6.7
1965	Apr. 11, 1965	17.87	31
1966	June 21, 1966	19.41	68
1967	Mar. 30, 1967	17.35	21
1968	June 10, 1968	16.07	2.1
1969	Apr. 7, 1969	17.04	15
1970	Apr. 19, 1970	17.79	29
1971	June 29, 1971	17.45	23
1972	July 26, 1972	18.52	46
1973	Aug. 16, 1973	16.67	9.0
1974	Oct. 9, 1973	16.52	6.8
1975	Apr. 27, 1975	17.33	21
1976	Mar. 23, 1976	b17.84	12
1977	Aug. 31, 1977	18.30	41
1978	June 16, 1978	17.44	23
1979	June 16, 1979	18.23	39
1980	June 5, 1980	16.94	14

b Backwater from ice.

CROW RIVER BASIN

05276200 North Fork Crow River at Paynesville, MN

Location.—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.

Drainage area.—236 mi^2.

Records available.—October 1972 to present.

Gage.—Crest-stage gage at downstream side of bridge. Datum of crest-stage gage is 1,140.02 ft, National Geodetic Vertical Datum of 1929.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1973	Mar. 16, 1973	b5.17	765
1974	---	d	e300
1975	Apr. 28, 1975	6.47	1,320
1976	Mar. 28, 1976	b7.30	535
1977	Aug. 31, 1977	3.15	374
1978	June 16, 1978	5.10	890
1979	Apr. 17, 1979	c7.05	1,640
1980	Mar. 31, 1980	3.02	345

b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

CROW RIVER BASIN

05278350 Fountain Creek near Montrose, MN

(Site No. 153)

Location.--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.

Drainage area.--6.73 mi^2.

Records available.--October 1961 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--3.42 ft, upstream; 2.72 ft, downstream.

Bankfull stage.--7 ft.

Basin characteristics.--Main-channel length, 6.50 miles; main-channel slope, 3.49 ft per mile; mean basin altitude, 988 ft; forest area, 6 percent; area of lakes and swamps, 12 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	May 23, 1962	7.42	109
1963	June 10, 1963	5.40	32
1964	May 6, 1964	5.46	33
1965	Apr. 9, 1965	b8.14	95
1966	Mar. 4, 1966	b7.20	38
1967	Mar. 30, 1967	6.61	73
1968	July 14, 1968	5.51	36
1969	Apr. 7, 1969	6.37	63
1970	June 16, 1970	5.28	29
1971	Mar. 31, 1971	b7.77	60
1972	July 23, 1972	6.79	81
1973	Mar. 11, 1973	b5.45	28
1974	July 12, 1974	6.27	60
1975	Apr. 23, 1975	5.88	47
1976	Mar. 20, 1976	b6.26	43
1977	Mar. 12, 1977	b5.83	30
1978	Aug. 27, 1978	7.91	132
1979	Mar. 30, 1979	b7.16	63
1980	June 5, 1980	5.38	32

b Backwater from ice.

CROW RIVER BASIN

05278700 Otter Creek near Lester Prairie, MN

(Site No. 115)

Location.--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 above mouth.

Drainage area.—30.2 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert. Prior to Aug. 12, 1979, water-stage recorder at same site and datum.

Culvert invert elevations.—4.60 ft, upstream; 4.12 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 14.3 miles; main-channel slope, 3.27 ft per mile; mean basin altitude, 1,030 ft; forest area, 4 percent; area of lakes and swamps, 4 percent.

Remarks.--Recording rain gage operated Nov. 23, 1965 to Aug. 11, 1970.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 18, 1961	6.08	46
1962	May 22, 1962	8.66	348
1963	June 11, 1963	c7.46	89
1964	May 8, 1964	5.75	33
1965	Apr. 14, 1965	9.24	525
1966	Mar. 4, 1966	b8.37	106
1967	Mar. 30, 1967	b8.86	195
1968	Apr. 24, 1968	7.22	82
1969	Apr. 9, 1969	9.02	365
1970	June 19, 1970	6.34	43
1971	June 29, 1971	8.08	170
1972	Mar. 24, 1972	8.52	244
1973	Mar. 14, 1973	b8.98	156
1974	Apr. 3, 1974	6.80	63
1975	Apr. 23, 1975	8.08	169
1976	Mar. 20, 1976	b7.82	65
1977	Mar. 12, 1977	b6.45	35
1978	Aug. 27, 1978	8.34	210
1979	Mar. 30, 1979	b9.53	245
1980	Mar. 19, 1980	b6.89	51

b Backwater from ice.
c Affected by shifting control.

CROW RIVER BASIN

05278750 Otter Creek tributary near Lester Prairie, MN

(Site No. 151)

Location.--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 above mouth.

Drainage area.—1.54 mi^2.

Records available.--October 1961 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.98 ft, upstream; 5.49 ft, downstream.

Bankfull stage.--7 ft.

Basin characteristics.—Main-channel length, 2.12 miles; main-channel slope, 14.5 ft per mile; mean basin altitude, 1,018 ft; forest area, 5 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	May 23, 1962	10.83	79
1963	June 10, 1963	7.98	21
1964	May 6, 1964	8.28	26
1965	Apr. 10, 1965	11.14	87
1966	Mar. 4, 1966	b10.09	41
1967	June 19, 1967	8.10	23
1968	July 14, 1968	7.50	12
1969	Apr. 7, 1969	8.42	31
1970	Apr. 19, 1970	8.17	27
1971	June 29, 1971	8.32	30
1972	July 23, 1972	8.27	29
1973	Mar. 14, 1973	b8.88	31
1974	Apr. 3, 1974	8.38	31
1975	Apr. 28, 1975	8.40	31
1976	Mar. 12, 1976	b7.59	6.6
1977	Apr. 15, 1977	7.88	22
1978	Aug. 27, 1978	10.22	69
1979	Mar. 30, 1979	b8.30	28
1980	June 5, 1980	8.97	42

b Backwater from ice.

CROW RIVER BASIN

05278850 Buffalo Creek tributary near Brownton, MN

(Site No. 113)

Location.--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 above mouth, and 2.6 miles northwest of Brownton.

Drainage area.--9.45 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--12.26 ft, upstream; 11.73 ft, downstream.

Bankfull stage.--16 ft.

Basin characteristics.--Main-channel length, 4.60 miles; main-channel slope, 2.90 ft per mile; mean basin altitude, 1,033 ft; forest area, 3 percent; area of lakes and swamps, 14 percent.

Remarks.--0.86 mi^2 of drainage area is lake storage.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	---	d	<9
1962	Mar. 28, 1962	b16.16	70
1963	June 10, 1963	13.71	35
1964	---	d	<12
1965	Apr. 10, 1965	b17.39	124
1966	Mar. 4, 1966	b14.33	36
1967	Apr. 2, 1967	13.88	39
1968	June 18, 1968	13.38	20
1969	Apr. 6, 1969	14.57	64
1970	---	d	<17
1971	June 29, 1971	13.98	43
1972	May 27, 1972	14.27	53
1973	---	d	<25
1974	Apr. 12, 1974	13.45	23
1975	Apr. 28, 1975	14.33	55
1976	Mar. 12, 1976	b13.65	19
1977	---	d	<7
1978	Aug. 27, 1978	13.82	37
1979	Apr. 3, 1979	b16.58	87
1980	Mar. 19, 1980	b13.70	17

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

05279000 South Fork Crow River near Mayer, MN

Location.—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.

Drainage area.—1,170 mi^2.

Records available.—October 1979 to present. April 1934 to September 1979, continuous records available. Monthly discharge only for some periods published in Water-Supply Paper 1308.

Gage.—Crest-stage gage at downstream side of bridge.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 63.0 miles; main-channel slope, 3.1 ft per mile; mean basin altitude, 1,020 ft; forest area, 1 percent; area of lakes and swamps, 4 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1934	Apr. 7, 1934	1.20	28
1935	May 17, 1935	4.70	770
1936	Mar. 24, 1936	9.34	2,470
1937	Apr. 14, 1937	4.94	860
1938	May 23, 1938	6.46	1,360
1939	Mar. 24, 1939	7.96	1,960
1940	Apr. 5, 1940	---	461
1941	Apr. 3, 1941	8.96	2,400
1942	May 31, 1942	5.80	920
1943	Mar. 30, 1943	10.68	3,490
1944	May 8, 1944	10.88	4,120
1945	Mar. 16, 1945	9.84	3,300
1946	Mar. 21, 1946	---	2,050
1947	Apr. 16, 1947	6.66	1,400
1948	Mar. 27, 1948	12.11	4,620
1949	Apr. 1, 1949	8.08	2,070
1950	Apr. 2, 1950	---	2,280
1951	Apr. 12, 1951	12.15	5,070
1952	Apr. 10, 1952	15.70	11,000
1953	June 30, 1953	11.01	3,900
1954	July 3, 1954	6.60	1,440
1955	July 17, 1955	7.08	1,500
1956	June 22, 1956	9.58	2,850
1957	June 23, 1957	16.00	9,660
1958	Apr. 10, 1958	6.80	1,490

05279000 South Fork Crow River near Mayer, MN--Continued

Annual maximum data.--Continued

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 7, 1959	2.99	344
1960	Apr. 3, 1960	10.62	3,550
1961	May 19, 1961	3.71	457
1962	Apr. 7, 1962	10.17	3,000
1963	June 12, 1963	10.84	3,750
1964	May 10, 1964	3.97	506
1965	Apr. 13, 1965	19.23	16,100
1966	Mar. 17, 1966	9.00	2,520
1967	Apr. 7, 1967	10.08	3,180
1968	July 16, 1968	7.14	1,460
1969	Apr. 11, 1969	16.48	9,770
1970	June 24, 1970	7.00	1,400
1971	Apr. 1, 1971	9.37	2,500
1972	Mar. 21, 1972	13.16	5,360
1973	Mar. 17, 1973	8.97	2,280
1974	Oct. 19, 1973	6.84	1,330
1975	Apr. 30, 1975	13.90	5,900
1976	Mar. 23, 1976	7.22	1,490
1977	July 25, 1977	3.70	381
1978	Mar. 28, 1978	b9.12	2,290
1979	Apr. 5, 1979	b13.76	5,530
1980	Mar. 29, 1980	7.05	1,220

b Backwater from ice.

CROW RIVER BASIN

05279030 South Fork Crow River tributary near Mayer, MN

(Site No. 152)

Location.--Lat 44°54'21", long 93°53'51", in NW¼NE¼ sec.36, T.117 N., R.26 W., Carver County, Hydrologic Unit 07010205, at culvert on State Highway 7, 0.7 mile above mouth, and 1.4 miles north of Mayer.

Drainage area.—7.74 mi^2.

Records available.--October 1961 to May 1971.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—3.98 ft, upstream; 3.04 ft, downstream.

Bankfull stage.—5 ft.

Basin characteristics.—Main-channel length, 5.09 miles; main-channel slope, 6.02 ft per mile; mean basin altitude, 958 ft; forest area, 6 percent; area of lakes and swamps, 5 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	May 22, 1962	5.91	95
1963	Mar. 24, 1963	b5.84	57
1964	---	d	<20
1965	Apr. 8, 1965	b9.06	306
1966	Mar. 4, 1966	b5.95	82
1967	Mar. 29, 1967	6.54	167
1968	July 14, 1968	5.92	96
1969	Apr. 7, 1969	6.04	108
1970	June 16, 1970	4.67	21

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

CROW RIVER BASIN

05280300 School Lake Creek tributary near St. Michael, MN

(Site No. 163)

Location.--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 above mouth, and 1.5 miles southwest of St. Michael.

Drainage area.—2.04 mi^2.

Records available.--October 1963 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.59 ft, upstream.

Bankfull stage.—7 ft.

Basin characteristics.--Main-channel length, 2.52 miles; main-channel slope, 10.6 ft per mile; mean basin altitude, 950 ft; forest area, 10 percent; area of lakes and swamps, 6 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1964	May 6, 1964	7.34	9.1
1965	Apr. 11, 1965	12.68	434
1966	Mar. 4, 1966	b11.03	47
1967	Mar. 30, 1967	11.05	166
1968	Mar. 7, 1968	b8.20	15
1969	Apr. 7, 1969	9.23	61
1970	June 16, 1970	7.49	21
1971	Mar. 30, 1971	b8.89	39
1972	Mar. 21, 1972	b10.05	33
1973	Mar. 11, 1973	b8.08	20
1974	June 10, 1974	9.13	59
1975	June 27, 1975	11.92	135
1976	Mar. 20, 1976	b8.69	36
1977	Mar. 12, 1977	b8.38	22
1978	June 25, 1978	8.49	44
1979	May 10, 1979	7.30	17
1980	Mar. 20, 1980	7.76	20

b Backwater from ice.

RUM RIVER BASIN

05284100 Mille Lacs Lake tributary near Wealthwood, MN

(Site No. 137)

Location.--Lat 46°21'26", long 93°41'43", in NW¼NE¼ sec.25, T.45 N., R.27 W., Aitkin County, Hydrologic Unit 07010207, at culvert on State Highway 18, 0.2 mile above mouth, and 2.0 miles west of Wealthwood.

Drainage area.--0.58 mi^2 (revised).

Records available.--October 1960 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--6.93 ft, upstream; 6.64 ft, downstream.

Bankfull stage.--9 ft.

Basin characteristics.--Main-channel length, 0.82 miles; main-channel slope, 33.9 ft per mile; mean basin altitude, 1,268 ft; forest area, 97 percent; area of lakes and swamps, 7 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Apr. 18, 1961	7.34	0.5
1962	May 23, 1962	10.10	32
1963	June 10, 1963	7.91	3.8
1964	May 6, 1964	8.47	9.4
1965	Apr. 13, 1965	b10.35	20
1966	Mar. 31, 1966	b9.56	10
1967	Mar. 31, 1967	b9.21	8.7
1968	June 20, 1968	11.60	48
1969	Apr. 7, 1969	9.41	23
1970	Apr. 19, 1970	7.94	4.8
1971	Apr. 11, 1971	b9.77	15
1972	July 22, 1972	12.34	53

b Backwater from ice.

RUM RIVER BASIN

05284600 Robinson Brook near Onamia, MN

(Site No. 95)

Location.--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 above mouth, and 6.8 miles south of Onamia.

Drainage area.—4.79 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—12.23 ft, upstream; 11.53 ft, downstream.

Bankfull stage.—14 ft.

Basin characteristics.—Main-channel length, 5.62 miles; main-channel slope, 9.48 ft per mile; mean basin altitude, 1,248 ft; forest area, 61 percent; area of lakes and swamps, 24 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	July 16, 1960	14.36	36
1961	Apr. 18, 1961	---	g10
1962	May 23, 1962	15.52	140
1963	June 8, 1963	16.75	232
1964	May 6, 1964	15.17	96
1965	Apr. 13, 1965	b15.85	130
1966	June 4, 1966	15.40	123
1967	June 14, 1967	15.79	162
1968	June 30, 1968	c14.34	62
1969	Oct. 17, 1968	15.43	138
1970	Apr. 19, 1970	15.13	119
1971	Apr. 8, 1971	15.30	116
1972	July 22, 1972	19.32	458
1973	Mar. 11, 1973	b14.77	42
1974	June 6, 1974	13.68	38
1975	Apr. 27, 1975	16.12	186
1976	Mar. 29, 1976	14.41	76
1977	Mar. 12, 1977	b15.88	10
1978	Apr. 6, 1978	14.35	72
1979	May 10, 1979	14.75	95
1980	---	---	g22

b Backwater from ice.
c Affected by shifting control.
g Estimated; gage height unknown.

RUM RIVER BASIN

05284620 Rum River tributary near Onamia, MN

(Site No. 94)

Location.--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 above mouth, and 7.8 miles south of Onamia.

Drainage area.--2.37 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.46 ft, upstream; 5.13 ft, downstream.

Bankfull stage.--7 ft.

Basin characteristics.--Main-channel length, 3.65 miles; main-channel slope, 13.1 ft per mile; mean basin altitude, 1,236 ft; forest area, 46 percent; area of lakes and swamps, 20 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 3, 1960	6.92	19
1961	Apr. 18, 1961	b7.68	27
1962	May 23, 1962	9.49	80
1963	June 8, 1963	13.37	172
1964	May 6, 1964	8.87	65
1965	Apr. 13, 1965	10.19	96
1966	June 4, 1966	9.21	74
1967	June 14, 1967	13.85	405
1968	June 21, 1968	7.85	40
1969	Apr. 7, 1969	10.32	98
1970	Apr. 19, 1970	8.06	45
1971	Apr. 8, 1971	b8.66	55
1972	July 22, 1972	13.87	280
1973	Mar. 11, 1973	b7.97	31
1974	Oct. 10, 1973	6.94	19
1975	July 2, 1975	10.77	107
1976	Mar. 29, 1976	8.61	59
1977	July 4, 1977	6.99	20
1978	Apr. 6, 1978	8.09	45
1979	May 9, 1979	8.26	50
1980	Sept. 4, 1980	7.12	23

b Backwater from ice.

RUM RIVER BASIN

05284920 Stanchfield Creek tributary near Day, MN

(Site No. 126)

Location.--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 above mouth, and 1.5 miles southwest of Day.

Drainage area.--1.26 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.91 ft, upstream; 4.37 ft, downstream.

Bankfull stage.--6 ft.

Basin characteristics.--Main-channel length, 1.46 miles; main-channel slope, 34.9 ft per mile; mean basin altitude, 979 ft; forest area, 26 percent; area of lakes and swamps, 9 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 14, 1961	6.38	13
1962	May 23, 1962	8.50	70
1963	May 28, 1963	6.80	22
1964	May 8, 1964	5.95	26
1965	Apr. 12, 1965	7.01	55
1966	Mar. 15, 1966	b7.45	48
1967	Mar. 30, 1967	b7.18	55
1968	Sept.23, 1968	6.51	41
1969	Apr. 7, 1969	6.73	47
1970	Apr. 19, 1970	4.71	e2
1971	Mar. 30, 1971	5.62	22
1972	July 22, 1972	10.22	203
1973	May 24, 1973	5.55	20
1974	June 10, 1974	6.08	34
1975	July 2, 1975	8.25	99
1976	Mar. 29, 1976	b7.30	40
1977	Mar. 12, 1977	b6.61	30
1978	Apr. 23, 1978	5.34	14
1978	July 2, 1978		
1979	July 13, 1979	6.52	47
1980	Apr. 1, 1980	4.93	5.0

b Backwater from ice.
e Estimated.

MINNESOTA RIVER BASIN

05299100 Lazarus Creek tributary near Canby, MN

(Site No. 79)

Location.--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 above mouth.

Drainage area.—2.97 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert. Datum of gage is 1,283.12 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.—8.18 ft, upstream; 7.83 ft, downstream.

Bankfull stage.—13 ft.

Basin characteristics.—Main-channel length, 3.20 miles; main-channel slope, 67.9 ft per mile; mean basin altitude, 1,388 ft; forest area, 1 percent; area of lakes and swamps, 2 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	11.67	139
1961	July 1, 1961	10.80	55
1962	July 4, 1962	13.64	387
1963	July 26, 1963	18.49	1,000
1964	Apr. 13, 1964	10.75	51
1965	May 21, 1965	12.19	204
1966	Mar. 10, 1966	b11.44	74
1967	June 18, 1967	11.00	71
1968	---	d	<5
1969	Apr. 7, 1969	13.17	330
1970	June 16, 1970	f14.92	486
1971	June 29, 1971	13.92	420
1972	May 30, 1972	12.03	228
1973	Mar. 11, 1973	10.51	99
1974	---	d	<20
1975	Apr. 13, 1975	b12.10	74
1976	Mar. 23, 1976	b11.52	61
1977	June 16, 1977	11.36	169
1978	Mar. 27, 1978	b11.28	120
1979	Aug. 20, 1979	c11.18	145
1980	June 5, 1980	11.94	220

< Less than.
b Backwater from ice.
c Affected by shifting control
d Peak stage did not reach bottom of gage.
f Backwater from aquatic growth.

MINNESOTA RIVER BASIN

05301200 Minnesota River tributary near Montevideo, MN

(Site No. 80)

Location.--Lat 44°56'08", long 95°48'12", in SW¼SE¼ sec.16, T.117 N., R.41 W., Lac qui Parle County, Hydrologic Unit 07020004, at culvert on U.S. Highway 212, 0.1 mile above mouth, and 4.0 miles west of Montevideo.

Drainage area.—0.40 mi^2.

Records available.—October 1959 to September 1975.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—6.64 ft, upstream; 3.59 ft, downstream.

Bankfull stage.--Not subject to overflow.

Basin characteristics.—Main-channel length, 1.56 miles; main-channel slope, 10.3 ft per mile; mean basin altitude, 1,006 ft; forest area, 1 percent; area of lakes and swamps, 5 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	b8.91	21
1961	Mar. 25, 1961	b8.16	e0.8
1962	July 19, 1962	9.28	31
1963	June 10, 1963	7.49	4.1
1964	Apr. 12, 1964	b8.20	1.6
1965	May 23, 1965	10.20	50
1966	Mar. 3, 1966	b8.64	1.2
1967	June 14, 1967	7.27	2.0
1968	---	d	h1
1969	Apr. 7, 1969	b14.40	30
1970	June 15, 1970	10.57	58
1971	June 29, 1971	8.54	18
1972	May 23, 1972	8.39	16
1973	May 24, 1973	8.80	23
1974	Apr. 1, 1974	b7.76	0.8
1975	Apr. 26, 1975	7.43	3.5

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.
h Revised.

MINNESOTA RIVER BASIN

05302500 Little Chippewa River near Starbuck, MN

(Site No. 185)

Location.--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.

Drainage area.—69.6 mi^2. (Contributing area).
94.1 mi^2. (Total area).

Records available.—October 1978 to present. Continuous records available April 1938 to September 1939.

Gage.—Crest-stage gage on downstream wingwall of triple box culvert.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 16, 1979	12.54	(+)
1980	Apr. 1, 1980	12.09	(+)

+ Discharge not determined.

MINNESOTA RIVER BASIN

05302970 Outlet Creek tributary near Starbuck, MN

(Site No. 150)

Location (revised).--Lat 45°31'35", long 95°33'43", in NW¼NW¼ sec.27, T.127 N., R.39 W., Pope County, Hydrologic Unit 07020005, at culvert on State Highway 29, 0.2 mile above mouth, and 6.6 miles south of Starbuck.

Drainage area.--0.47 mi^2. (Contributing area)
0.57 mi^2. (Total area)

Records available.--October 1961 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--6.15 ft, upstream; 5.54 ft, downstream.

Bankfull stage.--9 ft.

Basin characteristics.--Main-channel length, 1.09 miles; main-channel slope, 51.2 ft per mile; mean basin altitude, 1,211 ft; forest area, 4 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	July 19, 1962	10.30	59
1963	---	d	<2
1964	Apr. 5, 1964	b7.26	3.3
1965	Aug. 6, 1965	8.00	17
1966	Oct. 18, 1965	7.29	7.3
1967	June 16, 1967	7.08	4.6
1968	---	d	<2
1969	Apr. 7, 1969	7.70	13
1970	May 29, 1970	8.14	19
1971	June 29, 1971	7.65	12
1972	May 27, 1972	8.15	19
1973	Mar. 11, 1973	7.41	9.0
1974	Mar. 15, 1974	b7.05	1.7
1975	June 24, 1975	8.32	22
1976	Mar. 20, 1976	7.49	10
1977	May 30, 1977	6.91	2.9
1978	June 25, 1978	7.42	9.1
1979	June 20, 1979	7.70	13
1980	June 23, 1980	7.74	13

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

MINNESOTA RIVER BASIN

05303450 Hassel Creek near Clontarf, MN

(Site No. 149)

Location.--Lat 45°24'03", long 95°34'13", in SW¼SE¼ sec.4, T.122 N., R.39 W., Swift County, Hydrologic Unit 07020005, at culvert on State Highway 29, 0.2 mile above Lake Hassel, and 5.6 miles east of Clontarf.

Drainage area.—7.53 mi^2.

Records available.--October 1961 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.60 ft, upstream; 5.04 ft, downstream.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 5.71 miles; main-channel slope, 40.4 ft per mile; mean basin altitude, 1,158 ft; forest area, 2 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	July 19, 1962	11.92	177
1963	June 3, 1963	8.41	44
1964	Oct. 20, 1963	9.70	81
1965	May 23, 1965	7.86	30
1966	Mar. 12, 1966	b8.69	38
1967	Mar. 26, 1967	b10.89	56
1968	Mar. 19, 1968	b8.26	28
1969	May 16, 1969	14.41	313
1970	Apr. 28, 1970	9.57	76
1971	Mar. 31, 1971	b10.03	61
1972	July 26, 1972	10.26	110
1973	Mar. 11, 1973	8.29	48
1974	Oct. 9, 1973	7.26	22
1975	Apr. 28, 1975	7.83	35
1976	Mar. 23, 1976	b8.41	37
1977	Mar. 12, 1977	b9.63	43
1978	June 25, 1978	c9.29	58
1979	June 20, 1979	c9.31	40
1980	June 7, 1980	c9.69	44

b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05305200 Spring Creek near Montevideo, MN

(Site No. 38)

Location.--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 above mouth, and 2.0 miles north of Montevideo.

Drainage area.—16.0 mi^2.

Records available.--October 1958 to present.

Gage.—Water-stage recorder upstream from culvert. Prior to Sept. 23, 1970, crest-stage gage at same site and datum.

Culvert invert elevations.—11.82 ft, upstream; 11.30 ft, downstream.

Bankfull stage.—14 ft.

Basin characteristics.—Main-channel length, 7.51 miles; main-channel slope, 5.68 ft per mile; mean basin altitude, 991 ft; forest area, 2 percent; area of lakes and swamps, 1 percent.

Remarks.--Recording rain gage installed Sept. 23, 1970.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Sept. 22, 1959	13.67	62
1960	Apr. 4, 1960	17.60	427
1961	Mar. 13, 1961	12.74	21
1962	July 19, 1962	18.22	492
1963	Aug. 26, 1963	13.92	99
1964	Apr. 12, 1964	13.51	69
1965	Apr. 5, 1965	15.21	203
1966	Mar. 11, 1966	b14.15	79
1967	June 14, 1967	15.14	197
1968	June 29, 1968	12.60	17
1969	Apr. 7, 1969	17.94	463
1970	June 16, 1970	13.75	86
1971	Mar. 13, 1971	14.99	185
1972	May 23, 1972	14.02	108
1973	Mar. 11, 1973	14.14	118
1974	Mar. 4, 1974	b12.97	30
1975	Apr. 26, 1975	13.07	40
1976	Mar. 23, 1976	12.53	15
1977	Mar. 12, 1977	b17.20	164
1978	Mar. 19, 1978	b15.61	116
1979	June 16, 1979	18.06	480
1980	Mar. 18, 1980	13.11	36

b Backwater from ice.

MINNESOTA RIVER BASIN

05311200 North Branch Yellow Medicine River near Ivanhoe, MN

(Site No. 75)

Location.--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.

Drainage area.—14.8 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—9.96 ft, upstream; 9.76 ft, downstream.

Bankfull stage.—12 ft.

Basin characteristics.—Main-channel length, 7.26 miles; main-channel slope, 11.8 ft per mile; mean basin altitude, 1,780 ft; forest area, 2 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	13.98	228
1961	July 31, 1961	f12.10	3.6
1962	July 1, 1962	13.66	168
1963	July 26, 1963	14.30	288
1964	Apr. 21, 1964	12.60	25
1965	Apr. 8, 1965	b15.89	431
1966	Mar. 10, 1966	b14.28	19
1967	June 15, 1967	16.0	540
1968	July 26, 1968	12.70	31
1969	Apr. 7, 1969	18.70	940
1970	June 16, 1970	14.63	158
1971	Mar. 14, 1971	b13.55	59
1972	May 30, 1972	13.87	96
1973	Mar. 11, 1973	b13.90	87
1974	Mar. 3, 1974	b13.08	24
1975	Apr. 13, 1975	b13.12	17
1976	Mar. 20, 1976	b12.64	14
1977	June 16, 1977	13.58	112
1978	May 29, 1978	c13.67	100
1979	Apr. 2, 1979	b15.00	115
1980	June 5, 1980	c15.13	150

b Backwater from ice.
c Affected by shifting control.
f Backwater from aquatic growth.

MINNESOTA RIVER BASIN

05311250 North Branch Yellow Medicine River tributary near Wilno, MN

(Site No. 77)

Location.--Lat 44°33'12", long 96°16'33", in SE¼NE¼ sec.33, T.133 N., R.45 W., Lincoln County, Hydrologic Unit 07020004, at culvert on U.S. Highway 75, 2.1 miles above mouth, and 4.3 miles northwest of Wilno.

Drainage area.—0.33 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert. Datum of gage is 1,636.33 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.—6.72 ft, upstream; 5.87 ft, downstream.

Bankfull stage.—10 ft.

Basin characteristics.—Main-channel length, 0.76 miles; main-channel slope, 87.7 ft per mile; mean basin altitude, 1,669 ft; forest area, 3 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	8.63	19
1961	July 1, 1961	10.27	50
1962	July 4, 1962	9.10	26
1963	July 26, 1963	9.23	28
1964	Apr. 13, 1964	8.71	20
1965	May 23, 1965	10.19	48
1966	July 13, 1966	8.80	21
1967	Mar. 10, 1967	7.86	6.8
1968	July 26, 1968	10.64	56
1969	Apr. 4, 1969	10.47	54
1970	June 16, 1970	9.22	28
1971	July 7, 1971	9.51	34
1972	May 1, 1972	8.18	11
1973	Mar. 11, 1973	8.28	13
1974	---	d	<2
1975	Apr. 13, 1975	b8.59	13
1976	Mar. 20, 1976	b10.20	12
1977	Mar. 12, 1977	b9.49	16
1978	Mar. 27, 1978	8.14	11
1979	June 20, 1979	8.43	15
1980	June 5, 1980	8.83	21

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

MINNESOTA RIVER BASIN

5311300 North Branch Yellow Medicine River tributary No. 2 near Porter, MN

(Site No. 78)

Location.--Lat 44°35'39", long 96°16'34", in SE¼NE¼ sec.16, T.113 N., R.45 W., Lincoln County, Hydrologic Unit 07020004, at culvert on U.S. Highway 75, 6.2 miles southwest of Porter.

Drainage area.—3.70 mi^2.

Records available.—October 1959 to September 1975.

Gage.--Crest-stage gage upstream from culvert. Datum of gage is 1,521.97 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.--12.24 ft, upstream; 11.85 ft, downstream.

Bankfull stage.--14 ft.

Basin characteristics.—Main-channel length, 2.90 miles; main-channel slope, 30.9 ft per mile; mean basin altitude, 1,524 ft; forest area, 2 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 13, 1960	14.56	111
1961	July 1, 1961	14.30	93
1962	Apr. 10, 1962	b16.79	247
1963	July 26, 1963	14.76	124
1964	Apr. 13, 1964	b14.78	92
1965	May 23, 1965	15.15	153
1966	Mar. 10, 1966	b15.76	91
1967	Mar. 10, 1967	b15.14	20
1968	July 26, 1968	14.23	64
1969	Apr. 7, 1969	16.57	212
1970	June 16, 1970	15.15	78
1971	June 29, 1971	14.61	76
1972	May 1, 1972	14.49	55
1973	May 28, 1973	14.03	66
1974	June 9, 1974	14.45	73
1975	Apr. 13, 1975	b15.54	74

b Backwater from ice.

MINNESOTA RIVER BASIN

05313800 Kandiyohi County ditch 16 near Blomkest, MN

(Site No. 35)

Location.--Lat 44°58'48", long 95°02'36", in SW¼SW¼ sec.35, T.118 N., R.35 W., Kandiyohi County, Hydrologic Unit 07020004, at culvert on U.S. Highway 71, 2.8 miles northwest of Blomkest.

Drainage area.--0.83 mi^2.

Records available.--October 1958 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.50 ft, upstream; 3.58 ft, downstream.

Bankfull stage.--13 ft.

Basin characteristics.--Main-channel length, 1.72 miles; main-channel slope, 7.75 ft per mile; mean basin altitude, 1,106 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	---	d	<5
1960	Apr. 2, 1960	7.26	51
1961	May 5, 1961	5.86	8.6
1962	Apr. 17, 1962	b8.71	49
1963	June 5, 1963	8.52	74
1964	Apr. 13, 1964	7.79	70
1965	May 15, 1965	7.78	69
1966	Mar. 11, 1966	b9.92	26
1967	July 8, 1967	9.70	57
1968	Mar. 18, 1968	6.76	33
1969	Apr. 7, 1969	8.02	34
1970	June 16, 1970	8.94	23
1971	June 29, 1971	9.15	32
1972	May 27, 1972	7.69	13

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

MINNESOTA RIVER BASIN

05314900 Redwood River at Ruthton, MN

(Site No. 31)

Location.--Lat 44°10'53", long 96°06'07", in NW¼NW¼ sec.11, T.108 N., R.44 W., Pipestone County, Hydrologic Unit 07020006, at culvert on State Highway 23, 0.3 mile north of Ruthton.

Drainage area.--6.18 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--9.87 ft, upstream; 9.50 ft, downstream.

Bankfull stage.--13 ft.

Basin characteristics.--Main-channel length, 4.91 miles; main-channel slope, 42.4 ft per mile; mean basin altitude, 1,791 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Mar. 10, 1959	b12.79	19
1960	Apr. 2, 1960	14.37	228
1961	July 5, 1961	13.23	71
1962	July 4, 1962	16.09	472
1963	July 19, 1963	14.22	204
1964	Apr. 13, 1964	13.75	126
1965	Apr. 9, 1965	14.81	330
1966	Mar. 14, 1966	b14.66	142
1967	June 7, 1967	14.86	338
1968	July 26, 1968	14.52	187
1969	Apr. 8, 1969	18.19	728
1970	June 16, 1970	14.55	191
1971	June 29, 1971	a15.25	230
1972	May 1, 1972	a14.21	82
1973	Mar. 11, 1973	b14.37	109
1974	May 12, 1974	12.19	8.8
1975	Apr. 13, 1975	b14.92	38
1976	Mar. 20, 1976	b14.41	28
1977	June 16, 1977	c14.89	148
1978	Mar. 19, 1978	b14.77	86
1979	May 10, 1979	c14.27	120
1980	June 5, 1980	c14.60	56

a Backwater from debris.
b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05315200 Prairie Ravine near Marshall, MN

(Site No. 33)

Location.--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.

Drainage area.—5.63 mi^2.

Records available.—October 1958 to present. Continuous records available March 1959 to September 1964.

Gage.—Crest-stage gage upstream from culvert. Prior to Oct. 5, 1964, water-stage recorder at same site and datum.

Culvert invert elevations.—4.24 ft, upstream; 3.86 ft, downstream.

Bankfull stage.—6 ft.

Basin characteristics.—Main-channel length, 3.85 miles; main-channel slope, 11.4 ft per mile; mean basin altitude, 1,148 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 17, 1959	4.89	2.0
1960	Apr. 4, 1960	c7.11	65
1961	May 17, 1961	c5.27	8.3
1962	Mar. 28, 1962	b7.62	75
1963	July 18, 1963	c7.30	67
1964	Apr. 28, 1964	c5.17	9.8
1965	Apr. 9, 1965	b9.84	55
1966	Mar. 14, 1966	b7.48	44
1967	June 15, 1967	6.58	47
1968	June 10, 1968	6.37	41
1969	Apr. 7, 1969	9.96	221
1970	Apr. 13, 1970	5.75	23
1971	Mar. 14, 1971	b7.51	45
1972	Mar. 16, 1972	b7.84	55
1973	Mar. 11, 1973	b6.18	26
1974	Mar. 4, 1974	b5.37	6.3
1975	Apr. 13, 1975	b6.42	19
1976	Mar. 18, 1976	b7.52	16
1977	May 17, 1977	8.70	131
1978	Mar. 13, 1978	b7.61	54
1979	June 20, 1979	c7.33	89
1980	Nov. 1, 1979	6.33	40

b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05316550 West Fork Beaver Creek near Olivia, MN

(Site No. 34)

Location.--Lat 44°50'56", long 95°01'53", in SE¼SW¼ sec.14, T.116 N., R.35 W., Renville County, Hydrologic Unit 07020004, at culvert on field road, 0.25 mile upstream from U.S. Highway 71, and 5.5 miles northwest of Olivia.

Drainage area.—12.2 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—1.46 ft, upstream; 1.28 ft, downstream.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 6.13 miles; main-channel slope, 4.57 ft per mile; mean basin altitude, 1,102 ft; forest area, 2 percent; area of lakes and swamps, 4 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 26, 1959	4.51	14
1960	Mar. 30, 1960	6.17	70
1961	Apr. 26, 1961	4.52	13
1962	Apr. 8, 1962	b7.53	98
1963	June 5, 1963	7.45	110
1964	Apr. 13, 1964	5.90	61
1965	May 15, 1965	6.80	91
1966	Mar. 11, 1966	b6.65	32
1967	June 26, 1967	7.53	352
1968	July 14, 1968	3.18	20
1969	Apr. 7, 1969	7.7	269
1970	July 13, 1970	8.34	243
1971	Mar. 31, 1971	b9.85	148
1972	May 27, 1972	6.32	87
1973	Mar. 11, 1973	5.46	30
1974	Apr. 12, 1974	c6.70	61
1975	Apr. 26, 1975	b7.49	74
1976	Mar. 20, 1976	b7.95	50
1977	Mar. 12, 1977	b8.84	68
1978	May 28, 1978	7.92	156
1979	May 10, 1979	c7.09	94
1980	May 30, 1980	c5.59	56

b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05316570 Beaver Creek at Beaver Falls, MN

Location.—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 in Beaver Falls, 2.2 miles upstream from mouth, and 3.8 miles northwest of Morton.

Drainage area.—194 mi^2.

Records available.—October 1971 to present. Miscellaneous discharge measurements 1966 to 1968.

Gage.—Crest-stage gage downstream from bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	May 30, 1972	10.03	779
1973	---	d	<500
1974	Oct. 10, 1973	9.27	531
1975	Apr. 23, 1975	b10.02	675
1976	Mar. 20, 1976	d	e250
1977	Mar. 12, 1977	b9.70	605
1978	July 22, 1978	9.84	715
1979	Apr. 3, 1979	10.68	1,060
1980	May 29, 1980	10.45	940

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

MINNESOTA RIVER BASIN

05316690 Spring Creek tributary near Sleepy Eye, MN

(Site No. 173)

Location.--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 above mouth, and 7.5 miles north of Sleepy Eye.

Drainage area.—3.69 mi^2.

Records available.--October 1965 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—2.60 ft, upstream; 1.01 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 2.95 miles; main-channel slope, 6.33 ft per mile; mean basin altitude, 1,011 ft; forest area, 1 percent; area of lakes and swamps, 6 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1966	Mar. 3, 1966	b5.49	40
1967	July 8, 1967	5.45	62
1968	July 26, 1968	3.97	20
	Sept.22, 1968		
1969	Apr. 6, 1969	7.14	117
1970	Apr. 5, 1970	b5.02	21
1971	May 31, 1971	5.56	64
1972	Mar. 20, 1972	4.71	40
1973	Mar. 11, 1973	3.41	7.5
1974	Mar. 3, 1974	b4.76	15
1975	Apr. 23, 1975	b6.31	49
1976	Mar. 20, 1976	3.74	15
1977	June 16, 1977	5.89	74
1978	Mar. 20, 1978	b4.77	28
1979	July 20, 1979	7.49	130
1980	May 29, 1980	5.38	59

b Backwater from ice.

MINNESOTA RIVER BASIN

05316700 Spring Creek near Sleepy Eye, MN

(Site No. 22)

Location.--Lat 44°24'12", long 94°44'14", in NE¼SE¼ sec.24, T.111 N., R.33 W., Brown County, Hydrologic Unit 07020007, at culvert on county highway, 4.3 miles above mouth, and 7.5 miles north of Sleepy Eye.

Drainage area.—31.3 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—7.92 ft, upstream; 7.04 ft, downstream.

Bankfull stage.—11 ft.

Basin characteristics.—Main-channel length, 15.4 miles; main-channel slope, 2.88 ft per mile; mean basin altitude, 1,012 ft; forest area, 2 percent; area of lakes and swamps, 4 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 31, 1959	10.81	149
1960	Mar. 28, 1960	13.66	416
1961	Aug. 1, 1961	10.66	139
1962	July 7, 1962	15.89	680
1963	Mar. 26, 1963	b11.25	161
1964	Apr. 13, 1964	9.61	66
1965	Apr. 10, 1965	17.79	930
1966	Mar. 3, 1966	b11.56	170
1967	Apr. 2, 1967	11.45	203
1968	July 26, 1968	11.89	241
1969	Apr. 6, 1969	15.93	683
1970	Apr. 5, 1970	9.83	83
1971	May 31, 1971	11.55	212
1972	Mar. 20, 1972	10.35	116
1973	Mar. 11, 1973	b9.36	45
1974	Aug. 9, 1974	9.06	39
1975	Apr. 24, 1975	b11.91	200
1976	Mar. 20, 1976	9.52	61
1977	June 16, 1977	c12.00	234
1978	Mar. 19, 1978	b11.56	132
1979	July 20, 1979	11.54	211
1980	May 29, 1980	12.97	345

b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05316800 Cottonwood River tributary near Balaton, MN

(Site No. 32)

Location.--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.

Drainage area.—0.91 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—4.20 ft, upstream; 3.62 ft, downstream.

Bankfull stage.—6 ft.

Basin characteristics.—Main-channel length, 1.78 miles; main-channel slope, 42.8 ft per mile; mean basin altitude, 1,648 ft; forest area, 0 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Mar. 10, 1969	b6.54	12
1960	Mar. 30, 1960	b6.87	64
1961	Mar. 14, 1961	5.24	h8.2
1962	July 4, 1962	5.73	31
1963	July 19, 1963	6.74	73
1964	Apr. 13, 1964	5.84	35
1965	Apr. 9, 1965	5.47	23
1966	Mar. 23, 1966	5.31	h12
1967	June 7, 1967	5.37	h16
1968	June 26, 1968	4.89	h1.3
1969	Apr. 6, 1969	b7.74	106
1970	June 16, 1970	5.47	23
1971	June 7, 1971	5.97	39
1972	Mar. 16, 1972	b8.09	44
1973	Mar. 11, 1973	b5.55	9.8
1974	Mar. 3, 1974	b7.06	25
1975	Apr. 13, 1975	b6.90	19
1976	Mar. 20, 1976	b7.39	18
1977	June 16, 1977	6.99	84
1978	Mar. 22, 1978	5.70	30
1979	June 19, 1979	10.84	486
1980	May 27, 1980	7.92	133

b Backwater from ice.
h Revised.

MINNESOTA RIVER BASIN

05316850 Meadow Creek tributary near Marshall, MN

(Site No. 99)

Location.--Lat 44°22'42", long 95°45'20", in SE¼NE¼ sec.34, T.111 N., R.41 W., Lyon County, Hydrologic Unit 07020008, at culvert on U.S. Highway 59, 1.2 miles above mouth, and 4.5 miles south of Marshall.

Drainage area.—0.54 mi^2.

Records available.--October 1960 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—12.10 ft, upstream; 11.44 ft, downstream.

Bankfull stage.—14 ft.

Basin characteristics.—Main-channel length, 2.08 miles; main-channel slope, 57.0 ft per mile; mean basin altitude, 1,232 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 19, 1961	b14.18	5.0
1962	May 22, 1962	13.49	1.4
1963	July 19, 1963	13.94	17
1964	June 30, 1964	14.02	24
1965	Apr. 9, 1965	14.00	22
1966	Mar. 14, 1966	b14.78	8.6
1967	Apr. 30, 1967	14.63	76
1968	July 26, 1968	13.52	1.8
1969	July 4, 1969	14.81	90
1970	Apr. 5, 1970	13.89	14
1971	June 7, 1971	15.05	112
1972	Mar. 16, 1972	b16.59	29

b Backwater from ice

MINNESOTA RIVER BASIN

05316900 Dry Creek near Jeffers, MN

(Site No. 72)

Location.--Lat 44°07'21", long 95°12'13", in NE¼NE¼ sec.31, T.108 N., R.36 W., Cottonwood County, Hydrologic Unit 07020008, at culvert on County Highway 10, 4.5 miles north of Jeffers.

Drainage area.--3.13 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert. Prior to Oct, 4, 1979, water-stage recorder at same site and datum.

Culvert invert elevations.--3.56 ft, upstream; 2.95 ft, downstream.

Bankfull stage.--5 ft.

Basin characteristics.--Main-channel length, 4.62 miles; main-channel slope, 61.4 ft per mile; mean basin altitude, 1,332 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Remarks.--Recording rain gage installed Sept. 27, 1963, discontinued Oct. 4, 1979.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 14, 1961	b5.12	26
1962	July 7, 1962	6.50	158
1963	July 19, 1963	9.96	508
1964	July 10, 1964	4.83	37
1965	Apr. 6, 1965	b10.64	400
1966	Mar. 3, 1966	b6.00	83
1967	Apr. 2, 1967	8.39	332
1968	July 26, 1968	8.66	360
1969	Oct. 17, 1968	9.36	435
1970	June 16, 1970	6.87	188
1971	May 31, 1971	6.56	163
1972	May 2, 1972	4.90	41
1973	Mar. 11, 1973	b6.28	66
1974	Apr. 12, 1974	c4.92	25
1975	Apr. 13, 1975	b7.34	71
1976	Mar. 20, 1976	b5.71	31
1977	June 16, 1977	6.86	187
1978	Mar. 18, 1978	b7.62	153
1979	Mar. 31, 1979	b9.53	162
1980	Mar. 15, 1980	b6.58	88

b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05316920 Cottonwood River tributary No. 2 near Sanborn, MN

(Site No. 74)

Location.--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.

Drainage area.—0.42 mi^2.

Records available.--October 1965 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—2.41 ft, upstream; 0.20 ft, downstream.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 1.18 miles; main-channel slope, 46.6 ft per mile; mean basin altitude, 1,144 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1966	Apr. 19, 1966	6.06	72
1967	Apr. 2, 1967	4.43	21
1968	July 26, 1968	4.58	25
1969	Oct. 17, 1968	4.82	31
1970	June 16, 1970	f5.48	44
1971	May 31, 1971	6.18	76
1972	Mar. 13, 1972	b8.59	6.7
1973	---	d	<7
1974	---	d	<12
1975	Apr. 23, 1975	4.11	14
1976	Mar. 20, 1976	b6.13	10
1977	June 16, 1977	6.84	103
1978	Mar. 20, 1978	b4.91	21
1979	Mar. 26, 1979	b6.08	25
1980	May 30, 1980	4.10	14

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
f Backwater from ice.

MINNESOTA RIVER BASIN

05316950 Cottonwood River near Springfield, MN

Location.—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 about 3.5 miles southwest of Springfield.

Drainage area.—773 mi^2.

Records available.—November 1972 to present. Annual peak for 1969 available from miscellaneous flood data collected prior to activation of station.

Gage.—Crest-stage gage located at downstream side of bridge. Zero of upper crest-stage gage is at 1,000.06 ft, National Geodetic Vertical Datum of 1929.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1969	Apr. 8, 1969	31.55	18,300
1973	Mar. 13, 1973	b20.05	1,940
1974	Apr. 15, 1974	d	e520
1975	Apr. 23, 1975	b21.11	3,050
1976	Mar. 20, 1976	20.20	1,320
1977	Mar. 12, 1977	b21.28	2,260
1978	Mar. 22, 1978	b22.52	1,920
1979	Mar. 31, 1979	c26.62	6,420
1980	Nov. 1, 1979	20.76	3,160

b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

MINNESOTA RIVER BASIN

05317845 East Branch Blue Earth River near Walters, MN

(Site No. 186)

Location.--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 wingwall of box culvert on State Highway 22, 2.5 miles northwest of Walters.

Drainage area.--29.6 mi^2.

Records available.--November 1978 to present.

Gage.--Crest-stage gage at downstream side of triple box culvert.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Aug. 21, 1979	17.35	380
1980	May 30, 1980	17.82	(+)

+ Discharge not determined.

MINNESOTA RIVER BASIN

05317850 Foster Creek near Alden, MN

(Site No. 16)

Location.--Lat 43°39'31", long 93°35'30", in NE¼NE¼ sec.9, T.102 N., R.23 W., Freeborn County, Hydrologic Unit 07020009, at culvert on U.S. Highway 16, 1.2 miles southwest of Alden.

Drainage area.--2.26 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--3.80 ft, upstream; 3.34 ft, downstream.

Bankfull stage.--6 ft.

Basin characteristics.--Main-channel length, 2.12 miles; main-channel slope, 20.1 ft per mile; mean basin altitude, 1,249 ft; forest area, 3 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	f4.55	13
1960	May 21, 1960	f6.37	112
1961	July 21, 1961	f7.55	175
1962	Oct. 10, 1961	5.83	86
1963	July 18, 1963	f5.21	24
1964	Sept.20, 1964	4.42	13
1965	Apr. 7, 1965	6.99	185
1966	Mar. 31, 1966	6.23	108
1967	June 11, 1967	7.27	152
1968	June 9, 1968	7.62	183
1969	Oct. 16, 1968	7.30	123
1970	May 14, 1970	5.02	39
1971	June 7, 1971	6.83	147
1972	July 20, 1972	5.92	46
1973	Apr. 16, 1973	5.82	85
1974	June 9, 1974	6.70	148
1975	June 30, 1975	7.40	169
1976	Mar. 12, 1976	6.11	80
1977	June 30, 1977	7.25	115
1978	June 15, 1978	7.55	137
1979	Aug. 21, 1979	c7.52	67
1980	May 30, 1980	c7.66	75

c Affected by shifting control.
f Backwater from aquatic growth.

05318000 East Branch Blue Earth River near Bricelyn, MN

Location.—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 miles upstream from Brush Creek, 3 miles downstream from South Walnut Lake, and 5 miles northeast of Bricelyn.

Drainage area.—132 mi^2.

Records available.—March 1951 to September 1970, March 1972 to present. Continuous records available March 1951 to September 1970.

Gage.—Crest-stage gage at downstream side of bridge. Datum of gage is 1,131.86 ft, National Geodetic Vertical Datum of 1929. March 1951 to September 1970 nonrecording gage at same site and datum.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1951	Apr. 7, 1951	10.68	1,320
1952	Apr. 1, 1952	9.57	776
1953	Mar. 21, 1953	7.15	231
1954	June 24, 1954	8.04	274
1955	July 8, 1955	7.12	196
1956	Apr. 1, 1956	7.04	207
1957	June 30, 1957	5.57	62
1958	Apr. 27, 1958	c5.13	56
1959	June 3, 1959	c6.37	81
1960	May 23, 1960	10.36	935
1961	May 28, 1961	9.08	502
1962	Mar. 30, 1962	10.65	1,150
1963	July 19, 1963	7.21	211
1964	May 14, 1964	6.24	128
1965	Apr. 7, 1965	11.70	1,260
1966	Apr. 3, 1966	7.70	268
1967	June 16, 1967	10.04	725
1968	July 27, 1968	9.47	469
1969	Mar. 26, 1969	b10.62	792
1970	May 29, 1970	—	e140
1973	Mar. 13, 1973	b9.40	524
1974	July 11, 1974	c9.21	432
1975	May 29, 1975	c9.94	690
1976	Mar. 12, 1976	c5.92	80
1977	June 16, 1977	5.53	74
1978	July 22, 1978	c9.85	636
1979	Aug. 21, 1979	c9.90	680
1980	May 30, 1980	c9.21	500

b Backwater from ice.
c Affected by shifting control.
e Estimated.

MINNESOTA RIVER BASIN

05318100 East Branch Blue Earth River tributary near Blue Earth, MN

(Site No. 65)

Location.--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 above mouth, and 4.3 miles east of Blue Earth.

Drainage area.—9.20 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—2.02 ft, upstream; 1.81 ft, downstream.

Bankfull stage.—4 ft.

Basin characteristics.—Main-channel length, 5.46 miles; main-channel slope, 10.5 ft per mile; mean basin altitude, 1,094 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	6.55	233
1961	June 12, 1961	6.42	222
1962	Mar. 27, 1962	b6.87	119
1963	July 19, 1963	8.57	406
1964	Apr. 13, 1964	3.79	58
1965	Apr. 6, 1965	a6.54	187
1966	June 21, 1966	a6.51	217
1967	June 8, 1967	a5.29	130
1968	June 9, 1968	9.23	468
1969	June 29, 1969	a6.65	203
1970	May 14, 1970	3.30	35
1971	Mar. 13, 1971	b5.67	107
1972	June 28, 1972	6.35	218
1973	Mar. 11, 1973	a4.73	73
1974	June 6, 1974	c4.19	52
1975	June 4, 1975	c5.51	138
1976	Mar. 12, 1976	4.53	73
1977	June 16, 1977	c3.38	16
1978	June 15, 1978	8.05	355
1979	Aug. 28, 1979	6.19	126
1980	May 30, 1980	7.32	205

a Backwater from debris.
b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05318300 Watonwan River near Delft, MN

(Site No. 70)

Location.--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.

Drainage area.--13.0 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--11.95 ft, upstream; 11.74 ft, downstream.

Bankfull stage.--15 ft.

Basin characteristics.--Main-channel length, 7.04 miles; main-channel slope, 15.7 ft per mile; mean basin altitude, 1,434 ft; forest area, 1 percent; area of lakes and swamps, 2 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	17.04	549
1961	Mar. 25, 1961	b14.91	32
1962	Apr. 9, 1962	b18.00	108
1963	July 19, 1963	f17.30	345
1964	Apr. 13, 1964	14.48	27
1965	Apr. 4, 1965	b18.42	810
1966	June 21, 1966	15.45	61
1967	Apr. 2, 1967	15.33	55
1968	July 26, 1968	17.21	565
1969	Apr. 6, 1969	17.72	865
1970	Apr. 5, 1970	b16.28	92
1971	Mar. 27, 1971	b16.42	177
1972	May 2, 1972	14.77	34
1973	May 27, 1973	14.05	18
1974	Apr. 13, 1974	c14.74	39
1975	Apr. 23, 1975	c15.09	54
1976	Mar. 20, 1976	c14.87	45
1977	June 16, 1977	c14.76	41
1978	Mar. 18, 1978	b17.78	91
1979	Mar. 29, 1979	b17.98	215
1980	May 30, 1980	c17.82	900

b Backwater from ice.
c Affected by shifting control.
f Backwater from aquatic growth.

MINNESOTA RIVER BASIN

05318897 South Fork Watonwan River near Ormsby, MN

(Site No. 187)

Location.--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 wingwall of bridge on township road, 2.6 miles north of Ormsby, 5.0 miles upstream from mouth of Willow Creek.

Drainage area.--109 mi^2.

Records available.—October 1978 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Mar. 31, 1979	b16.58	836
1980	May 31, 1980	18.40	1,410

b Backwater from ice.

MINNESOTA RIVER BASIN

05320200 Le Sueur River tributary near Mankato, MN

(Site No. 19)

Location.--Lat 44°07'29", long 93°57'33", in SE¼SW¼ sec.28, T.108 N., R.26 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 22, 0.2 mile above mouth, and 1.5 miles southeast of Mankato Airport.

Drainage area.--0.073 mi^2.

Records available.--October 1958 to present.

Gage.--Water-stage recorder upstream from culvert. Prior to Nov. 5, 1965, crest-stage gage at same site and datum.

Culvert invert elevations.--17.92 ft, upstream; 11.28 ft, downstream.

Basin characteristics.--Main-channel length, 0.35 miles; main-channel slope, 158 ft per mile; mean basin altitude, 982 ft; forest area, 0 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1969	May 30, 1959	23.72	33
1960	May 21, 1960	23.02	33
1961	May 18, 1961	22.29	32
1962	July 20, 1962	20.33	18
1963	July 18, 1963	21.11	29
1964	---	d	<1.0
1965	July 8, 1965	20.50	20
1966	Feb. 9, 1966	b21.09	16
1967	Apr. 2, 1967	19.96	14
1968	Aug. 7, 1968	24.99	36
1969	Oct. 17, 1968	19.48	8.6
1970	May 29, 1970	20.03	15
1971	July 7, 1971	22.51	61
1972	July 9, 1972	19.56	9.7
1973	May 1, 1973	19.44	8.0
1974	June 6, 1974	23.02	75
1975	Apr. 28, 1975	19.62	10
1976	Mar. 12, 1976	b20.00	9.0
1977	June 16, 1977	19.77	12
1978	Aug. 27, 1978	23.52	83
1979	Aug. 21, 1979	19.72	12
1980	Sept.21, 1980	19.56	9.6

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

MINNESOTA RIVER BASIN

05320300 Cobb River tributary near Mapleton, MN

(Site No. 18)

Location.--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 above mouth, and 6.3 miles north of Mapleton.

Drainage area.--7.25 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--12.22 ft, upstream; 11.52 ft, downstream.

Bankfull stage.--14 ft.

Basin characteristics.--Main-channel length, 4.30 miles; main-channel slope, 4.02 ft per mile; mean basin altitude, 992 ft; forest area, 4 percent; area of lakes and swamps, 4 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	18.09	258
1960	May 21, 1960	22.24	526
1961	Mar. 25, 1961	16.61	176
1962	July 7, 1962	15.67	126
1963	July 18, 1963	15.89	137
1964	Apr. 13, 1964	14.99	92
1965	Apr. 6, 1965	18.60	293
1966	Feb. 9, 1966	b14.93	71
1967	June 15, 1967	17.92	252
1968	Aug. 7, 1968	18.77	302
1969	Oct. 17, 1968	16.35	162
1970	Apr. 7, 1970	14.29	60
1971	Nov. 9, 1970	15.94	140
1972	Mar. 14, 1972	b14.57	38
1973	May 1, 1973	15.86	135
1974	June 6, 1974	19.40	343
1975	June 15, 1975	15.34	109
1976	Nov. 10, 1975	14.64	76
1977	June 16, 1977	14.86	86
1978	Apr. 18, 1978	14.59	74
1979	Mar. 30, 1979	15.53	119
1980	Apr. 5, 1980	14.86	86

b Backwater from ice.

MINNESOTA RIVER BASIN

05320400 Maple River tributary near Mapleton, MN

(Site No. 20)

Location.--Lat 43°55'18", long 94°01'17", in SE¼SW¼ sec.1, T.105 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 30, 0.9 mile above mouth, and 3.3 miles west of Mapleton.

Drainage area.—6.22 mi^2.

Records available.--October 1958 to present.

Gage.—Water-stage recorder upstream from culvert. Prior to Nov. 5, 1965, crest-stage gage at same site and datum.

Culvert invert elevations.—12.95 ft, upstream; 12.32 ft, downstream.

Bankfull stage.—14 ft.

Basin characteristics.—Main-channel length, 4.16 miles; main-channel slope, 9.30 ft per mile; mean basin altitude, 1,010 ft; forest area, 0 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	15.89	54
1960	May 21, 1960	23.26	548
1961	Mar. 25, 1961	19.58	257
1962	Aug. 31, 1962	18.08	175
1963	Oct. 9, 1962	15.61	43
1964	Sept. 7, 1964	15.64	44
1965	Apr. 6, 1965	b21.11	285
1966	Mar. 23, 1966	16.73	96
1967	June 8, 1967	19.67	381
1968	July 23, 1968	19.81	284
1969	Oct. 17, 1968	18.28	191
1970	Sept.25, 1970	15.18	38
1971	June 11, 1971	21.16	e500
1972	Oct. 30, 1971	14.71	23
1973	Mar. 14, 1973	16.81	107
1974	June 6, 1974	17.35	140
1975	June 15, 1975	18.28	189
1976	Mar. 12, 1976	b17.33	43
1977	June 16, 1977	17.74	190
1978	Apr. 6, 1978	16.91	114
1979	Aug. 21, 1979	c16.74	65
1980	May 29, 1980	c16.96	73

b Backwater from ice.
c Affected by shifting control.
e Estimated.

MINNESOTA RIVER BASIN

05320440 Judicial ditch 49 near Amboy, MN

(Site No 21)

Location.--Lat 43°53'17", long 94°07'38", in NW¼ sec.19, T.105 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, at culvert on State Highway 30, 1.6 miles east of Amboy, and 4.3 miles above mouth.

Drainage area.—18.0 mi^2.

Records available.—October 1958 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—10.07 ft, upstream; 9.87 ft, downstream.

Bankfull stage.--17 ft.

Basin characteristics.—Main-channel length, 5.30 miles; main-channel slope, 8.82 ft per mile; mean basin altitude, 1,020 ft; forest area, 2 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Mar. 30, 1959	b12.26	56
1960	May 21, 1960	19.51	1,110
1961	Mar. 26, 1961	14.06	206
1962	Aug. 31, 1962	c15.60	202
1963	July 19, 1963	c14.30	130
1964	Sept. 7, 1964	c13.59	100
1965	Apr. 6, 1965	b20.30	480
1966	June 28, 1966	13.72	144
1967	June 15, 1967	17.85	450
1968	June 19, 1968 July 23, 1968	16.92	288
1969	Oct. 9, 1968 Oct. 17, 1968	15.83	314
1970	June 16, 1970	13.88	133
1971	Mar. 27, 1971	14.25	207
1972	June 8, 1972	c13.19	84

b Backwater from ice.
c Affected by shifting control.

MINNESOTA RIVER BASIN

05320480 Maple River near Rapidan, MN

Location.—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.

Drainage area.—343 mi^2 (revised).

Records available.—November 1971 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1972	---	d	<1,400
1973	Mar. 14, 1973	8.07	2,760
1974	Mar. 3, 1974	b8.60	2,670
1975	June 15, 1975	7.40	2,090
1976	Mar. 14, 1976	d	e900
1977	Mar. 12, 1977	b7.82	510
1978	Apr. 7, 1978	b7.75	1,460
1979	Apr. 1, 1979	b8.93	2,600
1980	May 30, 1980	i10.76	(+)

< Less than.
+ Discharge not determined.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.
i Datum change.

MINNESOTA RIVER BASIN

05325100 Minnesota River tributary near North Mankato, MN

(Site No. 107)

Location.--Lat 44°14'31", long 94°01'42", in SW¼SW¼ sec.13, T.109 N., R.27 W., Nicollet County, Hydrologic Unit 07020007, at culvert on county road, 200 ft above U.S. Highway 169, 0.4 mile above mouth, and 4.2 miles north of North Mankato.

Drainage area.--0.21 mi^2.

Records available.--October 1960 to September 1967.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--2.61 ft, upstream; 0.04 ft, downstream.

Bankfull stage.--9 ft.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 18, 1961	8.08	154
1962	May 23, 1962	5.56	61
1963	---	d	<25
1964	Sept. 7, 1964	4.13	23
1965	Apr. 6, 1965	b5.43	43
1966	Feb. 9, 1966	4.81	39
1967	Apr. 30, 1967	10.28	e792

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

MINNESOTA RIVER BASIN

05326100 Middle Branch Rush River near Gaylord, MN

(Site No. 188)

Location.--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.

Drainage area.--68.5 mi^2.

Records available.--November 1978 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 2, 1979	b21.00	715
1980	June 7, 1980	12.28	128

b Backwater from ice.

MINNESOTA RIVER BASIN

05330150 Sand Creek tributary near Montgomery, MN

(Site No. 106)

Location.--Lat 44°25'41", long 93°30'31", in NE¼NE¼ sec.18, T.111 N., R.22 W., Rice County, Hydrologic Unit 07020012, at culvert on State Highway 21, 3.5 miles east of Montgomery.

Drainage area.--0.36 mi^2.

Records available.--October 1960 to present.

Gage.--Crest-stage gage upstream from culvert. Datum of gage is 1,097.3 ft, National Geodetic Vertical Datum of 1929 (4th-order levels by Topographic Division).

Culvert invert elevations.--6.50 ft, upstream; 5.49 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 0.90 miles; main-channel slope, 68.7 ft per mile; mean basin altitude, 1,126 ft; forest area, 6 percent; area of lakes and swamps, 6 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	Mar. 25, 1961	8.21	16
1962	May 12, 1962	8.68	25
1963	July 18, 1963	8.11	14
1964	Sept. 8, 1964	8.75	27
1965	Apr. 6, 1965	b10.50	43
1966	Feb. 9, 1966	b9.14	15
1967	Apr. 2, 1967	8.86	29
1968	July 13, 1968	8.97	31
1969	Apr. 3, 1969	8.61	23
1970	Apr. 20, 1970	8.87	29
1971	Mar. 31, 1971	b9.14	24
1972	Mar. 18, 1972	b9.69	10
1973	Sept.26, 1973	7.86	10
1974	Mar. 6, 1974	b8.80	18
1975	Apr. 28, 1975	8.88	29
1976	Mar. 20, 1976	7.44	4.2
1977	July 24, 1977	7.97	12
1978	Mar. 21, 1978	b9.38	21
1979	Aug. 21, 1979	11.01	82
1980	Oct. 31, 1979	8.06	13

b Backwater from ice.

MINNESOTA RIVER BASIN

05330200 Rice Lake tributary near Montgomery, MN

(Site No. 105)

Location.--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 above Rice Lake, and 2.5 miles east of Montgomery.

Drainage area.—3.16 mi^2.

Records available.—October 1960 to present. Annual peak for 1960 available from miscellaneous flood data collected prior to activation of station.

Gage.--Crest-stage gage upstream from culvert. Datum of gage is 1,057.4 ft, National Geodetic Vertical Datum of 1929 (4th-order levels by Topographic Division).

Culvert invert elevations.—4.45 ft, upstream; 3.84 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 2.40 miles; main-channel slope, 10.0 ft per mile; mean basin altitude, 1,073 ft; forest area, 6 percent; area of lakes and swamps, 12 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	13.72	279
1961	May 18, 1961	6.67	33
1962	May 12, 1962	7.88	76
1963	Mar. 23, 1963	b6.13	10
1964	Sept. 8, 1964	6.12	18
1965	Apr. 6, 1965	b10.96	114
1966	Feb. 9, 1966	6.66	33
1967	Mar. 24, 1967	b8.16	67
1968	May 16, 1968	6.01	16
1969	Apr. 3, 1969	7.60	65
1970	Apr. 20, 1970	6.46	27
1971	Mar. 14, 1971	8.33	91
1972	July 26, 1972	7.37	57
1973	Sept.26, 1973	7.68	67
1974	June 6, 1974	7.85	74
1975	Apr. 28, 1975	7.94	77
1976	Mar. 20, 1976	b6.83	29
1977	Sept.23, 1977	7.04	45
1978	Mar. 21, 1978	b7.33	41
1979	Aug. 21, 1979	8.94	113
1980	Mar. 18, 1980	b7.43	35

b Backwater from ice.

MINNESOTA RIVER BASIN

05330300 Sand Creek near New Prague, MN

(Site No. 104)

Location.--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 Highways 13 and 19, 1.9 miles east of New Prague.

Drainage area.--62.4 mi^2.

Records available.--October 1960 to present. Annual peak for 1960 available from miscellaneous flood data collected prior to activation of station.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--8.12 ft, upstream; 7.74 ft, downstream.

Bankfull stage.--11 ft.

Basin characteristics.--Main-channel length, 17.8 miles; main-channel slope, 5.97 ft per mile; mean basin altitude, 1,040 ft; forest area, 6 percent; area of lakes and swamps, 11 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	14.84	1,100
1961	Mar. 25, 1961	b10.39	204
1962	Oct. 11, 1961	9.32	84
1963	Mar. 23, 1963	b9.85	54
1964	Sept.10, 1964	9.14	64
1965	Apr. 8, 1965	14.79	1,070
1966	Mar. 4, 1966	b11.54	325
1967	Apr. 3, 1967	10.85	294
1968	---	d	<140
1969	Apr. 3, 1969	12.26	540
1970	Apr. 21, 1970	10.20	197
1971	Mar. 31, 1971	b13.89	665
1972	Mar. 21, 1972	b10.94	247
1973	May 1, 1973	10.06	177
1974	June 7, 1974	10.68	268
1975	Apr. 28, 1975	c11.41	420
1976	Mar. 12, 1976	b10.30	144
1977	Apr. 2, 1977	9.34	86
1978	Mar. 22, 1978	b10.78	167
1979	Apr. 3, 1979	12.46	575
1980	Mar. 18, 1980	b10.60	143

< Less than.
b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.

MINNESOTA RIVER BASIN

05330550 Raven Stream tributary near New Prague, MN

(Site No. 109)

Location.--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 above mouth, and 2.3 miles northwest of New Prague.

Drainage area.--22.1 mi^2.

Records available.--October 1960 to present. Annual peak for 1960 available from miscellaneous flood data collected prior to activation of station.

Gage.--Water-stage recorder upstream from culvert.

Culvert invert elevations.--8.32 ft, upstream; 7.91 ft, downstream.

Bankfull stage.--13 ft.

Basin characteristics.--Main-channel length, 10.4 miles; main-channel slope, 10.0 ft per mile; mean basin altitude, 978 ft; forest area, 8 percent; area of lakes and swamps, 10 percent.

Remarks.--Recording rain gage installed Mar. 30, 1965.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	17.34	929
1961	May 18, 1961	11.05	161
1962	May 23, 1962	10.57	126
1963	Mar. 23, 1963	9.86	73
1964	June 7, 1964	10.38	112
1965	Apr. 7, 1965	14.74	505
1966	Mar. 4, 1966	11.22	163
1967	June 16, 1967	12.26	249
1968	July 13, 1968	9.73	61
1969	Apr. 3, 1969	13.06	325
1970	Apr. 20, 1970	10.51	122
1971	Mar. 31, 1971	11.82	211
1972	Mar. 18, 1972	b13.09	192
1973	May 1, 1973	10.53	113
1974	June 7, 1974	11.44	180
1975	Apr. 28, 1975	12.14	240
1976	Mar. 12, 1976	b10.99	110
1977	Mar. 12, 1977	b12.25	94
1978	June 16, 1978	10.35	101
1979	Aug. 24, 1979	12.88	308
1980	Mar. 16, 1980	11.42	140

b Backwater from ice.

MINNESOTA RIVER BASIN

05330600 Sand Creek tributary No. 2 near Jordan, MN

(Site No. 110)

Location.--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 above mouth, and 2.8 miles south of Jordan.

Drainage area.--2.62 mi^2.

Records available.--October 1960 to present. Annual peak for 1960 available from miscellaneous flood data collected prior to activation of station.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--11.08 ft, upstream; 10.36 ft, downstream.

Bankfull stage.--12 ft.

Basin characteristics.--Main-channel length, 1.64 miles; main-channel slope, 30.9 ft per mile; mean basin altitude, 939 ft; forest area, 2 percent; area of lakes and swamps, 6 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	19.66	558
1961	July 1, 1961	13.27	72
1962	May 23, 1962	13.02	51
1963	Mar. 23, 1963	b12.60	21
1964	---	d	<10
1965	Apr. 7, 1965	b16.77	106
1966	Apr. 1, 1966	13.46	85
1967	Mar. 24, 1967	14.35	143
1968	July 13, 1968	13.31	75
1969	Mar. 23, 1969	13.17	64
1970	Apr. 20, 1970	12.77	37
1971	Mar. 31, 1971	13.55	91
1972	Mar. 18, 1972	b13.19	34
1973	Mar. 14, 1973	12.56	29
1974	June 6, 1974	13.79	107
1975	Apr. 28, 1975	12.76	37
1976	Mar. 12, 1976	12.45	26
1977	Mar. 12, 1977	b12.48	18
1978	Aug. 27, 1978	13.29	73
1979	Mar. 30, 1979	13.46	85
1980	Mar. 16, 1980	b12.92	33

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

ST. CROIX RIVER BASIN

05336200 Glaisby Brook near Kettle River, MN

(Site No. 93)

Location.--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.

Drainage area.--24.2 mi^2.

Records available.--October 1959 to present. Continuous records available October 1959 to September 1970.

Gage.--Water-stage recorder upstream from bridge. Altitude of gage is 1,105 ft (from topographic map).

Basin characteristics.--Main-channel length, 12.2 miles; main-channel slope, 11.5 ft per mile; mean basin altitude, 1,180 ft; forest area, 80 percent; area of lakes and swamps, 17 percent.

Remarks.--Recording rain gage installed Mar. 25, 1965.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 25, 1960	4.37	204
1961	May 16, 1961	4.83	301
1962	May 23, 1962	6.17	476
1963	June 11, 1963	3.81	115
1964	May 7, 1964	5.57	406
1965	Apr. 18, 1965	8.42	813
1966	June 4, 1966	7.27	636
1967	June 15, 1967	8.30	794
1968	Apr. 24, 1968	4.75	270
1969	Apr. 13, 1969	c7.21	614
1970	Apr. 25, 1970	4.97	320
1971	Apr. 11, 1971	7.65	770
1972	July 22, 1972	10.18	1,370
1973	Mar. 15, 1973	b4.37	162
1974	Apr. 17, 1974	5.65	398
1975	Apr. 23, 1975	8.11	865
1976	Apr. 3, 1976	5.83	428
1977	Sept.26, 1977	4.52	228
1978	Aug. 24, 1978	c5.25	286
1979	May 10, 1979	9.02	1,080
1980	Sept. 5, 1980	5.35	350

b Backwater from ice.
c Affected by shifting control.

ST. CROIX RIVER BASIN

05336300 Moose River tributary at Moose Lake, MN

(Site No. 92)

Location.--Lat 46°27'17", long 92°47'14", in SE¼NE¼ sec.19, T.46 N., R.19 W., Carlton County, Hydrologic Unit 07030003, at culvert on State Highway 27, 0.9 mile above mouth, and 1.2 miles west of Moose Lake.

Drainage area.--1.23 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.92 ft, upstream; 5.84 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.--Main-channel length, 1.37 miles; main-channel slope, 30.4 ft per mile; mean basin altitude, 1,142 ft; forest area, 19 percent; area of lakes and swamps, 3 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 24, 1960	7.81	27
1961	May 15, 1961	8.60	64
1962	May 23, 1962	9.68	112
1963	June 10, 1963	7.54	17
1964	Sept. 7, 1964	9.87	118
1965	Apr. 13, 1965	b11.52	104
1966	Oct. 20, 1965	8.58	64
1967	June 14, 1967	12.11	208
1968	Apr. 23, 1968	8.33	61
1969	Oct. 17, 1968	8.89	83
1970	May 25, 1970	9.71	112
1971	Apr. 11, 1971	9.18	94
1972	July 22, 1972	13.26	479
1973	May 24, 1973	7.65	31
1974	Oct. 12, 1973	8.40	64
1975	Apr. 21, 1975	c8.70	70
1976	July 19, 1976	c8.02	37
1977	Sept.24, 1977	c8.67	67
1978	Aug. 23, 1978	c8.31	52
1979	May 10, 1979	12.95	315
1980	Mar. 30, 1980	b8.88	15

b Backwater from ice.
c Affected by shifting control.

ST. CROIX RIVER BASIN

05336550 Wolf Creek tributary near Sandstone, MN

(Site No. 91)

Location.--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 above mouth, and 2.2 miles north of Sandstone.

Drainage area.--5.64 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--14.25 ft, upstream; 13.85 ft, downstream.

Bankfull stage.--16 ft.

Basin characteristics.--Main-channel length, 3.00 miles; main-channel slope, 12.4 ft per mile; mean basin altitude, 1,100 ft; forest area, 16 percent; area of lakes and swamps, 58 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	b15.80	15
1961	May 14, 1961	15.56	22
1962	May 23, 1962	17.80	121
1963	Mar. 24, 1963	b15.27	7.1
1964	May 6, 1964	16.24	51
1965	Apr. 15, 1965	19.20	200
1966	Apr. 4, 1966	17.06	86
1967	June 19, 1967	17.43	104
1968	June 20, 1968	15.71	33
1969	Oct. 17, 1968	17.87	125
1970	Apr. 19, 1970	15.57	28
1971	Apr. 8, 1971	b16.92	79
1972	July 22, 1972	19.68	224
1973	May 24, 1973	15.70	33
1974	Oct. 12, 1973	16.94	84
1975	June 29, 1975	17.69	115
1976	Mar. 31, 1976	b17.47	44
1977	Sept.24, 1977	c15.94	14
1978	July 7, 1978	c16.66	47
1979	May 10, 1979	20.03	240
1980	Apr. 1, 1980	c15.77	15

b Backwater from ice.
c Affected by shifting control.

ST. CROIX RIVER BASIN

05336600 Kettle River tributary at Sandstone, MN

(Site No. 90)

Location.--Lat 46°08'46", long 92°51'57", in SE¼SE¼ sec.4, T.42 N., R.20 W., Pine County, Hydrologic Unit 07030003, at culvert on U.S. Highway 61 at Sandstone, and 0.2 mile above mouth.

Drainage area.--0.65 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--5.88 ft, upstream; 4.22 ft, downstream.

Bankfull stage.--7 ft.

Basin characteristics.--Main-channel length, 1.40 miles; main-channel slope, 32.4 ft per mile; mean basin altitude, 1,117 ft; forest area, 11 percent; area of lakes and swamps, 28 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Apr. 4, 1960	b7.26	6.7
1961	May 15, 1961	6.94	6.3
1962	May 23, 1962	7.45	16
1963	Mar. 24, 1963	b6.97	3.1
1964	May 6, 1964	7.48	17
1965	Apr. 15, 1965	10.11	84
1966	Apr. 4, 1966	8.74	45
1967	June 14, 1967	7.99	28
1968	June 20, 1968	f7.05	6.5
1969	Apr. 9, 1969	8.22	32
1970	Apr. 19, 1970	7.63	21
1971	Apr. 8, 1971	b7.60	15
1972	July 22, 1972	8.22	32
1973	Mar. 12, 1973	b7.53	7.8
1974	Oct. 12, 1973	7.72	22
1975	Apr. 16, 1975	b9.20	32
1976	Mar. 31, 1976	b8.22	16
1977	Aug. 31, 1977	7.78	24
1978	July 7, 1978	7.52	18
1979	May 10, 1979	8.89	48
1980	Sept. 5, 1980	d	e6

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.
f Backwater from aquatic growth.

ST. CROIX RIVER BASIN

05338200 Mission Creek near Hinckley, MN

(Site No. 89)

Location.--Lat 45°59'52", long 92°56'44", in SW¼SW¼ sec.25, T.41 N., R.21 W., Pine County, Hydrologic Unit 07030004, at culvert on U.S. Highway 23, 1.2 miles south of Hinckley.

Drainage area.—3.84 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert. Datum of gage is 990.04 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.—11.88 ft, upstream; 11.08 ft, downstream.

Bankfull stage.--16 ft.

Basin characteristics.—Main-channel length, 3.16 miles; main-channel slope, 12.7 ft per mile; mean basin altitude, 1,020 ft; forest area, 17 percent; area of lakes and swamps, 20 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	b14.28	45
1961	May 15, 1961	13.13	28
1962	May 23, 1962	14.69	121
1963	Mar. 24, 1963	b13.66	21
1964	May 6, 1964	13.63	52
1965	Apr. 15, 1965	14.96	143
1966	Apr. 4, 1966	b15.38	98
1967	Mar. 31, 1967	14.15	82
1968	June 20, 1968	13.88	65
1969	Apr. 9, 1969	15.03	146
1970	Apr. 19, 1970	15.15	158
1971	Mar. 31, 1971	b15.72	56
1972	July 22, 1972	15.39	217
1973	Nov. 2, 1973	13.10	26
1974	Oct. 12, 1973	14.70	122
1975	Apr. 16, 1975	b14.56	76
1976	Mar. 31, 1976	b15.03	45
1977	Sept.24, 1977	13.31	34
1978	July 7, 1978	14.84	133
1979	May 10, 1979	14.93	143
1980	Sept. 5, 1980	13.47	42

b Backwater from ice.

VERMILLION RIVER BASIN

05345900 Vermillion River tributary near Hastings, MN

(Site No. 81)

Location.--Lat 44°43'19", long 92°56'03", in NE¼SE¼ sec.35, T.115 N., R.18 W., Dakota County, Hydrologic Unit 07040001, at culvert on county highway, 2.0 miles above mouth, and 4.1 miles west of Hastings.

Drainage area.--14.3 mi^2. (Contributing area)
22.5 mi^2. (Total area)

Records available.--October 1959 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--14.33 ft, upstream; 13.96 ft, downstream.

Basin characteristics.--Main-channel length, 7.96 miles; main-channel slope, 5.53 ft per mile; mean basin altitude, 838 ft; forest area, 2 percent; area of lakes and swamps, 16 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Dec. 28, 1959	b15.44	8.0
1961	Mar. 25, 1961	15.62	20
1962	Apr. 3, 1962	b18.50	37
1963	Mar. 15, 1963	15.51	15
1964	Mar. 13, 1964	b15.59	6.2
1965	Apr. 6, 1965	21.95	544
1966	Mar. 4, 1966	21.28	310
1967	Mar. 24, 1967	b21.21	228
1968	---	d	<1
1969	Apr. 3, 1969	16.15	44
1970	Mar. 3, 1970	b15.70	<5
1971	Mar. 31, 1971	b15.89	23
1972	Mar. 18, 1972	16.66	65

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

CANNON RIVER BASIN

05352700 Turtle Creek tributary No. 2 near Pratt, MN

(Site No. 62)

Location.--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 above mouth, and 1.7 miles southeast of Pratt.

Drainage area.--1.26 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--14.27 ft, upstream; 13.70 ft, downstream.

Bankfull stage.--16 ft.

Basin characteristics.--Main-channel length, 1.73 miles; main-channel slope, 36.2 ft per mile; mean basin altitude, 1,252 ft; forest area, 3 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	18.09	135
1961	May 31, 1961	19.79	220
1962	Apr. 30, 1962	15.75	32
1963	July 19, 1963	15.89	37
1964	Apr. 21, 1964	a15.04	7.3
1965	July 8, 1965	18.97	185
1966	Mar. 4, 1966	b16.28	40
1967	June 15, 1967	16.93	79
1968	July 23, 1968	16.71	70
1969	June 29, 1969	16.42	57
1970	May 14, 1970	16.97	81
1971	June 11, 1971	19.40	210
1972	Sept.25, 1972	15.56	26
1973	Mar. 11, 1973	16.72	70
1974	Apr. 3, 1974	16.23	49
1975	Apr. 28, 1975	16.70	69
1976	Mar. 12, 1976	b15.98	33
1977	Mar. 12, 1977	b16.53	11
1978	July 17, 1978	20.48	211
1979	Aug. 28, 1979	17.90	(+)
1980	Nov. 5, 1979	15.25	(+)

+ Discharge not determined.
a Backwater from debris.
b Backwater from ice.

CANNON RIVER BASIN

0535280 Turtle Creek tributary near Steele Center, MN

(Site No. 61)

Location.--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 above mouth, and 1.6 miles northeast of Steele Center.

Drainage area.—5.01 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—3.33 ft, upstream; 2.81 ft, downstream.

Bankfull stage.--10 ft.

Basin characteristics.—Main-channel length, 4.62 miles; main-channel slope, 16.4 ft per mile; mean basin altitude, 1,226 ft; forest area, 2 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	9.10	206
1961	May 31, 1961	12.20	369
1962	Aug. 31, 1962	6.42	71
1963	July 19, 1963	4.64	27
1964	Sept. 7, 1964	6.18	79
1965	July 8, 1965	9.53	228
1966	Mar. 4, 1966	6.32	84
1967	June 12, 1967	7.04	114
1968	July 23, 1968	5.35	45
1969	June 29, 1969	5.73	58
1970	July 29, 1970	5.40	45
1971	June 11, 1971	11.64	344
1972	Sept.25, 1972	5.75	59
1973	May 1, 1973	9.61	235
1974	June 3, 1974	6.71	97
1975	June 12, 1975	6.41	85
1976	Mar. 12, 1976	b5.79	52
1977	---	d	e6.0
1978	July 22, 1978	6.97	109
1979	Mar. 30, 1979	b8.12	139
1980	Sept.21, 1980	4.63	17

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

CANNON RIVER BASIN

05355024 Cannon River at Northfield, MN

Location.—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.

Drainage area.—934 mi^2.

Records available.—October 1979 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1980	Mar. 19, 1980	904.28	4,900

CANNON RIVER BASIN

05355100 Little Cannon River tributary near Kenyon, MN

(Site No. 88)

Location.--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 above mouth, and 5.3 miles north of Kenyon.

Drainage area.--2.20 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert. Datum of gage is 1,026.0 ft, National Geodetic Vertical Datum of 1929 (4th-order levels by Topographic Division). Prior to October 18, 1966, water-stage recorder at same site and datum.

Culvert invert elevations.--10.28 ft, upstream; 6.75 ft, downstream.

Bankfull stage.--15 ft.

Basin characteristics.--Main-channel length, 2.58 miles; main-channel slope, 53.4 ft per mile; mean basin altitude, 1,090 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	June 23, 1960	18.51	714
1961	Mar. 27, 1961	13.28	162
1962	Aug. 31, 1962	14.56	270
1963	Mar. 15, 1963	b12.52	18
1964	Sept. 9, 1964	12.04	74
1965	July 13, 1965	14.68	280
1966	Mar. 3, 1966	b15.49	264
1967	Mar. 24, 1967	b15.08	186
1968	May 15, 1968	20.84	1,040
1969	Oct. 17, 1968	13.95	217
1970	May 30, 1970	12.83	128
1971	July 12, 1971	13.34	167
1972	June 14, 1972	13.63	190
1973	July 2, 1973	13.82	205
1974	June 3, 1974	12.72	121
1975	June 12, 1975	14.10	229
1976	Mar. 20, 1976	b12.49	84
1977	---	d	e30
1978	July 1, 1978	17.33	561
1979	Aug. 28, 1979	15.62	372
1980	Mar. 19, 1980	b13.25	89

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

CANNON RIVER BASIN

05355150 Pine Creek near Cannon Falls, MN

(Site No. 83)

Location.--Lat 44°32'27", long 92°53'40", in NE¼NE¼ sec.6, T.112 N., R.17 W., Goodhue County, Hydrologic Unit 07040002, at culvert on State Highway 20, 2.0 miles above mouth, and 2.1 miles north of Cannon Falls.

Drainage area.—20.2 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert. Prior to Oct. 16, 1964, water-stage recorder at same site and datum.

Culvert invert elevations.—0.81 ft, upstream; 0.18 ft, downstream.

Bankfull stage.—4 ft.

Basin characteristics.—Main-channel length, 9.20 miles; main-channel slope, 12.8 ft per mile; mean basin altitude, 906 ft; forest area, 1 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 27, 1960	1.70	40
1961	Mar. 20, 1961	1.65	36
1962	May 12, 1962	2.78	133
1963	Mar. 16, 1963	1.41	21
1964	Sept. 9, 1964	c1.14	6.3
1965	Apr. 8, 1965	7.54	844
1966	Mar. 4, 1966	5.63	519
1967	Mar. 24, 1967	5.03	428
1968	May 15, 1968	4.92	412
1969	Apr. 3, 1969	3.24	187
1970	May 28, 1970	2.24	81
1971	Mar. 31, 1971	3.62	232
1972	Mar. 18, 1972	3.58	228
1973	Mar. 7, 1973	3.49	216
1974	Mar. 4, 1974	2.41	96
1975	Apr. 28, 1975	4.14	300
1976	Mar. 12, 1976	b3.94	211
1977	Apr. 21, 1977	1.80	46
1978	July 1, 1978	2.55	110
1979	Mar. 24, 1979	3.23	186
1980	Mar. 18, 1980	3.95	275

b Backwater from ice.
c Affected by shifting control.

CANNON RIVER BASIN

05355200 Cannon River at Welch, MN

Location.--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 at Welch, and 1.8 miles upstream from Belle Creek.

Drainage area.--1,320 mi^2.

Records available.--June 1909 to January 1914 (no winter records 1909-11), November 1930 to Septermber 1971, October 1973 to present. Continuous records available June 1909 to January 1914, November 1930 to September 1971.

Gage.--Water-stage recorder. Datum of gage is 699.16 ft, National Geodetic Vertical Datum of 1929. Prior to November 11, 1930, nonrecording gage on highway bridge at site 0.3 mile upstream, at datum 3.00 ft lower. November 11, 1920 to October 11, 1938, water-stage recorder at site 0.3 mile upstream at present datum.

Remarks.--Maximum stage known 17.1 ft, present datum, in April 1888, from floodmark at mill about 2,400 ft upstream.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1911	June 4, 1911	6.9	701
1912	Oct. 17, 1911	12.85	5,300
1913	Mar. 24, 1913	10.4	3,120
1931	June 24, 1931	4.92	1,190
1932	Apr. 7, 1932	---	4,270
1933	Jan. 22, 1933	11.44	10,500
1934	Apr. 3, 1934	7.38	3,980
1935	Aug. 8, 1935	8.22	4,290
1936	Mar. 23, 1936	17.04	11,300
1937	Mar. 4, 1937	b7.24	2,690
1938	Sept.10, 1938	8.55	5,940
1939	Mar. 23, 1939	11.14	10,800
1940	July 11, 1940	---	2,330
1941	Mar. 29, 1941	8.33	5,510
1942	Sept.18, 1942	9.99	8,230
1943	Mar. 27, 1943	8.76	6,240
1944	May 4, 1944	10.85	9,980
1945	Mar. 14, 1945	10.33	8,840
1946	Mar. 14, 1946	7.52	4,470
1947	Apr. 11, 1947	8.68	6,090
1948	Mar. 20, 1948	b11.77	9,050
1949	Mar. 24, 1949	8.11	5,230
1950	Mar. 27, 1950	10.17	9,200
1951	July 21, 1951	11.68	14,600
1952	Apr. 2, 1952	12.00	15,800

b Backwater from ice.

05355200 Cannon River at Welch, MN--Continued

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1953	July 25, 1953	7.44	4,200
1954	June 20, 1954	11.30	13,200
1955	July 8, 1955	9.59	8,150
1956	Apr. 3, 1956	7.28	4,800
1957	Aug. 14, 1957	8.11	5,840
1958	June 4, 1958	7.27	4,780
1959	June 26, 1959	6.80	4,220
1960	May 23, 1960	10.16	9,420
1961	Mar. 26, 1961	7.47	5,020
1962	Mar. 30, 1962	9.20	6,900
1963	July 16, 1963	4.67	1,780
1964	Sept. 9, 1964	4.50	1,660
1965	Apr. 8, 1965	14.01	36,100
1966	Feb. 10, 1966	b13.93	20,800
1967	Mar. 25, 1967	10.58	10,000
1968	July 14, 1968	6.75	3,380
1969	Apr. 5, 1969	10.29	9,370
1970	May 28, 1970	9.92	6,480
1971	Apr. 1, 1971	9.03	6,700
1972	Mar. 20, 1972	6.63	3,490
1973	May 3, 1973	10.71	10,500
1974	Apr. 6, 1974	6.52	3,390
1975	Apr. 29, 1975	9.23	7,000
1976	Mar. 12, 1976	6.91	3,780
1977	Mar. 12, 1977	4.41	1,590
1978	July 1, 1978	10.80	10,600
1979	Aug. 30, 1979	9.60	7,700
1980	Mar. 20, 1980	10.37	9,350

b Backwater from ice.

CANNON RIVER BASIN

05355230 Cannon River tributary near Welch, MN

(Site No. 84)

Location.--Lat 44°36'04", long 92°42'34", in SW¼SW¼ sec.11, T.113 N., R.16 W., Goodhue County, Hydrologic Unit 07040002, at culvert on U.S. Highway 61, 1.2 miles above mouth, and 2.7 miles northeast of Welch.

Drainage area.—0.05 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—6.66 ft, upstream; 2.34 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 0.26 miles; main-channel slope, 140 ft per mile; mean basin altitude, 1,034 ft; forest area, 4 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	July 2, 1960	8.43	18
1961	Apr. 15, 1961	8.13	14
1962	May 12, 1962	8.32	14
1963	Mar. 16, 1963	b8.85	8.0
1964	May 25, 1964	10.15	49
1965	July 8, 1965	11.13	80
1966	Mar. 31, 1966	9.15	27
1967	Apr. 2, 1967	8.38	15
1968	May 15, 1968	10.15	48
1969	Apr. 3, 1969	8.24	13
1970	June 13, 1970	9.87	42
1971	June 29, 1971	7.70	6.1
1972	July 23, 1972	9.91	43
1973	Mar. 6, 1973	b10.33	22
1974	June 20, 1974	9.27	30
1975	Aug. 23, 1975	10.07	47
1976	Mar. 12, 1976	---	g3
1977	Mar. 11, 1977	b8.09	5
1978	June 25, 1978	10.20	50
1979	Aug. 29, 1979	8.34	15
1980	May 30, 1980	10.24	51

b Backwater from ice.
g Estimated; gage height unknown.

ZUMBRO RIVER BASIN

05372800 South Fork Zumbro River on Belt Line at Rochester, MN

Location.—Lat 44°00'26", long 92°28'19", in SE¼SW¼ sec.2, T.106 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, on west-bound lane of U.S. Highway 14 at Rochester, and 1.5 miles upstream from Bear Creek.

Drainage area.—155 mi^2.

Records available.—July 1968 to present.

Gage.--Crest-stage gage at downstream side of highway bridge. Datum of gage is 994.63 ft, National Geodetic Vertical Datum of 1929.

Bankfull stage.—2.0 ft.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1969	---	d	<2,500
1970	May 28, 1970	998.20	2,520
1971	Mar. 31, 1971	997.99	2,200
1972	Mar. 15, 1972	b995.81	645
1973	Mar. 10, 1973	1001.78	6,020
1974	Apr. 4, 1974	999.18	3,160
1975	Apr. 28, 1975	997.22	1,680
1976	Mar. 12, 1976	998.47	2,570
1977	June 16, 1977	995.28	640
1978	July 6, 1978	1,005.97	20,500
1979	Aug. 29, 1979	996.84	1,450
1980	Mar. 15, 1980	b998.74	1,100

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

ZUMBRO RIVER BASIN

05372930 Bear Creek on Belt Line at Rochester, MN

Location.—Lat 44°00'29", long 92°26'44", in SW¼SE¼ sec.1, T.106 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, at bridge on westbound lane of U.S. Highway 14 at Rochester, and 1.2 miles upstream from mouth.

Drainage area.—80 mi^2.

Records available.—July 1968 to present.

Gage.—Crest-stage gage at downstream side of highway bridge. Datum of gage is 993.74 ft, National Geodetic Vertical Datum of 1929.

Bankfull stage.—5.0 ft.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1969	Apr. 4, 1969	997.50	870
1970	——	d	e650
1971	Mar. 31, 1971	997.16	780
1972	Mar. 15, 1972	996.74	670
1973	Mar. 10, 1973	1000.11	1,870
1974	June 21, 1974	1003.39	5,800
1975	Apr. 28, 1975	996.90	718
1976	Mar. 12, 1976	1000.41	2,240
1977	June 16, 1977	995.40	350
1978	July 6, 1978	1,007.87	24,900
1979	Aug. 29, 1979	c997.98	930
1980	Mar. 15, 1980	c999.11	1,075

c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

ZUMBRO RIVER BASIN

05372950 Silver Creek at Rochester, MN

Location.—Lat 44°01'44", long 92°25'44", near center of sec.31, T.107 N., R.13 W., Olmsted County, Hydrologic Unit 07040004, at bridge on county highway at east edge of Rochester, and 1.7 miles upstream from mouth.

Drainage area.--17.3 mi^2.

Records available.—July 1968 to present.

Gage.--Crest-stage gage at downstream side of bridge. Datum of gage is 1007.99 ft, National Geodetic Vertical Datum of 1929.

Bankfull stage.—5.0 ft.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1969	Apr. 4, 1969	10.62	428
1970	June 17, 1970	10.93	510
1971	July 12, 1971	12.87	1,210
1972	Mar. 15, 1972	—	e150
1973	Mar. 10, 1973	12.91	1,290
1974	June 21, 1974	15.65	6,580
1975	June 18, 1975	9.84	259
1976	Mar. 12, 1976	11.46	670
1977	June 16, 1977	10.33	360
1978	July 6, 1978	16.18	9,290
1979	Aug. 29, 1979	11.40	645
1980	May 30, 1980	10.51	400

e Estimated.

ZUMBRO RIVER BASIN

05372990 Cascade Creek at Rochester, MN

Location.--Lat 44°01'51", long 92°28'18", in SE¼NW¼ sec.35, T.107 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, at bridge on 7th St. NW at Rochester, and 0.6 mile upstream from mouth.

Drainage area.--37.0 mi^2.

Records available.--July 1968 to present.

Gage.--Crest-stage gage at downstream side of bridge. Datum of gage is 977.84 ft, National Geodetic Vertical Datum of 1929.

Bankfull stage.--10.0 ft.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1969	Apr. 4, 1969	979.02	450
1970	June 17, 1970	978.80	401
1971	June 7, 1971	980.63	880
1972	Mar. 15, 1972	d	e170
1973	Mar. 10, 1973	982.15	1,430
1974	June 21, 1974	983.52	2,050
1975	June 18, 1975	978.00	240
1976	Mar. 12, 1976	981.01	1,000
1977	Mar. 29, 1977	978.29	302
1978	July 6, 1978	---	g1,000
1979	Aug. 28, 1979	978.75	402
1980	Mar. 15, 1980	979.03	(+)

+ Discharge not determined.
d Peak stage did not reach bottom of gage.
e Estimated.
g Estimated; gage height unknown.

ZUMBRO RIVER BASIN

05373080 Milliken Creek near Concord, MN

(Site No. 189)

Location.--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 miles upstream from mouth, and 2.1 miles southeast of Concord.

Drainage area.—22.2 mi^2.

Records available.--November 1978 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Aug. 29, 1979	13.93	(+)
1980	Mar. 19, 1980	b13.90	(+)

+ Discharge not determined.
b Backwater from ice.

ZUMBRO RIVER BASIN

05373350 Zumbro River tributary near South Troy, MN

(Site No. 143)

Location.--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 above mouth, and 1.3 miles south of South Troy.

Drainage area.—0.16 mi^2.

Records available.--October 1961 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.94 ft, upstream; 5.24 ft, downstream.

Bankfull stage.—9 ft.

Basin characteristics.—Main-channel length, 0.48 miles; main-channel slope, 156 ft per mile; mean basin altitude, 1,118 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	June 17, 1962	7.65	16
1963	Mar. 16, 1963	b8.01	9.5
1964	Mar. 13, 1964	b7.21	3.6
1965	Apr. 8, 1965	7.90	21
1966	Mar. 4, 1966	b8.36	12
1967	June 15, 1967	10.75	84
1968	June 25, 1968	8.15	26
1969	Apr. 3, 1969	b8.18	20
1970	June 15, 1970	9.87	65
1971	Mar. 31, 1971	b9.17	9.0
1972	Mar. 17, 1972	b9.08	24
1973	Mar. 6, 1973	b8.65	26
1974	June 20, 1974	12.72	122
1975	July 5, 1975	12.37	117
1976	Aug. 17, 1976	8.19	27
1977	June 5, 1977	8.37	30
1978	July 17, 1978	14.07	138
1979	May 30, 1979	8.29	29
1980	May 30, 1980	11.47	102

b Backwater from ice.

ZUMBRO RIVER BASIN

05373700 Spring Creek near Wanamingo, MN

(Site No. 87)

Location.--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 above mouth, and 4.2 miles southwest of Wanamingo.

Drainage area.—9.93 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert. Datum of gage is 1,106.15 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.—8.07 ft, upstream; 7.63 ft, downstream.

Bankfull stage.--12 ft.

Basin characteristics.—Main-channel length, 6.06 miles; main-channel slope, 20.7 ft per mile; mean basin altitude, 1,175 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 31, 1960	12.11	765
1961	Mar. 27, 1961	10.29	331
1962	Aug. 31, 1962	10.86	457
1963	May 12, 1963	10.00	271
1964	---	d	<100
1965	Apr. 7, 1965	b13.00	870
1966	Mar. 3, 1966	b11.60	490
1967	June 12, 1967	13.39	1,120
1968	July 15, 1968	10.38	350
1969	Oct. 17, 1968	11.55	620
1970	Apr. 20, 1970	9.43	123
1971	Mar. 31, 1971	b12.83	450
1972	Sept.26, 1972	9.67	186
1973	May 1, 1973	15.45	1,820
1974	Apr. 4, 1974	10.39	352
1975	Apr. 28, 1975	11.87	705
1976	Aug. 17, 1976	c9.62	145
1977	---	d	e50
1978	Apr. 6, 1978	10.61	400
1979	Aug. 28, 1979	18.08	2,850
1980	Mar. 19, 1980	b11.17	106

< Less than.
b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

ZUMBRO RIVER BASIN

05373900 Trout Brook tributary near Goodhue, MN

(Site No. 86)

Location.--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 above mouth, and 3.0 miles south of Goodhue.

Drainage area.—0.40 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert. Dtum of gage is 1,082.0 ft, National Geodetic Vertical Datum of 1929 (4th-order levels by Topographic Division).

Culvert invert elevations.—4.18 ft, upstream; 3.86 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 0.97 miles; main-channel slope, 88.9 ft per mile; mean basin altitude, 1,127 ft; forest area, 5 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	June 29, 1960	6.27	55
1961	Apr. 15, 1961	6.50	64
1962	Aug. 31, 1962	6.77	75
1963	July 17, 1963	8.50	163
1964	Apr. 21, 1964	5.76	37
1965	July 13, 1965	7.81	126
1966	Mar. 3, 1966	8.83	181
1967	Mar. 24, 1967	b8.74	54
1968	Aug. 19, 1968	7.04	88
1969	Apr. 2, 1969	b6.24	33
1970	May 28, 1970	13.84	592
1971	Mar. 31, 1971	b9.87	102
1972	Sept.26, 1972	6.70	72
1973	July 24, 1973	6.68	71
1974	June 3, 1974	7.08	88
1975	June 30, 1975	c6.81	69
1976	Aug. 17, 1976	7.19	95
1977	Mar. 11, 1977	b9.61	31
1978	July 1, 1978	13.98	759
1979	July 4, 1979	8.61	169
1980	May 20, 1980	b8.60	115

b Backwater from ice.
c Affected by shifting control.

ZUMBRO RIVER BASIN

05374400 Long Creek near Potsdam, MN

(Site No. 175)

Location.--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.

Drainage area.--4.46 mi^2.

Records available.--October 1965 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--11.92 ft, upstream; 10.25 ft, downstream.

Basin characteristics.--Main-channel length, 2.68 miles; main-channel slope, 41.3 ft per mile; mean basin altitude, 1,046 ft; forest area, 10 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1966	Mar. 4, 1966	17.39	228
1967	June 15, 1967	19.75	408
1968	June 25, 1968	15.96	137
1969	Apr. 3, 1969	15.24	97
1970	June 15, 1970	16.11	151
1971	Oct. 9, 1970	15.27	100
1972	Mar. 18, 1972	b15.27	78
1973	Mar. 11, 1973	20.08	435
1974	June 20, 1974	26.50	773
1975	July 5, 1975	16.77	200
1976	Mar. 12, 1976	15.70	130
1977	June 5, 1977	18.92	361
1978	July 17, 1978	22.10	574
1979	Aug. 28, 1979	16.62	194
1980	May 30, 1980	13.57	720

b Backwater from ice.

EAST INDIAN CREEK BASIN

05375800 East Indian Creek tributary near Weaver, MN

(Site No. 1)

Location.--Lat 44°13'41", long 91°58'35", in NW¼SE¼ sec.23, T.109 N., R.10 W., Wabasha County, Hydrologic Unit 07040003, at culvert on County Highway 14, 0.3 mile above mouth, and 2.5 miles northwest of Weaver.

Drainage area.—0.22 mi^2.

Records available.—October 1961 to September 1975

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—7.80 ft, upstream; 3.46 ft, downstream.

Basin characteristics.--Main-channel length, 0.75 miles; main-channel slope, 604 ft per mile; mean basin altitude, 921 ft; forest area, 41 percent; area of lakes and swamps, 9 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	May 29, 1962	9.25	25
1963	Mar. 16, 1963	b7.98	3.2
1964	Oct. 25, 1963	9.67	31
1965	May 16, 1965	10.34	26
1966	Aug. 7, 1966	10.65	31
1967	Oct. 15, 1966	11.01	37
1968	June 21, 1968	10.77	34
1969	July 17, 1969	8.48	3.4
1970	Aug. 29, 1970	8.90	7.6
1971	July 8, 1971	8.79	6.6
1972	Mar. 17, 1972	b8.92	4.0
1973	Mar. 11, 1973	b9.13	8.2
1974	Oct. 3, 1973	8.67	5.3
1975	Apr. 28, 1975	9.04	9.8

b Backwater from ice.

WHITEWATER RIVER BASIN

05376500 South Fork Whitewater River near Altura, MN

Location.—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 miles west of Altura, and 2.4 miles upstream from Keefer Creek.

Drainage area.—76.8 mi^2.

Records available.—October 1939 to present. Continuous records available Ocotber, 1939 to September, 1971.

Gage.—Water-stage recorder. Datum of gage is 761.80 ft, adjustment of 1912.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1940	July 10, 1940	9.35	4,240
1941	Sept.15, 1941	4.94	1,080
1942	June 28, 1942	8.06	3,080
1943	July 5, 1943	6.58	1,800
1944	Mar. 23, 1944	4.03	738
1945	July 21, 1945	7.87	2,910
1946	Mar. 6, 1946	b4.92	976
1947	Aug. 31, 1947	10.61	5,460
1948	Mar. 18, 1948	5.08	1,160
1949	Mar. 24, 1949	6.88	2,060
1950	Mar. 26, 1950	9.84	4,710
1951	July 21, 1951	9.36	4,250
1952	Mar. 31, 1952	8.55	3,520
1953	May 10, 1953	5.92	1,480
1954	Apr. 26, 1954	3.72	544
1955	July 8, 1955	7.02	2,180
1956	Apr. 2, 1956	7.11	2,250
1957	July 16, 1957	5.86	1,440
1958	Feb. 25, 1958	b4.47	576
1959	Mar. 25, 1959	5.53	1,140
1960	Mar. 27, 1960	5.74	1,400
1961	Mar. 25, 1961	9.65	4,530
1962	Mar. 28, 1962	10.01	4,870
1963	July 17, 1963	4.74	954
1964	Mar. 12, 1964	2.11	136
1965	Apr. 7, 1965	7.23	2,360
1966	Feb. 9, 1966	8.95	3,880
1967	Mar. 24, 1967	8.02	3,050
1968	June 21, 1968	3.53	391
1969	Apr. 3, 1969	4.77	971
1970	June 13, 1970	6.95	1,920

b Backwater from ice.

05376500 South Fork Whitewater River near Altura, MN--Continued

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1971	Mar. 31, 1971	5.29	1,060
1972	Mar. 17, 1972	5.23	1,010
1973	Mar. 11, 1973	6.42	1,640
1974	June 21, 1974	10.84	5,620
1975	July 5, 1975	5.39	1,090
1976	Mar. 12, 1976	7.78	2,760
1977	June 5, 1977	6.32	1,660
1978	July 5, 1978	10.83	5,610
1979	Aug. 22, 1979	5.77	1,320
1980	June 5, 1980	5.57	1,180

GARVIN BROOK BASIN

05378300 Straight Valley Creek near Rollingstone, MN

(Site No. 4)

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 mile above mouth, and 1.5 miles southwest of Rollingstone.

Drainage area.--5.16 mi^2.

Records available.--October 1958 to present. Continuous records available October 1970 to present.

Gage.--Water-stage recorder downstream from bridge. Prior to Oct. 20, 1966, crest-stage gage at same site and datum.

Low-steel elevation.--18.47 ft.

Bankfull stage.--16 ft.

Basin characteristics.--Main-channel length, 4.68 miles; main-channel slope, 113 ft per mile; mean basin altitude, 943 ft; forest area, 41 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 26, 1969	17.28	1,200
1960	May 16, 1960	13.19	255
1961	Mar. 25, 1961	15.30	635
1962	Mar. 28, 1962	15.23	625
1963	Mar. 23, 1963	12.20	149
1964	Sept. 7, 1964	---	g60
1965	Apr. 8, 1965	14.65	495
1966	Mar. 4, 1966	13.01	233
1967	Mar. 24, 1967	14.48	460
1968	July 14, 1968	14.17	402
1969	June 26, 1969	11.27	85
1970	Aug. 29, 1970	11.61	104
1971	Mar. 31, 1971	9.89	29
1972	Aug. 20, 1972	13.11	224
1973	Mar. 10, 1973	14.50	470
1974	June 21, 1974	13.93	364
1975	June 4, 1975	12.76	188
1976	Mar. 12, 1976	14.62	496
1977	June 4, 1977	16.33	827
1978	July 5, 1978	18.10	1,500
1979	Aug. 22, 1979	13.30	272
1980	June 5, 1980	17.60	1,330

g Estimated; gage height unknown.

GILMORE CREEK BASIN

053790000 Gilmore Creek at Winona, MN

(Site No. 168)

Location.--Lat 44°02'40", long 91°41'25", in N½ sec.29, T.107 N., R.7 W., Winona County, Hydrologic Unit 07040003, about 1,500 ft above bridge carrying U.S. Highway 14 at west edge of Winona, and 2.25 miles above mouth.

Drainage area.—8.95 mi^2.

Records available.--October 1939 to September 1965. Continuous records available October 1939 to July 1963.

Gage.—Staff gage in stilling well. Datum of gage is 672.92 ft, adjustment of 1912. Prior to July 31, 1963, water-stage recorder at same site and datum.

Basin characteristics.—Main-channel length, 4.94 miles; main-channel slope, 109 ft per mile; mean basin altitude, 890 ft; forest area, 46 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1940	Mar. 29, 1940	2.57	137
1941	Sept.15, 1941	2.74	169
1942	June 28, 1942	6.74	2,200
1943	July 5, 1943	c4.87	835
1944	June 22, 1944	4.49	820
1945	July 31, 1945	5.58	1,370
1946	Nov. 8, 1945	5.11	1,070
1947	July 27, 1947	c6.97	2,460
1948	Feb. 27, 1948	2.33	131
1949	Aug. 17, 1949	c3.20	333
1950	Mar. 26, 1950	c3.00	330
1951	July 21, 1951	9.47	5,360
1952	July 19, 1952	2.50	156
1953	---	---	---
1954	June 20, 1954	c1.66	h53
1955	July 8, 1955	3.22	318
1956	Apr. 3, 1956	c1.83	73
1957	July 20, 1957	2.74	198
1958	Oct. 19, 1957	1.02	22
1959	June 25, 1959	c3.08	585
1960	Mar. 27, 1960	c1.80	201
1961	Mar. 25, 1961	c2.59	425
1962	Aug. 30, 1962	c1.65	436
1963	Mar. 23, 1963	1.86	638
1964	Nov. 22, 1963	1.07	114
1965	Apr. 7, 1965	b4.65	436

b Backwater from ice.
c Affected by shifting control.
h Revised.

ROOT RIVER BASIN

05383600 North Branch Root River tributary near Stewartville, MN

(Site No. 13)

Location.--Lat 43°51'20", long 92°26'50", near center of 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 above mouth.

Drainage area.—0.73 mi^2.

Records available.—October 1958 to present. Continuous records available March 1959 to September 1964. Annual peak for 1958 available from miscellaneous flood data collected prior to activation of station.

Gage.--Crest-stage gage upstream from culvert. Altitude of gage is 1,205 ft (from topographic map). Prior to Sept. 26, 1979, water-stage recorder at same site and datum.

Culvert invert elevations.—4.12 ft, upstream; 3.12 ft, downstream.

Bankfull stage.—6 ft.

Basin characteristics.—Main-channel length, 2.00 miles; main-channel slope, 47.3 ft per mile; mean basin altitude, 1,252 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Remarks.—Recording rain gage installed Sept. 26, 1963, discontinued Sept. 26, 1979.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1958	June 4, 1958	12.47	297
1959	June 25, 1959	9.78	164
1960	July 2, 1960	13.47	328
1961	Mar. 25, 1961	7.97	90
1962	Mar. 28, 1962	b8.63	98
1963	Apr. 29, 1963	5.89	24
1964	Apr. 28, 1964	4.74	0.2
1965	Apr. 7, 1965	7.49	71
1966	Mar. 3, 1966	b6.64	25
1967	Mar. 26, 1967	7.87	86
1968	June 13, 1968	5.26	12
1969	July 17, 1969	9.93	172
1970	May 27, 1970	6.77	49
1971	Mar. 31, 1971	5.95	25
1972	Sept.28, 1972	6.05	28
1973	Sept.29, 1973	9.04	133
1974	Apr. 2, 1974	6.83	51
1975	Apr. 28, 1975	7.28	65
1976	Mar. 12, 1976	6.31	35
1977	June 5, 1977	7.49	71
1978	July 5, 1978	8.37	106
1979	Aug. 29, 1979	12.01	282
1980	May 30, 1980	5.86	23

ROOT RIVER BASIN

05383700 Mill Creek tributary near Chatfield, MN

(Site No. 10)

Location.--Lat 43°53'57", long 92°14'16", in SW¼NW¼ sec.14, T.105 N., R.12 W., Olmsted County, Hydrologic Unit 07040008, at culvert on county highway, 0.8 mile above mouth, and 4.5 miles northwest of Chatfield.

Drainage area.—2.36 mi^2.

Records available.—October 1958 to September 1975.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—10.28 ft, upstream; 9.94 ft, downstream.

Bankfull stage.—15 ft.

Basin characteristics.—Main-channel length, 3.20 miles; main-channel slope, 80.8 ft per mile; mean basin altitude, 1,117 ft; forest area, 8 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Aug. 21, 1959	13.52	402
1960	July 2, 1960	15.46	703
1961	Apr. 15, 1961	13.74	435
1962	Mar. 28, 1962	13.57	405
1963	Sept.18, 1963	12.54	235
1964	Sept. 7, 1964	12.09	141
1965	Apr. 6, 1965	14.20	506
1966	Mar. 3, 1966	b13.14	271
1967	June 8, 1967	15.92	780
1968	Apr. 23, 1968	13.45	345
1969	Aug. 7, 1969	14.60	524
1970	June 17, 1970	13.67	376
1971	June 7, 1971	13.44	344
1972	Sept.28, 1972	12.95	274
1973	Mar. 11, 1973	b14.57	361
1974	June 20, 1974	17.32	1,030
1975	Apr. 28, 1975	13.48	407

b Backwater from ice.

ROOT RIVER BASIN

05383720 Mill Creek near Chatfield, MN

(Site No. 144)

Location.--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 above mouth.

Drainage area.--22.4 mi^2.

Records available.--October 1961 to present.

Gage.--Crest-stage gage upstream from culvert.

Basin characteristics.--Main-channel length, 6.40 miles; main-channel slope, 50.4 ft per mile; mean basin altitude, 1,149 ft; forest area, 7 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	Mar. 28, 1962	15.95	4,150
1963	June 9, 1963	12.39	1,030
1964	Mar. 12, 1964	b10.06	137
1965	Apr. 6, 1965	14.31	1,800
1966	Mar. 3, 1966	14.39	1,900
1967	Mar. 26, 1967	13.98	1,550
1968	June 26, 1968	10.76	535
1969	Aug. 7, 1969	11.38	721
1970	June 17, 1970	10.83	555
1971	July 12, 1971	12.71	1,130
1972	Sept.28, 1972	12.85	1,170
1973	Mar. 11, 1973	13.93	1,530
1974	June 21, 1974	17.51	7,990
1975	June 27, 1975	14.21	1,700
1976	Mar. 12, 1976	14.08	1,600
1977	May 16, 1977	11.46	680
1978	July 6, 1978	17.68	8,580
1979	Aug. 28, 1979	15.71	3,100
1980	May 30, 1980	16.68	4,850

b Backwater from ice.

ROOT RIVER BASIN

05383850 South Fork Bear Creek near Grand Meadow, MN

(Site No. 146)

Location.--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 above North Fork Bear Creek.

Drainage area.--14.0 mi^2.

Records available.--October 1961 to present.

Gage.--Crest-stage gage upstream from culvert.

Low-steel elevation.--18.41 ft.

Basin characteristics.--Main-channel length, 6.89 miles; main-channel slope, 14.5 ft per mile; mean basin altitude, 1,334 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	Mar. 28, 1962	21.18	3,730
1963	Mar. 23, 1963	b16.76	290
1964	July 28, 1964	15.64	206
1965	Sept.28, 1965	18.60	1,020
1966	Mar. 3, 1966	b18.89	785
1967	Mar. 24, 1967	b19.35	485
1968	June 26, 1968	16.98	520
1969	June 26, 1969	18.96	1,140
1970	May 14, 1970	15.14	128
1971	Mar. 31, 1971	b18.66	570
1972	Sept.28, 1972	17.33	618
1973	Mar. 11, 1973	b19.43	800
1974	June 21, 1974	17.87	780
1975	Apr. 27, 1975	18.64	1,030
1976	Mar. 12, 1976	b18.27	600
1977	May 16, 1977	15.16	130
1978	July 17, 1978	23.18	8,500
1979	Aug. 22, 1979	18.84	1,100
1980	May 30, 1980	18.05	840

b Backwater from ice.

ROOT RIVER BASIN

05384100 Duschee Creek near Lanesboro, MN

(Site No. 5)

Location.--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, 4.0 miles south of Lanesboro, and 7.4 miles above mouth.

Drainage area.--3.85 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--10.74 ft, upstream; 10.70 ft, downstream.

Bankfull stage.--18 ft.

Basin characteristics.--Main-channel length, 3.05 miles; main-channel slope, 70.8 ft per mile; mean basin altitude, 1,099 ft; forest area, 12 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 25, 1959	14.11	185
1960	July 2, 1960	17.74	561
1961	Mar. 25, 1961	15.41	307
1962	Mar. 28, 1962	14.19	188
1963	Mar. 23, 1963	12.98	85
1964	May 8, 1964	15.01	267
1965	Sept.19, 1965	15.68	333
1966	Mar. 3, 1966	12.82	74
1967	June 9, 1967	17.60	550
1968	May 15, 1968	14.68	236
1969	July 17, 1969	20.39	1,680
1970	June 13, 1970	12.36	47
1971	July 12, 1971	14.48	218
1972	July 31, 1972	17.03	480
1973	Mar. 11, 1973	b13.00	73
1974	June 20, 1974	20.20	1,310
1975	Apr. 27, 1975	11.47	13
1976	Mar. 12, 1976	15.85	251
1977	July 17, 1977	12.38	48
1978	July 5, 1978	13.78	152
1979	June 4, 1979	14.40	210
1980	May 30, 1980	19.12	790

b Backwater from ice.

05384120 South Branch Root River at Lanesboro, MN

Location.—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.

Drainage area.—297 mi^2.

Records available.—1915, 1940-42, 1959, 1965-67, 1969 (discharge measurements only), November 1972 to present. Gage readings available in records of U.S. Army Corps of Engineers.

Gage.—Crest-stage gage at downstream side of bridge. Zero of gage is 815.48 ft, National Geodetic Vertical Datum of 1929.

Remarks.—Flood of March 26, 1950, reached a stage of 19.20 ft from records of Corps of Engineers.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1973	---	---	e5,000
1974	June 21, 1974	11.08	5,900
1975	Apr. 28, 1975	d	e3,700
1976	Mar. 12, 1976	b13.42	7,000
1977	Mar. 11, 1977	5.85	1,180
1978	July 7, 1978	10.45	5,100
1979	Mar. 30, 1979	b12.05	5,250
1980	May 30, 1980	11.95	7,100

b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

ROOT RIVER BASIN

05384150 Root River tributary near Whalan, MN

(Site No. 6)

Location.--Lat 43°43'03", long 91°56'39", in SE¼SW¼ sec.17, T.103 N., R.9 W., Fillmore County, Hydrologic Unit 07040008, at culvert on private road, 1.6 miles southwest of Whalan.

Drainage area.—0.82 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.--3.41 ft, upstream; 2.48 ft, downstream.

Bankfull stage.—6 ft.

Basin characteristics.—Main-channel length, 0.50 miles; main-channel slope, 243 ft per mile; mean basin altitude, 1,110 ft; forest area, 8 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 25, 1959	7.60	27
1960	Aug. 28, 1960	9.05	42
1961	Aug. 18, 1961	5.45	11
1962	Mar. 28, 1962	b5.85	6.1
1963	May 13, 1963	5.78	15
1964	May 8, 1964	4.69	4.2
1965	Sept.19, 1965	6.80	22
1966	July 13, 1966	7.65	27
1967	June 9, 1967	9.82	169
1968	May 15, 1968	7.15	24
1969	May 17, 1969	4.78	4.8
1970	June 13, 1970	7.40	26
1971	July 12, 1971	6.28	19
1972	July 9, 1972	8.87	35
1973	Aug. 23, 1973	6.44	20
1974	June 20, 1974	9.85	136
1975	June 15, 1975	7.54	26
1976	Mar. 12, 1976	5.01	6.7
1977	July 17, 1977	7.18	25
1978	May 28, 1978	9.60	100
1979	Aug. 4, 1979	9.29	48
1980	May 30, 1980	10.07	172

b Backwater from ice.

ROOT RIVER BASIN

05384200 Gribben Creek near Whalan, MN

(Site No. 7)

Location.--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 above mouth.

Drainage area.--7.80 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage upstream from bridge.

Culvert invert elevations.--12.64 ft, upstream; 12.62 ft, downstream.

Bankfull stage.--19 ft.

Basin characteristics.--Main-channel length, 3.74 miles; main-channel slope, 101 ft per mile; mean basin altitude, 1,020 ft; forest area, 22 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 25, 1959	16.52	510
1960	July 2, 1960	22.17	4,880
1961	Mar. 25, 1961	16.83	562
1962	Mar. 28, 1962	16.95	581
1963	Mar. 23, 1963	15.11	221
1964	May 8, 1964	20.14	1,430
1965	Sept.19, 1965	18.57	868
1966	Feb. 9, 1966	b15.43	247
1967	June 9, 1967	20.96	2,460
1968	May 15, 1968	19.76	1,170
1969	July 17, 1969	16.73	543
1970	Sept.10, 1970	14.61	182
1971	July 12, 1971	18.50	855
1972	July 31, 1972	15.66	360
1973	Mar. 11, 1973	h14.89	175
1974	June 20, 1974	22.24	5,200
1975	Apr. 27, 1975	15.01	200
1976	Mar. 12, 1976	16.95	580
1977	July 17, 1977	20.63	2,030
1978	July 5, 1978	15.30	264
1979	Aug. 4, 1979	15.15	230
1980	May 30, 1980	20.84	2,350

b Backwater from ice.
h Revised.

ROOT RIVER BASIN

05384300 Big Springs Creek near Arendahl, MN

(Site No. 9)

Location.--Lat 43°49'26", long 91°57'00", in NE¼SE¼ sec.7, T.104 N., R.9 W., Fillmore County, Hydrologic Unit 07040008, at culvert on State Highway 250, 2.0 miles west of Arendahl.

Drainage area.—0.14 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—6.88 ft, upstream; 5.42 ft, downstream.

Bankfull stage.--8 ft.

Basin characteristics.—Main-channel length, 0.40 miles; main-channel slope, 100 ft per mile; mean basin altitude, 1,185 ft; forest area, 7 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	June 25, 1959	8.32	9.0
1960	July 2, 1960	10.67	40
1961	Mar. 25, 1961	8.85	18
1962	Mar. 27, 1962	b9.19	19
1963	Mar. 23, 1963	8.07	6.2
1964	Apr. 13, 1964	7.68	2.0
1965	Apr. 6, 1965	8.92	18
1966	Mar. 31, 1966	8.99	19
1967	June 9, 1967	10.05	32
1968	June 18, 1968	9.63	28
1969	July 17, 1969	9.49	26
1970	June 18, 1970	8.13	7.6
1971	Mar. 31, 1971	8.69	16
1972	Mar. 17, 1972	b9.43	12
1973	Mar. 11, 1973	8.64	15
1974	June 20, 1974	11.61	256
1975	Apr. 28, 1975	8.60	15
1976	Mar. 12, 1976	b9.27	16
1977	July 17, 1977	7.54	1.6
1978	July 1, 1978	11.09	56.7
1979	June 26, 1979	11.38	125
1980	Apr. 30, 1980	10.48	36

b Backwater from ice.

ROOT RIVER BASIN

05384400 Pine Creek near Arendahl, MN

(Site No. 8)

Location.--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 above Hemingway Creek.

Drainage area.--28.1 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Basin characteristics.--Main-channel length, 11.4 miles; main-channel slope, 18.3 ft per mile; mean basin altitude, 1,074 ft; forest area, 5 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	Mar. 24, 1959	b13.52	1,020
1960	Aug. 28, 1960	14.16	h2,000
1961	Mar. 25, 1961	14.42	h2,380
1962	Mar. 27, 1962	b13.44	914
1963	Mar. 23, 1963	b12.21	476
1964	---	d	<80
1965	Apr. 6, 1965	13.32	1,140
1966	Mar. 4, 1966	12.30	590
1967	Mar. 26, 1967	13.53	1,290
1968	June 18, 1968	11.96	458
1969	Apr. 3, 1969	11.77	392
1970	June 18, 1970	12.45	652
1971	June 7, 1971	12.24	566
1972	Mar. 17, 1972	b13.44	974
1973	Mar. 11, 1973	12.93	900
1974	June 21, 1974	14.85	3,100
1975	Apr. 28, 1975	12.40	630
1976	Mar. 12, 1976	b14.24	1,140
1977	June 5, 1977	d	e60
1978	July 1, 1978	15.58	4,150
1979	June 7, 1979	14.12	1,870
1980	Sept.21, 1980	14.82	2,800

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.
h Revised.

ROOT RIVER BASIN

05384500 Rush Creek near Rushford, MN

Location.—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, and 3.0 miles upstream from mouth.

Drainage area.—129 mi^2.

Records available.—October 1979 to present. Continuous records available August 1942 to September 1979.

Gage.—Crest-stage gage at downstream side of bridge.

Basin characteristics.—Main-channel length, 17.6 miles; main-channel slope, 28.0 ft per mile; mean basin altitude, 940 ft; forest area, 15 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1942	June 28, 1942	—	11,000
1943	Mar. 25, 1943	—	3,600
1944	Mar. 11, 1944	—	1,660
1945	July 21, 1945	—	4,000
1946	Jan. 5, 1946	—	7,130
1947	Apr. 5, 1947	—	2,590
1948	Mar. 16, 1948	—	2,000
1949	Mar. 4, 1949	—	3,640
1950	Mar. 26, 1950	13.54	11,600
1951	July 21, 1951	11.46	6,580
1952	Mar. 31, 1952	11.05	6,740
1953	July 26, 1953	9.32	3,750
1954	June 19, 1954	6.54	920
1955	July 8, 1955	6.80	1,180
1956	Apr. 3, 1956	7.00	1,380
1957	Feb. 24, 1957	7.60	1,980
1958	Feb. 25, 1958	5.80	420
1959	Mar. 24, 1959	7.62	2,000
1960	July 3, 1960	9.05	3,460
1961	Mar. 25, 1961	10.26	4,920
1962	Mar. 28, 1962	9.98	4,550
1963	Mar. 23, 1963	7.15	1,530
1964	Mar. 12, 1964	2.48	53
1965	Apr. 6, 1965	9.06	5,490
1966	Feb. 9, 1966	10.20	7,490
1967	Mar. 24, 1967	8.65	5,170
1968	July 23, 1968	3.50	370
1969	Apr. 4, 1969	4.11	620

05384500 Rush Creek near Rushford, MN--Continued

Annual maximum data.--Continued

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1970	June 18, 1970	5.64	1,640
1971	Mar. 31, 1971	4.85	1,290
1972	Mar. 17, 1972	6.15	2,300
1973	Aug. 23, 1973	5.74	2,030
1974	June 21, 1974	8.30	4,400
1975	July 5, 1975	4.85	1,220
1976	Mar. 12, 1976	9.76	6,040
1977	June 5, 1977	4.94	1,300
1978	July 1, 1978	11.20	7,930
1979	Aug. 4, 1979	5.75	1,500
1980	Sept.21, 1980	8.26	3,930

CROOKED CREEK BASIN

05387030 Crooked Creek at Freeburg, MN

(Site no. 190)

Location.--Lat 43°36'37", long 91°21'39", in SW¼NE¼ sec.30, T.102 N., R.04 W., Houston County, Hydrologic Unit 07060001, on right downstream wingwall of bridge on State Highway 249 at Freeburg, 6.5 miles upstream from mouth.

Drainage area.--44.2 mi^2.

Records available.--November 1978 to present.

Gage.—Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	July 4, 1979	10.50	(+)
1980	Aug. 21, 1980	12.63	(+)

+ Discharge not determined.

IOWA RIVER BASIN

05457080 Rose Creek tributary near Dexter, MN

(Site No. 147)

Location.--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 above mouth, and 2.2 miles southwest of Dexter.

Drainage area.—1.17 mi^2.

Records available.--October 1961 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.62 ft, upstream; 5.37 ft, downstream.

Bankfull stage.—7 ft.

Basin characteristics.—Main-channel length, 1.27 miles; main-channel slope, 37.9 ft per mile; mean basin altitude, 1,370 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	Aug. 31, 1962	9.07	121
1963	May 10, 1963	7.70	56
1964	May 16, 1964	7.10	21
1965	July 9, 1965	10.31	201
1966	Mar. 31, 1966	9.08	122
1967	Mar. 24, 1967	8.31	86
1968	June 26, 1968	7.06	19
1969	June 26, 1969	10.21	194
1970	May 13, 1970	7.50	41
1971	Oct. 27, 1970	8.22	81
1972	Sept.29, 1972	8.04	73
1973	Mar. 11, 1973	9.30	135
1974	Apr. 4, 1974	8.63	100
1975	Apr. 27, 1975	9.81	166
1976	Mar. 12, 1976	b9.07	97
1977	July 24, 1977	7.99	71
1978	July 17, 1978	11.82	1,090
1979	Aug. 22, 1979	9.06	121
1980	May 30, 1980	c8.86	96

b Backwater from ice.
c Affected by shifting control.

DES MOINES RIVER BASIN

05474750 Beaver Creek tributary No. 2 near Slayton, MN

(Site No. 102)

Location.--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 above mouth.

Drainage area.—3.53 mi^2. (Contributing area)
5.10 mi^2. (Total area)

Records available.—October 1960 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—14.78 ft, upstream; 13.57 ft, downstream.

Bankfull stage.--16 ft.

Basin characteristics.—Main-channel length, 3.50 miles; main-channel slope, 43.7 ft per mile; mean basin altitude, 1,662 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 17, 1961	16.74	51
1962	Mar. 28, 1962	b21.22	211
1963	July 27, 1963	17.04	61
1964	Apr. 13, 1964	16.80	53
1965	May 9, 1965	18.48	128
1966	Mar. 3, 1966	b18.66	87
1967	Apr. 2, 1967	16.74	50
1968	Sept.21, 1968	---	g40
1969	Apr. 6, 1969	19.38	182
1970	Apr. 5, 1970	b16.97	47
1971	Mar. 27, 1971	16.42	39
1972	July 8, 1972	16.56	44
1973	Mar. 14, 1973	16.28	34
1974	---	d	<10
1975	Apr. 27, 1975	18.93	154
1976	Mar. 20, 1976	b17.95	78
1977	Mar. 11, 1977	18.08	107
1978	Mar. 21, 1978	16.63	46
1979	July 20, 1979	20.87	228
1980	May 27, 1980	18.69	140

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
g Estimated; gage height unknown.

DES MOINES RIVER BASIN

05474760 Beaver Creek tributary above Slayton, MN

(Site No. 101)

Location.--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 above mouth, and 1.7 miles west of Slayton.

Drainage area.—2.20 mi^2.

Records available.--October 1960 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—15.00 ft, upstream; 14.63 ft, downstream.

Bankfull stage.—19 ft.

Basin characteristics.—Main-channel length, 4.70 miles; main-channel slope, 38.8 ft per mile; mean basin altitude, 1,676 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1961	May 17, 1961	17.52	43
1962	Mar. 28, 1962	b21.56	116
1963	July 27, 1963	17.91	56
1964	May 3, 1964	17.13	31
1965	May 9, 1965	18.12	63
1966	Mar. 3, 1966	b18.71	50
1967	Apr. 2, 1967	17.07	29
1968	July 30, 1968	16.87	23
1969	Apr. 7, 1969	20.14	137
1970	Apr. 5, 1970	b18.00	12
1971	June 29, 1971	18.25	68
1972	May 2, 1972	16.57	15
1973	Mar. 14, 1973	16.90	24
1974	Mar. 3, 1974	b17.04	14
1975	Apr. 27, 1975	19.21	103
1976	Mar. 20, 1976	b20.61	63
1977	June 16, 1977	19.17	101
1978	Mar. 21, 1978	b17.90	40
1979	July 20, 1979	20.80	160
1980	May 27, 1980	19.47	112

b Backwater from ice.

DES MOINES RIVER BASIN

05475400 Warren Lake tributary near Windom, MN

(Site No. 23)

Location.--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 above Warren Lake, and 2.4 miles north of Windom.

Drainage area.—1.39 mi^2.

Records available.--October 1959 to present.

Gage.—Water-stage recorder upstream from culvert. Prior to Oct. 10, 1979, crest-stage gage at same site and datum.

Culvert invert elevations.—3.28 ft, upstream; 2.08 ft, downstream.

Bankfull stage.—5 ft.

Basin characteristics.—Main-channel length, 2.45 miles; main-channel slope, 17.4 ft per mile; mean basin altitude, 1,401 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	8.02	156
1961	Mar. 25, 1961	4.63	23
1962	Mar. 28, 1962	5.40	46
1963	July 18, 1963	5.68	56
1964	Sept. 8, 1964	4.46	18
1965	June 22, 1965	5.44	47
1966	June 21, 1966	13.76	395
1967	June 16, 1967	5.19	40
1968	July 26, 1968	6.93	104
1969	Apr. 7, 1969	5.88	63
1970	Oct. 5, 1970	4.52	21
1971	June 29, 1971	5.41	47
1972	June 7, 1972	6.31	79
1973	---	d	<14
1974	Mar. 2, 1974	b5.78	28
1975	---	d	<15
1976	Mar. 20, 1976	b5.24	27
1977	Mar. 11, 1977	b6.09	36
1978	Mar. 13, 1978	b9.41	64
1979	Mar. 28, 1979	b6.39	56
1980	May 29, 1980	12.84	370

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

DES MOINES RIVER BASIN

05475800 Des Moines River tributary near Jackson, MN

(Site No. 69)

Location.--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 above mouth, and 5.3 miles north of Jackson.

Drainage area.--1.52 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--12.01 ft, upstream; 10.00 ft, downstream.

Bankfull stage.--16 ft.

Basin characteristics.--Main-channel length, 3.38 miles; main-channel slope, 20.6 ft per mile; mean basin altitude, 1,407 ft; forest area, 1 percent; area of lakes and swamps, 1 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Oct. 30, 1959	13.71	21
1961	Mar. 22, 1961	b13.77	5.9
1962	Mar. 28, 1962	b16.34	69
1963	June 9, 1963	14.72	49
1964	May 24, 1964	13.51	16
1965	Apr. 5, 1965	b17.86	38
1966	Mar. 28, 1966	14.46	41
1967	June 15, 1967	14.82	52
1968	---	d	<3
1969	June 29, 1969	16.99	134
1970	July 13, 1970	14.74	50
1971	Mar. 27, 1971	15.03	59
1972	Mar. 12, 1972	b14.47	15
1973	June 18, 1973	13.09	7.6
1974	June 9, 1974	14.48	42
1975	June 22, 1975	13.75	22
1976	Mar. 20, 1976	b14.62	31
1977	June 16, 1977	13.79	23
1978	Mar. 21, 1978	b15.54	16
1979	Aug. 9, 1979	14.04	29
1980	Oct. 31, 1979	14.38	39

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

DES MOINES RIVER BASIN

05475900 Des Moines River tributary No. 2 near Lakefield, MN

(Site No. 68)

Location.--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 above mouth, and 5.8 miles east of Lakefield.

Drainage area.—5.18 mi^2.

Records available.--October 1959 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—3.50 ft, upstream; 3.19 ft, downstream.

Bankfull stage.—6 ft.

Basin characteristics.—Main-channel length, 4.52 miles; main-channel slope, 12.1 ft per mile; mean basin altitude, 1,470 ft; forest area, 2 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	6.75	104
1961	Mar. 25, 1961	b6.90	96
1962	Mar. 28, 1962	b8.86	61
1963	June 9, 1963	7.00	119
1964	May 6, 1964	5.52	49
1965	Apr. 5, 1965	b10.46	112
1966	Mar. 28, 1966	b6.98	90
1967	June 15, 1967	6.50	92
1968	---	d	<16
1969	June 29, 1969	10.44	271
1970	Apr. 5, 1970	5.67	48
1971	Mar. 27, 1971	7.96	155
1972	Mar. 12, 1972	b7.48	42
1973	June 18, 1973	4.90	22
1974	Mar. 3, 1974	b5.63	30
1975	June 22, 1975	c5.91	54
1976	Mar. 20, 1976	b6.68	68
1977	Mar. 11, 1977	b6.18	48
1978	Mar. 21, 1978	b7.14	75
1979	Apr. 1, 1979	b13.87	149
1980	Oct. 31, 1979	c6.66	75

< Less than.
b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.

DES MOINES RIVER BASIN

05476010 Nelson Creek at Jackson, MN

(Site No. 155)

Location.--Lat 43°36'56", long 94°59'36", in NW¼NW¼ sec.25, T.102 N., R.35 W., Jackson County, Hydrologic Unit 07100002, in flume spillway at intersection of U.S. Highways 16 an 71 at south edge of Jackson, 0.2 mile upstream from mouth.

Drainage area.--6.19 mi^2.

Records available.--October 1963 to September 1975.

Gage.--Crest-stage gage. Datum of gage is 1,295.50 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.--12.01 ft, upstream end.

Bankfull stage.--20 ft.

Basin characteristics.--Main-channel length, 4.10 miles; main-channel slope, 46.3 ft per mile; mean basin altitude, 1,403 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	---	2,690
1964	May 6, 1964	13.22	166
1965	Apr. 5, 1965	>15.39 <17.48	e670
1966	Mar. 14, 1966	b16.06	600
1967	June 15, 1967	14.03	412
1968	---	d	<120
1969	June 29, 1969	16.67	1,480
1970	---	d	<120
1971	May 31, 1971	14.41	542
1972	July 20, 1972	13.43	228
1973	---	d	<100
1974	June 6, 1974	14.41	542
1975	Apr. 22, 1975	13.63	290

< Less than.
> Greater than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

DES MOINES RIVER BASIN

05476100 Story Brook near Petersburg, MN

(Site No. 67)

Location.--Lat 43°32'22", long 94°59'38", in SW¼NW¼ sec.24, T.101 N., R.35 W., Jackson County, Hydrologic Unit 07100002, at bridge on U.S. Highway 71, 3.5 miles above mouth, and 3.8 miles west of Petersburg.

Drainage area.--25.8 mi^2.

Records available.--October 1959 to September 1972.

Gage.--Crest-stage gage at downstream side of bridge.

Low-steel elevation.--18.74 ft.

Bankfull stage.--17 ft.

Basin characteristics.--Main-channel length, 7.18 miles; main-channel slope, 23.2 ft per mile; mean basin altitude, 1,428 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	Mar. 29, 1960	11.03	1,030
1961	Mar. 25, 1961	11.06	1,050
1962	July 4, 1962	12.77	2,110
1963	July 18, 1963	7.82	177
1964	May 7, 1964	10.25	716
1965	Apr. 6, 1965	b12.75	1,200
1966	Mar. 28, 1966	a9.33	245
1967	June 15, 1967	10.38	763
1968	---	d	<27
1969	June 29, 1969	13.73	2,500
1970	May 14, 1970	8.97	398
1971	Mar. 27, 1971	10.88	960
1972	July 20, 1972	7.90	203

< Less than.
a Backwater from debris.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

DES MOINES RIVER BASIN

05476900 Fourmile Creek near Dunnell, MN

(Site No. 66)

Location.--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 above mouth, and 1.6 miles north of Dunnell.

Drainage area.--14.0 mi^2.

Records available.--October 1959 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Low-steel elevations.--17.33 ft.

Bankfull stage.--13 ft.

Basin characteristics.--Main-channel length, 9.70 miles; main-channel slope, 17.2 ft per mile; mean basin altitude, 1,356 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1960	May 21, 1960	14.58	705
1961	Mar. 25, 1961	14.69	760
1962	July 4, 1962	16.15	2,200
1963	July 4, 1963	10.82	66
1964	May 7, 1964	c10.89	86
1965	Apr. 6, 1965	b14.68	370
1966	Mar. 28, 1966	c11.92	150
1967	Apr. 2, 1967	c11.38	111
1968	June 10, 1968	14.55	690
1969	June 29, 1969	15.53	1,420
1970	May 14, 1970	13.26	345
1971	May 31, 1971	13.26	345
1972	Mar. 11, 1972	b11.81	111
1973	June 18, 1973	11.35	123
1974	June 6, 1974	12.29	215
1975	Apr. 27, 1975	12.14	199
1976	Mar. 20, 1976	b12.56	189
1977	Mar. 11, 1977	d	e20
1978	July 22, 1978	11.42	128
1979	Aug. 27, 1979	c15.18	410
1980	May 30, 1980	c11.66	132

b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.
e Estimated.

BIG SIOUX RIVER BASIN

06482933 Chanarambie Creek near Edgerton, MN

(Site No. 191)

Location.--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, and 7.4 miles upstream from mouth.

Drainage area.—56.1 mi^2.

Records available.--October 1978 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1979	Apr. 17, 1979	16.72	(+)
1980	June 5, 1980	16.92	(+)

+ Discharge not determined.

BIG SIOUX RIVER BASIN

06482950 Mound Creek near Hardwick, MN

(Site No. 30)

• Location.--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 northwest of Hardwick.

Drainage area.—2.47 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert. Datum of gage is 1,641.31 ft, National Geodetic Vertical Datum of 1929.

Culvert invert elevations.—5.62 ft, upstream; 5.08 ft, downstream.

Basin characteristics.--Main-channel length, 3.00 miles; main-channel slope, 25.3 ft per mile; mean basin altitude, 1,690 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 28, 1959	10.24	99
1960	Apr. 3, 1960	10.49	106
1961	Mar. 14, 1961	c7.83	14
1962	Apr. 13, 1962	9.92	88
1963	---	d	<5
1964	Apr. 27, 1964	7.38	20
1965	Apr. 6, 1965	b10.90	88
1966	Feb. 9, 1966	b10.22	82
1967	Apr. 2, 1967	8.35	43
1968	---	d	<5
1969	June 29, 1969	11.48	433
1970	Apr. 5, 1970	7.79	29
1971	Mar. 27, 1971	7.90	31
1972	May 1, 1972	8.12	37
1973	Mar. 14, 1973	7.73	27
1974	---	d	<5
1975	Apr. 9, 1975	b9.37	43
1976	Mar. 12, 1976	b9.19	51
1977	Mar. 11, 1977	9.82	85
1978	Mar. 19, 1978	b9.16	26
1979	Aug. 9, 1979	11.66	459
1980	June 5, 1980	9.64	79

< Less than.
b Backwater from ice.
c Affected by shifting control.
d Peak stage did not reach bottom of gage.

BIG SIOUX RIVER BASIN

06482960 Mound Creek tributary at Hardwick, MN

(Site No. 29)

Location.--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 above mouth, and 0.9 mile southwest of Hardwick.

Drainage area.—0.19 mi^2.

Records available.--October 1958 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—5.38 ft, upstream; 5.00 ft, downstream.

Bankfull stage.—8 ft.

Basin characteristics.—Main-channel length, 0.66 miles; main-channel slope, 112 ft per mile; mean basin altitude, 1,682 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 28, 1959	10.07	260
1960	Apr. 4, 1960	7.18	60
1961	July 1, 1961	6.72	38
1962	July 2, 1962	7.25	63
1963	---	d	<2
1964	Sept. 7, 1964	7.42	70
1965	Apr. 6, 1965	b10.08	172
1966	Feb. 9, 1966	b7.82	66
1967	June 19, 1967	6.47	23
1968	Apr. 3, 1968	6.22	9.2
1969	June 29, 1969	11.08	382
1970	June 16, 1970	6.15	6.6
1971	Mar. 27, 1971	6.54	28
1972	May 1, 1972	6.59	31
1973	Mar. 6, 1973	b7.48	24
1974	---	d	<3
1975	Apr. 28, 1975	6.27	12
1976	Mar. 12, 1976	b7.88	47
1977	Mar. 11, 1977	b8.82	122
1978	Mar. 19, 1978	d	e1
1979	Aug. 9, 1979	8.01	104
1980	June 5, 1980	7.44	71

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.
e Estimated.

BIG SIOUX RIVER BASIN

06483000 Rock River at Luverne, MN

Location.—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.

Drainage area.—425 mi^2.

Records available.—August 1911 to December 1914, 1969, September 1971 to present. Continuous records available. August 1911 to December 1914.

Gage.—Crest-stage gage at downstream side of bridge. Datum of gage is 1,426.26 ft, National Geodetic Vertical Datum of 1929. Prior to December 1914, non-recording gage at different site and datum.

Annual maximum data.—

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1912	Oct. 7, 1911	7.1	2,000
1913	May 22, 1913	4.4	434
1914	June 13, 1914	13.20	11,600
1969	Apr. 1969	13.13	19,500
1972	Mar. 15, 1972	9.23	3,000
1973	---	d	<1,800
1974	Mar. 4, 1974	b7.20	595
1975	Apr. 14, 1975	6.20	1,750
1976	Mar. 12, 1976	b5.51	980
1977	Mar. 12, 1977	b7.69	2,550
1978	Mar. 21, 1978	b9.78	4,900
1979	Apr. 15, 1979	8.30	4,760
1980	Nov. 3, 1979	8.00	4,220

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

BIG SIOUX RIVER BASIN

06483050 Rock River tributary near Luverne, MN

(Site No. 28)

Location.--Lat 43°34'15", long 96°12'45", in NE¼NE¼ sec.10, T.101 N., R.45 W., Rock County, Hydrologic Unit 10170204, at culvert on U.S. Highway 75, 5.8 miles south of Luverne.

Drainage area.—0.21 mi^2.

Records available.—October 1958 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.—11.88 ft, upstream; 11.38 ft, downstream.

Bankfull stage.—14 ft.

Basin characteristics.—Main-channel length, 0.49 miles; main-channel slope, 100 ft per mile; mean basin altitude, 1,452 ft; forest area, 0 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	15.19	180
1960	July 17, 1960	14.24	107
1961	Mar. 14, 1961	b13.50	11
1962	July 2, 1962	14.82	152
1963	July 27, 1963	12.93	3.8
1964	July 11, 1964	13.23	22
1965	Apr. 6, 1965	b15.78	163
1966	Feb. 9, 1966	b13.68	18
1967	June 19, 1967	13.38	36
1968	---	d	<3
1969	Apr. 6, 1969	13.3	28
1970	May 28, 1970	13.24	23
1971	June 7, 1971	14.76	146
1972	Mar. 11, 1972	b14.50	19

< Less than.
b Backwater from ice.
d Peak stage did not reach bottom of gage.

BIG SIOUX RIVER BASIN

06483200 Kanaranzi Creek tributary near Lismore, MN

(Site No. 27)

Location.--Lat 43°45'41", long 95°55'56", in SW¼SW¼ sec.31, T.104 N., R.42 W., Nobles County, Hydrologic Unit 10170204, at culvert on county highway adjacent to State Highway 91, 60 ft above mouth and 1.2 miles northeast of Lismore.

Drainage area.--0.14 mi^2.

Records available.--October 1958 to present.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--16.22 ft, upstream; 15.77 ft, downstream.

Bankfull stage.--18 ft.

Basin characteristics.--Main-channel length, 0.62 miles; main-channel slope, 66.0 ft per mile; mean basin altitude, 1,666 ft; forest area, 3 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	19.44	174
1960	May 16, 1960	17.84	62
1961	June 26, 1961	19.61	184
1962	Apr. 13, 1962	b18.52	72
1963	June 9, 1963	20.92	240
1964	July 2, 1964	17.59	49
1965	June 22, 1965	19.55	180
1966	Feb. 9, 1966	b18.23	56
1967	June 15, 1967	18.85	128
1968	July 30, 1968	17.46	42
1969	June 29, 1969	21.32	256
1970	June 16, 1970	17.53	46
1971	Mar. 27, 1971	b19.76	123
1972	July 12, 1972	18.35	93
1973	Sept.29, 1973	17.19	29
1974	Apr. 3, 1974	17.17	28
1975	Apr. 9, 1975	b18.46	42
1976	Mar. 12, 1976	b18.25	57
1977	Sept.30, 1977	18.19	83
1978	July 6, 1978	19.47	178
1979	Aug. 9, 1979	c18.81	112
1980	May 30, 1980	21.76	273

b Backwater from ice.
c Affected by shifting control.

BIG SIOUX RIVER BASIN

06483210 Kanaranzi Creek tributary No. 2 near Wilmont, MN

(Site No. 172)

Location.--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 above mouth.

Drainage area.—2.14 mi^2.

Records available.--October 1965 to present.

Gage.—Crest-stage gage upstream from culvert.

Culvert invert elevations.—2.60 ft, upstream; 2.35 ft, downstream.

Bankfull stage.—6 ft.

Basin characteristics.—Main-channel length, 3.42 miles; main-channel slope, 37.4 ft per mile; mean basin altitude, 1,693 ft; forest area, 0 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1966	Aug. 14, 1966	4.89	70
1967	Apr. 2, 1967	5.49	112
1968	July 30, 1968	a4.01	1.4
1969	June 29, 1969	12.03	1,230
1970	Apr. 5, 1970	5.82	135
1971	June 7, 1971	7.39	283
1972	May 1, 1972	4.74	133
1973	Mar. 14, 1973	b4.89	79
1974	Apr. 3, 1974	4.19	20
1975	Apr. 9, 1975	b6.79	46
1976	Mar. 12, 1976	b6.59	104
1977	Sept.30, 1977	5.64	142
1978	Mar. 21, 1978	b6.80	145
1979	Apr. 12, 1979	6.49	197
1980	May 30, 1980	9.16	430

a Backwater from debris.
b Backwater from ice.

LITTLE SIOUX RIVER BASIN

06603520 Judicial ditch 28 tributary near Spafford, MN

(Site No. 25)

Location.--Lat 43°36'58", long 95°22'58", in NW¼NE¼ sec.27, T.102 N., R.38 W., Jackson County, Hydrologic Unit 10230003, at culvert on U.S. Highway 16, 0.4 mile west of Spafford, and 0.6 mile above mouth.

Drainage area.--2.66 mi^2.

Records available.--October 1958 to September 1972.

Gage.--Crest-stage gage upstream from culvert.

Culvert invert elevations.--4.85 ft, upstream; 5.12 ft, downstream.

Bankfull stage.--6 ft.

Basin characteristics.--Main-channel length, 2.77 miles; main-channel slope, 14.5 ft per mile; mean basin altitude, 1,491 ft; forest area, 0 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1959	May 30, 1959	8.31	149
1960	Apr. 13, 1960	7.55	90
1961	Mar. 27, 1961	b7.28	39
1962	Apr. 5, 1962	b7.25	50
1963	July 24, 1963	6.32	14
1964	May 6, 1964	6.26	10
1965	Apr. 6, 1965	b8.27	128
1966	Mar. 14, 1966	b7.52	25
1967	June 15, 1967	6.93	42
1968	June 24, 1968	6.43	16
1969	June 29, 1969	11.58	400
1970	Aug. 7, 1970	6.95	21
1971	Mar. 14, 1971	8.81	80
1972	Mar. 11, 1972	b7.29	40

b Backwater from ice.

LITTLE SIOUX RIVER BASIN

06603530 Little Sioux River near Spafford, MN

(Site No. 148)

Location.--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 below Jackson County ditch No. 11, and 5.8 miles east of Spafford.

Drainage area.—41.1 mi^2.

Records available.--October 1961 to present.

Gage.--Crest-stage gage at downstream side of bridge.

Basin characteristics.--Main-channel length, 11.7 miles; main-channel slope, 6.39 ft per mile; mean basin altitude, 1,435 ft; forest area, 1 percent; area of lakes and swamps, 0 percent.

Annual maximum data.--

Water year	Date	Gage height (ft)	Discharge (ft^3/s)
1962	Apr. 6, 1962	b9.23	595
1963	July 18, 1963	7.66	118
1964	May 23, 1964	6.80	65
1965	Apr. 6, 1965	b11.08	2,700
1966	Mar. 14, 1966	b8.33	136
1967	June 15, 1967	8.52	310
1968	Apr. 23, 1968	5.92	32
1969	June 29, 1969	12.06	4,500
1970	Apr. 5, 1970	b7.70	70
1971	Mar. 27, 1971	b9.18	380
1972	Mar. 11, 1972	b8.80	134
1973	Mar. 14, 1973	b7.65	82
1974	Mar. 3, 1974	b7.65	58
1975	June 22, 1975	8.66	370
1976	Mar. 20, 1976	b8.31	135
1977	Sept.30, 1977	7.97	153
1978	Mar. 21, 1978	b8.64	139
1979	Aug. 9, 1979	9.20	740
1980	Oct. 31, 1979	8.80	445

b Backwater from ice.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1982-566-450/29